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# ASSESSMENT 2020

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# WEST AFRICA COASTAL AREAS

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## DETAILED MASTER PLAN

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COASTAL  
AREAS**

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# Tables of contents

|                                               |     |
|-----------------------------------------------|-----|
| <b>INTRODUCTION</b>                           | 7   |
| <b>SUMMARY TABLE OF SECTORS</b>               | 10  |
| <b>MAURITANIA</b>                             | 17  |
| Nouadhibou Peninsula and «Lévrier» Bay        | 19  |
| Banc d'Arguin - North Nouakchott              | 25  |
| Nouakchott                                    | 33  |
| Mauritania, South and Senegal River delta     | 39  |
| <b>SENEGAL (NORTH)</b>                        | 47  |
| Saint-Louis – Gandiolais – Grande cote        | 49  |
| Dakar                                         | 59  |
| Petite cote                                   | 66  |
| Sine Saloum                                   | 76  |
| <b>SENEGAL (SOUTH)</b>                        | 87  |
| Maritime Casamance                            | 88  |
| <b>THE GAMBIA</b>                             | 101 |
| <b>GUINEA-BISSAU</b>                          | 111 |
| <b>GUINEA</b>                                 | 127 |
| Cape Verga – Tristao North Zone               | 129 |
| Central Zone Mangroves                        | 139 |
| Conakry Urban and Peri-Urban Zone             | 144 |
| South Guinea Rice Growing Islands             | 151 |
| <b>SIERRA LEONE</b>                           | 157 |
| Northern Sierra Leone                         | 160 |
| Urban and peri-urban Freetown                 | 164 |
| Sierra Leone South Center                     | 176 |
| Sherbro Area – Liberia                        | 178 |
| <b>LIBERIA</b>                                | 187 |
| Sierra Leone – Robertsport – Monrovia         | 190 |
| Area under the influence of Monrovia          | 195 |
| Dolota – Buchanan                             | 204 |
| Buchanan – Rivercess – Greenville – Granceess | 207 |
| Granceess – Cape Palmas                       | 214 |





|                                                                |     |
|----------------------------------------------------------------|-----|
| <b>CÔTE D'IVOIRE</b>                                           | 219 |
| Liberia Border – San Pedro                                     | 221 |
| Eastern San Pedro – Sassandra – Fresco                         | 233 |
| Fresco – Assagny                                               | 240 |
| Rural Area Assagny – Jacqueville – Abidjan West                | 247 |
| Abidjan – Port Bouet                                           | 251 |
| Eastern Peri-Urban Area Abidjan Grand-Bassam                   | 257 |
| Sandy Terrace and Coconut Grove of Eastern Côte d'Ivoire       | 263 |
| <b>GHANA</b>                                                   | 271 |
| Sandy terrace and coconut grove of Western Ghana-Côte d'Ivoire | 274 |
| Cape Three Points                                              | 277 |
| Urban sector and peri-urban extension of Sekondi – Takoradi    | 280 |
| Shama – Elmina Hinterland                                      | 286 |
| Urban areas and extensions Elmina – Cape Coast – Saltpond      | 287 |
| Rural hinterland of Urban Areas of Cape Coast and Accra        | 294 |
| Accra West Urban Area                                          | 299 |
| Accra, East Urban And Outskirts Area                           | 301 |
| Volta Delta Right Bank Ningo – Adafoah                         | 308 |
| Cape Three Points                                              | 315 |
| <b>TOGO</b>                                                    | 321 |
| <b>BENIN</b>                                                   | 337 |
| West Zone                                                      | 339 |
| Central West Zone                                              | 345 |
| Central East Zone                                              | 348 |
| East Zone                                                      | 353 |
| <b>SÃO TOMÉ &amp; PRÍNCIPE</b>                                 | 357 |
| Island of Príncipe                                             | 359 |
| São Tomé Island – North and Eastern Zone                       | 362 |
| São tomé island south and south-west zone                      | 369 |





# Introduction

The initial version of the Master plan for the West Africa Coastal Areas (SDLAO) had been published and validated in 2011. The rapid development of the occupation of coastlines, observed as of 2011, implied, on the one hand, the setting up of a regional observation mechanism, and, on the other hand, the planning of an updating of this Master Plan.

One year after the validation of the SDLAO, the West African Coast Observation Mission (MOLOA) was established, including regional coordination and national antennas in each of the eleven countries involved in the initiative. All the monitoring work implemented within the framework of this system is delivered here through two documents: an update of the General Master Plan, and an update of the detailed Master Plan accompanied by an updated mapping of the SDLAO at the scale of 1/500,000th.

The purpose of this document is to give strategic orientations in a prospective way in order to define the articulation of the main objectives and to give visibility on the ambitions of the territories.

is intended for land managers, decision-makers and donors, and should enable:

- To apprehend the major problems of the sectors and/or zones in sight,
- To identify the necessary human, material, technical and economic resources,
- And to define the priorities of the different themes / sectors.

These elements should make it possible to define a realistic program of actions, taking into account the economy of the territories, access to technologies and the availability of actors.

The initial status and subsequent updates are carried out by the administrations of each country under the coordination of the Ministries in charge of the Environment of the coastal countries of West Africa and by the Ecological Monitoring Center. This work is therefore carried out thanks to the cross-examination of the actors who are familiar with the territory from an environmental point of view, the occupation/use of the land, land planning and in particular with regard to the evolution of the coastline due to human occupation in large areas of these coasts and the effects of climate change.

Indicators, whether quantitative or qualitative, form the basis for expert opinion. The actors and/or structures associated with the 2020 update are specified in the preamble of each Detailed Master Plan.

The detailed Master Plan results in:

- Cartographic representations that highlight the indicators according to simple analysis axes (geographical area or central problem [environment, port infrastructure...]);
- Detailed tables by sector;
- A global representation through a synthetic table indicating by sector all the variables to be considered for the establishment of the action plan.

The detailed Master Plan is a textual and cartographic document, approached differently between the initial version produced in 2011 and the first update in 2016. Indeed, the detailed Master Plan for 2011 is, for the textual part, of a journalistic editorial style. The update carried out in 2016 summarizes (summary table by country and summary tables by sector) the major descriptors of the sector studied, the changes observed since 2011 and the criticality indicators.

In order to feed these tables, a large amount of data is collected, analyzed and combined to establish indicators and conclusions. This work is carried out by local actors under the coordination of the CSE.

The main fields covered are described below:



- **Diagnostic:** Reminder of the main elements of the inventory carried out in 2011.
- Coastal and/or estuarine **Dynamics:** Reminder in a few words of the coastal and/or estuarine dynamics, its study, its evolution.
- **Stakes:** Identification of the main stakes in the sector.
  - ✓ Social stakes (population density, employment/unemployment, etc.).
  - ✓ Economic stakes (housing, tourism, commercial and industrial facilities, hotel facilities, port facilities, oil and gas exploration...).
  - ✓ Environmental stakes (outstanding natural areas by their biodiversity or their landscape, whether or not they have protected status, reproduction sites, egg-laying sites, nurseries, etc.).
- **Current projects:** Brief description of projects, projected infrastructure on the territory, projects and operations of financing banks to support strategies to reduce the effects of coastal erosion, marine submersion and the preservation of biodiversity, particularly with regard to the effects of climate change.
- **Outstanding natural areas:** Identification of outstanding natural areas in the sector (protected areas in the sense of the IUCN, outstanding areas not categorized in the sense of the IUCN, but with an international protection designation, outstanding areas in the process of being categorized, other areas of interest, etc.).
- **Hazards:** Identification of the main hazards of the sector (erosion, submersion, pollution, algal proliferation,...).
- **Recommendations:** Definition of the recommendations identified in the SDLAO. These are defined by the task Force and are not necessarily underpinned by scientific expertise and/or studies carried out on the territory.

All these data make it possible to assess the criticality of the sector from which the nature of the monitoring that should be put in place is derived.

#### ■ Criticality

Criticality is the combination of the severity of an effect, the frequency of its occurrence, its duration... or other attributes of a failure, such as the expression of the need to implement avoidance and/or reduction measures. In this case, it mainly concerns coastal risks (coastal erosion, exceptional meteorological-oceanographic events) having an impact on people and property. It can also be higher for the «environment» compartment and have a significant impact on biodiversity, ecosystem services...

The scale of criticality adopted here has four levels:

- Low: No action is required in the current situation.
- Medium: Consideration of the recommendations in the projects and Development Plans that may concern the sector in question. No prescribed action is to be taken in the near future..
- High: Consideration of the recommendations of the Master Plan in all planning or development operations undertaken on a local scale.  
  
Assessment of the effects and impacts of operations and changes that would occur in adjacent areas.
- Very high: Implementation of actions as soon as possible, since the situations observed are already critical or tend to become so in the near future.

Criticality is evaluated collegially during workshops (videoconference in 2020) that bring together, at a *minimum*, the Ministry of the Environment and CSE. This one is defined by experts of the territories.



- **Monitoring:** Qualification of the need for spatio-temporal monitoring of the sector based on that of the selected issues. Here again, 4 levels are to be considered:

No recommendations: monitoring action is to be taken in the current situation.

Watch-keeping: Necessity to monitor the spatio-temporal evolution of the hazards and stakes of the sector, but also of the territorial dynamics. The aim of this monitoring is the early identification of changes that could generate risks that could threaten the territory and consequently their inclusion in local planning documents, the execution of studies necessary for the understanding of the phenomenon and the definition of risk avoidance or reduction measures.

Regular and light monitoring: Necessity to make a regular and light monitoring of the spatio-temporal evolution of the hazards and stakes of the sector, but also of the territorial dynamics. Areas for which regular and light monitoring has been deemed necessary should be placed under the responsibility of an identified team.

Regular and intensive monitoring: Necessity to make a regular and intensive monitoring of the spatio-temporal evolution of the hazards and stakes of the sector, but also of the territorial dynamics. This monitoring can take the form of regular topometric measurements of the coastline, as conducted by university teams in the framework of case studies, characterizing the baseline. In these sectors, the comparison of the results obtained with baselines must be carried out at regular intervals by a team in charge of monitoring. .

Monitoring is carried out within each territory by the national institutions in charge of coastal management and ORLOA at regional level. The same applies to the structures in charge of implementing the action program.

As mentioned above, the Detailed Master Plan aims to characterize a territory and highlight its major issues, taking into account in particular the impact of climate change on the coastline. At this stage, the country identifies the need to implement actions, but does not define them or place them in time. This work of definition and prioritization is an internal work for each territory which could be facilitated by the adhesion of the territories to the Regional Observatory of the West African Coast (ORLOA). To date, it is up to each territory, with the support of its dedicated structures and experts, to define it after analyzing the elements presented in the report on the scale of a territory or a problem and with regard to the material, human and economic resources available.



# Summary Table of Sectors

## Mauritania

| N°                                           | REF   | NAME                                  | HABITAT                                                                             | STAKES  |                 | HAZARDS                                                                             | CRITICALITY |           |           | MONITORING            |                       |                       |
|----------------------------------------------|-------|---------------------------------------|-------------------------------------------------------------------------------------|---------|-----------------|-------------------------------------------------------------------------------------|-------------|-----------|-----------|-----------------------|-----------------------|-----------------------|
|                                              |       |                                       |                                                                                     |         |                 |                                                                                     | 2011        | 2016      | 2020      | 2011                  | 2016                  | 2020                  |
| MR1 NOUADHIBOU AND BAIE DU LÉVRIER PENINSULA |       |                                       |                                                                                     |         |                 |                                                                                     |             |           |           |                       |                       |                       |
| 1                                            | MR1-a | Cap Blanc                             |    | Fishing | Biodiversity    |    | Low         | Medium    | High      | No monitoring         | Watch-keeping         | Regular and light     |
| 2                                            | MR1-b | Cansado Spit and Bay                  |    | Trade   | Oil & Gas       |    | Low         | Medium    | High      | Watch-keeping         | Regular and light     | Regular and light     |
| 3                                            | MR1-c | Urban coastline and Nouadhibou port   |    | Fishing | Trade           |    | Medium      | Medium    | High      | Regular and light     | Regular and light     | Regular and light     |
| 4                                            | MR1-d | Nouadhibou North and Baie de l'Étoile |    |         | Biodiversity    |    | Medium      | Medium    | High      | Regular and intensive | Regular and intensive | Regular and intensive |
| 5                                            | MR1-e | Baie du Lévrier                       |    |         | Biodiversity    |    | Medium      | Medium    | High      | Regular and intensive | Regular and intensive | Regular and intensive |
| MR2 BANC D'ARGUIN – NORTH NOUAKCHOTT         |       |                                       |                                                                                     |         |                 |                                                                                     |             |           |           |                       |                       |                       |
| 6                                            | MR2-a | Banc d'Arguin (PNBA)                  |    | Fishing | Tourism         |    | Low         | Medium    | Medium    | Regular and light     | Regular and light     | Regular and light     |
| 7                                            | MR2-b | Mamghar – Majhrat                     |    | Fishing | Tourism         |    | Low         | Medium    | Medium    | No monitoring         | Regular and light     | Regular and light     |
| 8                                            | MR2-c | Tanit – Sebkhra N'Dramcha             |    | Fishing | Extractive Ind. |    | Low         | Medium    | Medium    | Watch-keeping         | Regular and light     | Regular and intensive |
| 9                                            | MR2-d | Djreidrat                             |    | Fishing | Tourism         |    | Low         | Medium    | Medium    | Watch-keeping         | Regular and light     | Regular and light     |
| MR3 NOUAKCHOTT                               |       |                                       |                                                                                     |         |                 |                                                                                     |             |           |           |                       |                       |                       |
| 10                                           | MR3-a | North Nouakchott                      |    | Fishing | Tourism         |    | High        | High      | High      | Regular and light     | Regular and intensive | Regular and intensive |
| 11                                           | MR3-b | South Nouakchott                      |    | Fishing | Extractive Ind. |    | Very High   | Very High | Very High | Regular and intensive | Regular and intensive | Regular and intensive |
| MR4 SOUTH MAURITANIA & RIVER SENEGAL DELTA   |       |                                       |                                                                                     |         |                 |                                                                                     |             |           |           |                       |                       |                       |
| 12                                           | MR4-a | PK 28 - South Tiguent                 |  | Fishing | Extractive Ind. |  | Medium      | Medium    | High      | Regular and light     | Regular and light     | Regular and light     |
| 13                                           | MR4-b | SouthTiguent - Chott Boul             |  | Fishing | Extractive Ind. |  | Low         | Medium    | High      | Watch-keeping         | Regular and light     | Regular and light     |
| 14                                           | MR4-c | Chott Boul - Ghara (RBTDs)            |  | Trade   | Extractive Ind. |  | Low         | Medium    | Medium    | Regular and light     | Regular and light     | Regular and intensive |
| 15                                           | MR4-d | Ndiago                                |  | Fishing | Oil & Gas       |  | Low         | Medium    | High      | Regular and light     | Regular and light     | Regular and intensive |

## Senegal

| N°                                         | REF   | NAME                                                 | HABITAT | STAKES           |                 |                 |              | HAZARDS   | CRITICALITY |           |           | MONITORING |           |                       |                       |                       |                       |                       |                       |
|--------------------------------------------|-------|------------------------------------------------------|---------|------------------|-----------------|-----------------|--------------|-----------|-------------|-----------|-----------|------------|-----------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                                            |       |                                                      |         |                  |                 |                 |              |           | 2011        | 2016      | 2020      | 2011       | 2016      | 2020                  |                       |                       |                       |                       |                       |
| SN1 SAINT-LOUIS - GANDIOLAIS - GRANDE COTE |       |                                                      |         |                  |                 |                 |              |           |             |           |           |            |           |                       |                       |                       |                       |                       |                       |
| 16                                         | SN1-a | Urban, peri-urban and heritage sector of Saint-Louis |         | Fishing          | Oil & Gas       | Tourism         | Biodiversity |           | Very High   | →         | Very High | →          | Very High | Regular and intensive | →                     | Regular and intensive | →                     | Regular and intensive |                       |
| 17                                         | SN1-b | South Saint-Louis - Lanque de Barbarie insularized   |         | Market-Gardening |                 | Tourism         | Biodiversity |           | High        | ↗         | Very High | →          | Very High | Regular and intensive | →                     | Regular and intensive | →                     | Regular and intensive |                       |
| 18                                         | SN1-c | Grande Côte - Nyayes                                 |         | Market-Gardening | Extractive Ind. | (Tourism)       | Biodiversity |           | Low         | ↗         | Medium    | →          | Medium    | Watch-keeping         | ↗                     | Regular and light     | ↘                     | Watch-keeping         |                       |
| 19                                         | SN1-d | Kayar - Guedjewaie                                   |         | Market-Gardening | Fishing         |                 | Biodiversity |           | High        | ↗         | Very High | →          | Very High | Watch-keeping         | ↗                     | Regular and intensive | →                     | Regular and intensive |                       |
| SN2 DAKAR                                  |       |                                                      |         |                  |                 |                 |              |           |             |           |           |            |           |                       |                       |                       |                       |                       |                       |
| 20                                         | SN2-a | Dakar dune coastline North Camberene - Yoff          |         | Fishing          | Extractive Ind. |                 |              |           | High        | →         | High      | →          | High      | Regular and intensive | →                     | Regular and intensive | →                     | Regular and intensive |                       |
| 21                                         | SN2-b | Dakar rocky coastline West Yoff - Cap Manuel         |         | Fishing          | Extractive Ind. | Tourism         | Biodiversity |           | High        | ↗         | Very High | ↘          | High      | Regular and intensive | →                     | Regular and intensive | →                     | Regular and intensive |                       |
| 22                                         | SN2-c | Bay of Hann - Rufisque                               |         | Fishing          | Trade           | Extractive Ind. | Tourism      | Oil & Gas |             | Very High | →         | Very High  | ↘         | High                  | Regular and intensive | →                     | Regular and intensive | →                     | Regular and intensive |
| SN3 PETITE COTE                            |       |                                                      |         |                  |                 |                 |              |           |             |           |           |            |           |                       |                       |                       |                       |                       |                       |
| 23                                         | SN3-a | Bargny - Kene - Ndiogom                              |         | Fishing          | Trade           | Extractive Ind. | (Tourism)    |           | High        | ↗         | Very High | →          | Very High | Regular and light     | ↗                     | Regular and intensive | →                     | Regular and intensive |                       |
| 24                                         | SN3-b | Popenguine                                           |         | Fishing          |                 | Tourism         | Biodiversity |           | High        | →         | High      | →          | High      | Regular and light     | ↗                     | Regular and intensive | →                     | Regular and intensive |                       |
| 25                                         | SN3-c | Saly - Portudal - Somone                             |         | Fishing          |                 | Tourism         | Biodiversity |           | Very High   | →         | Very High | →          | Very High | Regular and intensive | →                     | Regular and intensive | →                     | Regular and intensive |                       |
| 26                                         | SN3-d | Urban sector of Mbour                                |         | Fishing          |                 | Tourism         |              |           | Very High   | →         | Very High | →          | Very High | Regular and intensive | →                     | Regular and intensive | →                     | Regular and intensive |                       |
| 27                                         | SN3-e | Mbour - Pointe Sarène                                |         | Fishing          |                 | Tourism         |              |           | High        | ↗         | Very High | →          | Very High | Regular and intensive | →                     | Regular and intensive | →                     | Regular and intensive |                       |
| 28                                         | SN3-f | North Joal - Mbodiène Plage                          |         | Fishing          |                 | Tourism         | Biodiversity |           | Medium      | →         | Medium    | ↗          | High      | Watch-keeping         | ↗                     | Regular and light     | →                     | Regular and light     |                       |
| 29                                         | SN3-g | Joal                                                 |         | Fishing          |                 | Tourism         | Biodiversity |           | High        | →         | High      | →          | High      | Regular and light     | →                     | Regular and light     | →                     | Regular and light     |                       |
| SN4 SINE SALOUM                            |       |                                                      |         |                  |                 |                 |              |           |             |           |           |            |           |                       |                       |                       |                       |                       |                       |
| 30                                         | SN4-a | Fadiouth Peninsula and Island                        |         | Fishing          |                 | Tourism         | Biodiversity |           | High        | →         | High      | →          | High      | Regular and intensive | →                     | Regular and intensive | →                     | Regular and intensive |                       |
| 31                                         | SN4-b | South Fadiouth                                       |         | Fishing          |                 | Tourism         | Biodiversity |           | Medium      | →         | Medium    | ↗          | High      | Regular and intensive | →                     | Regular and intensive | →                     | Regular and intensive |                       |
| 32                                         | SN4-c | Palmarin - Falcao - Ngalou Peninsula                 |         | Fishing          | Extractive Ind. | Tourism         | Biodiversity |           | Medium      | →         | Medium    | ↗          | High      | Regular and intensive | →                     | Regular and intensive | →                     | Regular and intensive |                       |
| 33                                         | SN4-d | Djiffer - Palmarin Peninsula                         |         | Fishing          | Oil & Gas       | Tourism         | Biodiversity |           | Very High   | →         | Very High | →          | Very High | Regular and intensive | →                     | Regular and intensive | →                     | Regular and intensive |                       |
| 34                                         | SN4-e | Siné Saloum South                                    |         | Fishing          |                 | Tourism         | Biodiversity |           | High        | ↗         | Very High | →          | Very High | Regular and light     | ↗                     | Regular and intensive | →                     | Regular and intensive |                       |



## Gambia

| N°             | REF   | NAME                                                | HABITAT | STAKES        |                               |  | HAZARDS   | CRITICALITY |           |      | MONITORING |                       |      |                       |   |                       |
|----------------|-------|-----------------------------------------------------|---------|---------------|-------------------------------|--|-----------|-------------|-----------|------|------------|-----------------------|------|-----------------------|---|-----------------------|
|                |       |                                                     |         |               |                               |  |           | 2011        | 2016      | 2020 | 2011       | 2016                  | 2020 |                       |   |                       |
| GM1 THE GAMBIA |       |                                                     |         |               |                               |  |           |             |           |      |            |                       |      |                       |   |                       |
| 35             | GM1-a | Essau - Barra and right shore of the Gambia estuary |         | Fishing       | (Tourism) Biodiversity        |  | Low       | ↗           | Medium    | →    | Medium     | Watch-keeping         | ↗    | Regular and light     | → | Regular and light     |
| 36             | GM1-b | Banjul center                                       |         | Fishing Trade | Tourism Biodiversity          |  | Very High | →           | Very High | →    | Very High  | Regular and intensive | →    | Regular and intensive | → | Regular and intensive |
| 37             | GM1-c | Banjul - Kololi Point                               |         | Fishing       | Tourism                       |  | High      | ↗           | Very High | →    | Very High  | Regular and light     | ↗    | Regular and intensive | → | Regular and intensive |
| 38             | GM1-d | Kololi Point - Bald Cape                            |         |               | Tourism Biodiversity          |  | High      | →           | High      | ↗    | Very High  | Regular and intensive | →    | Regular and intensive | → | Regular and intensive |
| 39             | GM1-e | Bald Cape - Sanyang                                 |         | Fishing       | Tourism Biodiversity          |  | Low       | ↗           | Medium    | →    | Medium     | Watch-keeping         | ↗    | Regular and light     | → | Regular and light     |
| 40             | GM1-f | Gunjur to Kartong                                   |         | Fishing       | Extractive Ind.s Biodiversity |  | Low       | ↗           | Medium    | ↗    | High       | Watch-keeping         | ↗    | Regular and light     | → | Regular and light     |

## Guinea-Bissau

| N°                | REF   | NAME                                 | HABITAT                                                                           | STAKES       |              |                 |         | HAZARDS      | CRITICALITY                                                                       |           |      | MONITORING |      |           |                       |   |                       |   |                       |
|-------------------|-------|--------------------------------------|-----------------------------------------------------------------------------------|--------------|--------------|-----------------|---------|--------------|-----------------------------------------------------------------------------------|-----------|------|------------|------|-----------|-----------------------|---|-----------------------|---|-----------------------|
|                   |       |                                      |                                                                                   |              |              |                 |         |              | 2011                                                                              | 2016      | 2020 | 2011       | 2016 | 2020      |                       |   |                       |   |                       |
| GW1 GUINEA-BISSAU |       |                                      |                                                                                   |              |              |                 |         |              |                                                                                   |           |      |            |      |           |                       |   |                       |   |                       |
| 46                | GW1-a | North - Cap Varela maritime sector   |  | Rice-growing | Fishing      | Extractive Ind. | Tourism | Biodiversity |  | High      | →    | High       | →    | High      | Regular and light     | → | Regular and light     | → | Regular and light     |
| 47                | GW1-b | Central Maritime Sector              |  | Rice-growing | Cashew trees |                 |         | Biodiversity |  | Low       | ↗    | High       | →    | High      | No monitoring         | ↗ | Watch-keeping         | ↗ | Regular and light     |
| 48                | GW1-c | Bissau - Urban zone                  |  | Fishing      |              |                 |         |              |  | High      | →    | High       | →    | High      | Regular and light     | → | Regular and light     | → | Regular and light     |
| 49                | GW1-d | Guinea-Bissau South - Tite – Tombali |  | Rice-growing |              |                 |         | Biodiversity |  | Low       | →    | Low        | ↗    | High      | No monitoring         | ↗ | Watch-keeping         | ↗ | Regular and light     |
| 50                | GW1-e | Bijagos islands                      |  |              |              | Oil & Gas       | Tourism | Biodiversity |  | High      | →    | High       | →    | High      | Regular and light     | → | Regular and light     | → | Regular and light     |
| 51                | GW1-f | South Caciné                         |  | Rice-growing |              |                 |         |              |  | Very High | →    | Very High  | →    | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |

## Guinea

| N°                                    | REF   | NAME                                          | HABITAT                                                                             | STAKES       |                 |                                              | HAZARDS                                                                             | CRITICALITY |                                                                                     |                                                                                     | MONITORING                                                                           |                                                                                      |                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                       |
|---------------------------------------|-------|-----------------------------------------------|-------------------------------------------------------------------------------------|--------------|-----------------|----------------------------------------------|-------------------------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------|
|                                       |       |                                               |                                                                                     |              |                 |                                              |                                                                                     | 2011        | 2016                                                                                | 2020                                                                                | 2011                                                                                 | 2016                                                                                 | 2020                  |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                       |
| GN1 CAP VERGA – TRISTAO NORTH ZONE    |       |                                               |                                                                                     |              |                 |                                              |                                                                                     |             |                                                                                     |                                                                                     |                                                                                      |                                                                                      |                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                       |
| 52                                    | GN1-a | Far North West mangrove islands and Tristao   |  | Trade        |                 | Biodiversity                                 |  | Low         |  | Medium                                                                              |  | High                                                                                 | No monitoring         |  | Watch-keeping                                                                         |  | Regular and intensive                                                                 |                       |
| 53                                    | GN1-b | Rio Nuñez - Kamsar                            |  | Fishing      | Trade           | Biodiversity                                 |  | Medium      |  | Medium                                                                              |  | Medium                                                                               | Regular and light     |  | Regular and light                                                                     |  | Regular and light                                                                     |                       |
| 54                                    | GN1-c | Kapatchez coastal plain                       |  | Rice-growing | Trade           | Biodiversity                                 |  | Medium      |  | High                                                                                |  | High                                                                                 | Regular and light     |  | Regular and intensive                                                                 |  | Regular and intensive                                                                 |                       |
| 55                                    | GN1-d | Cap Verga                                     |  | Fishing      | Trade           | Extractive Ind. (Tourism)                    |  | Medium      |  | Medium                                                                              |  | Medium                                                                               | Watch-keeping         |  | Watch-keeping                                                                         |  | Regular and light                                                                     |                       |
| GN2 CENTRAL ZONE MANGROVES            |       |                                               |                                                                                     |              |                 |                                              |                                                                                     |             |                                                                                     |                                                                                     |                                                                                      |                                                                                      |                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                       |
| 56                                    | GN2-a | Boffa mangrove islands                        |  | Trade        | Extractive Ind. | Biodiversity                                 |  | Low         |  | Medium                                                                              |  | Very High                                                                            | No monitoring         |  | Regular and light                                                                     |  | Regular and intensive                                                                 |                       |
| 57                                    | GN2-b | Koba peninsula                                |  | Fishing      | Rice-growing    | Biodiversity                                 |  | High        |  | Very High                                                                           |  | Very High                                                                            | Regular and intensive |  | Regular and intensive                                                                 |  | Regular and intensive                                                                 |                       |
| 58                                    | GN2-c | Delta estuary of Konkouré                     |  | Fishing      |                 | Hydro-electricity<br>Tourism<br>Biodiversity |  | Accrétion   | Low                                                                                 |  | Medium                                                                               |  | High                  | No monitoring                                                                         |  | Regular and light                                                                     |  | Regular and intensive |
| GN3 CONAKRY URBAN AND PERI-URBAN ZONE |       |                                               |                                                                                     |              |                 |                                              |                                                                                     |             |                                                                                     |                                                                                     |                                                                                      |                                                                                      |                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                       |
| 59                                    | GN3-a | Conakry - Dubreka mangroves and rice fields   |  | Fishing      |                 |                                              |  |             | Medium                                                                              |  | High                                                                                 |  | High                  | Regular and light                                                                     |  | Regular and light                                                                     |  | Regular and intensive |
| 60                                    | GN3-b | Conakry - Coyah mangroves and peri-urban edge |  | Fishing      | Trade           |                                              |  |             | High                                                                                |  | Very High                                                                            |  | Very High             | Regular and intensive                                                                 |  | Regular and intensive                                                                 |  | Regular and intensive |
| 61                                    | GN3-c | Loos islands                                  |  | Fishing      |                 | Tourism<br>Biodiversity                      |  |             | Low                                                                                 |  | Medium                                                                               |  | Medium                | Watch-keeping                                                                         |  | Regular and light                                                                     |  | Regular and light     |
| GN4 SOUTH GUINEA RICE GROWING ISLANDS |       |                                               |                                                                                     |              |                 |                                              |                                                                                     |             |                                                                                     |                                                                                     |                                                                                      |                                                                                      |                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                       |
| 62                                    | GN4-a | Kakossa                                       |  | Fishing      | Rice-growing    | Trade+                                       |  |             | Medium                                                                              |  | Very High                                                                            |  | Very High             | Regular and light                                                                     |  | Regular and intensive                                                                 |  | Regular and intensive |
| 63                                    | GN4-b | Kabak lowland                                 |  | Fishing      | Rice-growing    | Trade                                        |  |             | Very High                                                                           |  | Very High                                                                            |  | Very High             | Regular and intensive                                                                 |  | Regular and intensive                                                                 |  | Regular and intensive |
| 64                                    | GN4-c | Benty                                         |  | Fishing      | Rice-growing    | Trade<br>Oil & Gas                           |  |             | Medium                                                                              | High                                                                                |  | High                                                                                 | Regular and light     |  | Regular and intensive                                                                 |  | Regular and intensive                                                                 |                       |



## Sierra Leone

| N°                                | REF   | NAME                                         | HABITAT | STAKES        |                 |                 | HAZARDS      | CRITICALITY  |        |        | MONITORING |           |                       |                       |                       |                       |                       |                       |                   |
|-----------------------------------|-------|----------------------------------------------|---------|---------------|-----------------|-----------------|--------------|--------------|--------|--------|------------|-----------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------------|
|                                   |       |                                              |         |               |                 |                 |              | 2011         | 2016   | 2020   | 2011       | 2016      | 2020                  |                       |                       |                       |                       |                       |                   |
| SL1 NORTH SIERRA LEONE            |       |                                              |         |               |                 |                 |              |              |        |        |            |           |                       |                       |                       |                       |                       |                       |                   |
| 65                                | SL1-a | Kolente right shore                          |         | Fishing       | Rice-growing    | Biodiversity    |              | Medium       | →      | Medium | ↗          | Very High | No monitoring         | ↗                     | Regular and light     | ↗                     | Regular and intensive |                       |                   |
| 66                                | SL1-b | Kolente estuary                              |         | Fishing       | Rice-growing    | Biodiversity    |              | High         | →      | High   | →          | High      | Regular and light     | →                     | Regular and light     | →                     | Regular and light     |                       |                   |
| 67                                | SL1-c | Lungi                                        |         | Fishing       | Trade+          | Extractive Ind. | Tourism      | Biodiversity |        | Medium | →          | Medium    | ↗                     | High                  | Watch-keeping         | →                     | Watch-keeping         | ↗                     | Regular and light |
| 68                                | SL1-d | Rokel estuary                                |         | Fishing       | Trade           | Extractive Ind. | Tourism      | Biodiversity |        | Medium | →          | Medium    | ↗                     | High                  | Watch-keeping         | ↗                     | Regular and light     | →                     | Regular and light |
| SL2 URBAN AND PERI-URBAN FREETOWN |       |                                              |         |               |                 |                 |              |              |        |        |            |           |                       |                       |                       |                       |                       |                       |                   |
| 69                                | SL2-a | Urban sector on the North / North East front |         | Fishing       | Trade           | Biodiversity    |              | Medium       | →      | Medium | ↗          | High      | Watch-keeping         | ↗                     | Regular and light     | →                     | Regular and light     |                       |                   |
| 70                                | SL2-b | Goderich urban sector on the West side       |         | Fishing       | (Tourism)       | Biodiversity    |              | High         | →      | High   | ↗          | Very High | Regular and light     | →                     | Regular and light     | ↗                     | Regular and intensive |                       |                   |
| 71                                | SL2-c | Hamilton - Lakka                             |         |               | Extractive Ind. | Tourism         | Biodiversity |              | High   | →      | High       | →         | High                  | Regular and light     | →                     | Regular and light     | →                     | Regular and light     |                   |
| 72                                | SL2-d | West side - Tokoh                            |         | Fishing       |                 | Tourism         | Biodiversity |              | High   | →      | High       | →         | High                  | Regular and intensive | →                     | Regular and intensive | →                     | Regular and intensive |                   |
| 73                                | SL2-e | Tombou - Cape Shilling                       |         | Fishing       |                 | Tourism         | Biodiversity |              | High   | →      | High       | →         | High                  | Watch-keeping         | →                     | Watch-keeping         | ↗                     | Regular and light     |                   |
| 74                                | SL2-f | Banana Island                                |         | Fishing       |                 | Tourism         | Biodiversity |              | Medium | →      | Medium     | →         | Medium                | Watch-keeping         | →                     | Watch-keeping         | →                     | Watch-keeping         |                   |
| SL3 CENTER SOUTH SIERRA LEONE     |       |                                              |         |               |                 |                 |              |              |        |        |            |           |                       |                       |                       |                       |                       |                       |                   |
| 75                                | SL3-a | Freetown bay of south pier                   |         | Rice-growing  | Fishing         | Tourism         | Biodiversity |              | Medium | →      | Medium     | →         | Medium                | No monitoring         | ↗                     | Watch-keeping         | ↗                     | Regular and light     |                   |
| 76                                | SL3-b | Shenge                                       |         | Rice-growing  | Fishing         | Biodiversity    |              | High         | →      | High   | →          | High      | Regular and intensive | →                     | Regular and intensive | →                     | Regular and intensive |                       |                   |
| SL4 SHERBRO - LIBERIA ZONE        |       |                                              |         |               |                 |                 |              |              |        |        |            |           |                       |                       |                       |                       |                       |                       |                   |
| 77                                | SL4-a | Sherbro estuary                              |         | Rice-growing  | Fishing         | (Biodiversity)  |              | Low          | →      | Low    | →          | Low       | Watch-keeping         | →                     | Watch-keeping         | →                     | Watch-keeping         |                       |                   |
| 78                                | SL4-b | Stocks of Turtle Islands                     |         |               | Fishing         | Biodiversity    |              | High         | →      | High   | →          | High      | Regular and light     | →                     | Regular and light     | ↗                     | Regular and intensive |                       |                   |
| 79                                | SL4-c | Sherbro - Main island                        |         | Ostréiculture | Fishing         | Biodiversity    |              | Medium       | →      | Medium | →          | Medium    | Regular and light     | →                     | Regular and light     | →                     | Regular and light     |                       |                   |
| 80                                | SL4-d | Sherbro - Moa mouth                          |         |               | Fishing         | Biodiversity    |              | Low          | →      | Low    | →          | Low       | No monitoring         | →                     | No monitoring         | ↗                     | Watch-keeping         |                       |                   |
| 81                                | SL4-e | Moa - Sulima mouth                           |         | Fishing       | Oil & Gas       | Biodiversity    |              | Low          | ↗      | Medium | ↗          | High      | Watch-keeping         | ↗                     | Regular and light     | →                     | Regular and light     |                       |                   |

## Liberia

| N°                                               | REF   | NAME                                      | HABITAT                                                                             | STAKES  |                 |                 | HAZARDS                                                                             | CRITICALITY                                                                         |        |           | MONITORING |           |                       |                       |                       |                       |                       |                       |
|--------------------------------------------------|-------|-------------------------------------------|-------------------------------------------------------------------------------------|---------|-----------------|-----------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|-----------|------------|-----------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                                                  |       |                                           |                                                                                     |         |                 |                 |                                                                                     | 2011                                                                                | 2016   | 2020      | 2011       | 2016      | 2020                  |                       |                       |                       |                       |                       |
| LR1 SIERRA LEONE - ROBERTSPORT - MONROVIA        |       |                                           |                                                                                     |         |                 |                 |                                                                                     |                                                                                     |        |           |            |           |                       |                       |                       |                       |                       |                       |
| 82                                               | LR1-a | Sierra Leone - Robertsport                |  | Fishing |                 | Biodiversity    |  | Low                                                                                 | →      | Low       | →          | Low       | No monitoring         | →                     | No monitoring         | ↗                     | Watch-keeping         |                       |
| 83                                               | LR1-b | Robertsport                               |  | Fishing | Tourism         | Biodiversity    |  | Low                                                                                 | →      | Low       | ↗          | Medium    | Watch-keeping         | →                     | Watch-keeping         | ↗                     | Regular and light     |                       |
| 84                                               | LR1-c | Lake Piso                                 |  | Fishing | Extractive Ind. | Biodiversity    |  | Low                                                                                 | →      | Low       | ↗          | Medium    | No monitoring         | →                     | No monitoring         | ↗                     | Regular and light     |                       |
| 85                                               | LR1-d | East Robertsport - Monrovia               |  | Fishing |                 | Biodiversity    |  | Low                                                                                 | ↗      | Medium    | ↘          | Low       | No monitoring         | ↗                     | Regular and light     | ↘                     | Watch-keeping         |                       |
| LR2 ZONE UNDER MONROVIA INFLUENCE                |       |                                           |                                                                                     |         |                 |                 |                                                                                     |                                                                                     |        |           |            |           |                       |                       |                       |                       |                       |                       |
| 86                                               | LR2-a | Saint-Paul north river - right shore      |  | Fishing | Extractive Ind. | Tourism         |  | High                                                                                | →      | High      | ↗          | Very High | Regular and intensive | →                     | Regular and intensive | →                     | Regular and intensive |                       |
| 87                                               | LR2-b | Inner Lagoon                              |  | Fishing | Extractive Ind. | Tourism         |  | Very High                                                                           | →      | Very High | →          | Very High | Regular and intensive | →                     | Regular and intensive | →                     | Regular and intensive |                       |
| 88                                               | LR2-c | West Point - Mesurado mouth and port zone |  |         | Trade           |                 |  | Very High                                                                           | →      | Very High | →          | Very High | Regular and intensive | →                     | Regular and intensive | →                     | Regular and intensive |                       |
| 89                                               | LR2-d | Mamba Point - Sinkor                      |  |         | Extractive Ind. | Tourism         | Biodiversity                                                                        |  | High   | →         | High       | →         | High                  | Regular and intensive | →                     | Regular and intensive | ↘                     | Regular and light     |
| 90                                               | LR2-e | Sinkor - Paynesville                      |  |         | Extractive Ind. | Tourism         | Biodiversity                                                                        |  | High   | →         | High       | ↗         | Very High             | Regular and light     | →                     | Regular and light     | ↗                     | Regular and intensive |
| 91                                               | LR2-f | Paynesville - Mamgbai                     |  | Fishing | Extractive Ind. | Tourism         | Biodiversity                                                                        |  | Medium | ↗         | High       | →         | High                  | Regular and light     | →                     | Regular and light     | →                     | Regular and light     |
| 92                                               | LR2-g | Mamgbai - Sopwe Town                      |  |         | Extractive Ind. | Tourism         |                                                                                     |  | High   | →         | High       | →         | High                  | Regular and light     | →                     | Regular and light     | →                     | Regular and light     |
| 93                                               | LR2-h | Sopwe Town - Dolota                       |  |         | Extractive Ind. | Tourism         | Biodiversity                                                                        |  | Medium | →         | Medium     | →         | Medium                | Regular and light     | →                     | Regular and light     | ↘                     | Watch-keeping         |
| LR3 DOLOTA – BUCHANAN                            |       |                                           |                                                                                     |         |                 |                 |                                                                                     |                                                                                     |        |           |            |           |                       |                       |                       |                       |                       |                       |
| 94                                               | LR3-a | Dolota                                    |  | Fishing | Extractive Ind. | Biodiversity    |  | Medium                                                                              | →      | Medium    | →          | Medium    | Watch-keeping         | →                     | Watch-keeping         | →                     | Watch-keeping         |                       |
| 95                                               | LR3-b | Buchanan                                  |  | Fishing | Trade           | Extractive Ind. |                                                                                     |  | High   | ↗         | Very High  | →         | Very High             | Regular and intensive | →                     | Regular and intensive | →                     | Regular and intensive |
| LR4 BUCHANAN - RIVERCESS - GREENVILLE - GRANCESS |       |                                           |                                                                                     |         |                 |                 |                                                                                     |                                                                                     |        |           |            |           |                       |                       |                       |                       |                       |                       |
| 96                                               | LR4-a | Buchanan - Rivercess                      |  |         |                 |                 |  | Low                                                                                 | →      | Low       | →          | Low       | No monitoring         | →                     | No monitoring         | ↗                     | Watch-keeping         |                       |
| 97                                               | LR4-b | Rivercess                                 |  |         |                 |                 |  | Low                                                                                 | →      | Low       | →          | Low       | No monitoring         | →                     | No monitoring         | ↗                     | Watch-keeping         |                       |
| 98                                               | LR4-c | Rivercess - Greenville                    |  |         | (Tourism)       | Biodiversity    |  | Low                                                                                 | →      | Low       | →          | Low       | No monitoring         | →                     | No monitoring         | ↗                     | Watch-keeping         |                       |
| 99                                               | LR4-d | Greenville                                |  |         | Trade           | Extractive Ind. |  | Low                                                                                 |        | Medium    |            | Very High | No monitoring         | ↗                     | Watch-keeping         | ↗                     | Regular and intensive |                       |
| 100                                              | LR4-e | Greenville - Granceess                    |  |         | Extractive Ind. | Biodiversity    |  | Low                                                                                 | →      | Low       | ↗          | Very High | No monitoring         | →                     | No monitoring         | ↗                     | Regular and intensive |                       |





| LR5 GRANCESS - CAP PALMAS |       |                    |                                                                                   |          |                          |                                                                                   |     |   |     |                                                                                     |        |               |                                                                                     |               |                                                                                     |                   |
|---------------------------|-------|--------------------|-----------------------------------------------------------------------------------|----------|--------------------------|-----------------------------------------------------------------------------------|-----|---|-----|-------------------------------------------------------------------------------------|--------|---------------|-------------------------------------------------------------------------------------|---------------|-------------------------------------------------------------------------------------|-------------------|
| 101                       | LR5-a | Granceess          |  | Palm oil | Tourism (Biodiversity)   |  | Low | → | Low |  | Medium | No monitoring | →                                                                                   | No monitoring |  | Watch-keeping     |
| 102                       | LR5-b | Granceess - Harper |  |          | (Tourism) (Biodiversity) |  | Low | → | Low |  | Medium | No monitoring | →                                                                                   | No monitoring |  | Watch-keeping     |
| 103                       | LR5-c | Harper             |  | Trade    | (Biodiversity)           |  | Low | → | Low |  | High   | Watch-keeping | →                                                                                   | Watch-keeping |  | Regular and light |
| 104                       | LR5-d | Cap Palmas         |  |          | (Biodiversity)           |  | Low | → | Low |  | Medium | No monitoring |  | Watch-keeping | →                                                                                   | Watch-keeping     |

## Côte d'Ivoire

| N°                                                    | REF   | NAME                                         | HABITAT | STAKES                 |                                           | HAZARDS | CRITICALITY                       |                       |                               | MONITORING                                                            |                   |      |
|-------------------------------------------------------|-------|----------------------------------------------|---------|------------------------|-------------------------------------------|---------|-----------------------------------|-----------------------|-------------------------------|-----------------------------------------------------------------------|-------------------|------|
|                                                       |       |                                              |         |                        |                                           |         | 2011                              | 2016                  | 2020                          | 2011                                                                  | 2016              | 2020 |
| C11 LIBERIA - SAN PEDRO BORDER                        |       |                                              |         |                        |                                           |         |                                   |                       |                               |                                                                       |                   |      |
| 105                                                   | C11-a | Cavally estuary - Liberia border             |         |                        | (Tourism) (Biodiversity)                  |         | Low → Low → Low                   |                       |                               | Watch-keeping → Watch-keeping → Watch-keeping                         |                   |      |
| 106                                                   | C11-b | West Tabou                                   |         |                        | (Tourism)                                 |         | Low → Low → Low                   |                       |                               | No monitoring → No monitoring                                         | Watch-keeping     |      |
| 107                                                   | C11-c | Tabou                                        |         | Maitrise du foncier    | (Tourism)                                 |         | Low → Low → Low                   |                       |                               | No monitoring  Watch-keeping → Watch-keeping                          |                   |      |
| 108                                                   | C11-d | East Tabou                                   |         | Fishing Palm oil trees | Agriculture (Tourism) Maitrise du foncier |         | Low → Low → Low                   |                       |                               | Watch-keeping → Watch-keeping → Watch-keeping                         |                   |      |
| 109                                                   | C11-e | Grand Bereby                                 |         | Fishing Agriculture    | Tourism (Biodiversity)                    |         | Low → Low → Low                   |                       |                               | Watch-keeping → Watch-keeping → Watch-keeping                         |                   |      |
| 110                                                   | C11-f | San Pedro West                               |         | Agriculture            | (Tourism)                                 |         | Low → Low                         | Medium                | No monitoring → No monitoring | Regular and light                                                     |                   |      |
| 111                                                   | C11-g | San Pedro urban zone and West periphery      |         | Trade+                 | Tourism                                   |         | High                              | Very High → Very High |                               | Regular and intensive → Regular and intensive → Regular and intensive |                   |      |
| C12 EAST SAN PEDRO - SASSANDRA - FRESCO               |       |                                              |         |                        |                                           |         |                                   |                       |                               |                                                                       |                   |      |
| 112                                                   | C12-a | East San Pedro                               |         | Fishing                | (Tourism) Biodiversity                    |         | Low → Low                         | Medium                | No monitoring → No monitoring | Regular and light                                                     |                   |      |
| 113                                                   | C12-b | Sassandra right shore                        |         | Fishing                | Tourism (Biodiversity)                    |         | Medium → Medium → Medium          |                       |                               | Watch-keeping → Watch-keeping → Watch-keeping                         |                   |      |
| 114                                                   | C12-c | Sassandra left shore- Dagbebo                |         | Agro-forestry          | Tourism Biodiversity                      |         | Low → Low → Low                   |                       |                               | Watch-keeping → Watch-keeping → Watch-keeping                         |                   |      |
| 115                                                   | C12-d | Dagbebo - Fresco                             |         | Fishing Agro-forestry  | (Tourism) Biodiversity                    |         | Low → Low → Low                   |                       |                               | Watch-keeping → Watch-keeping → Watch-keeping                         |                   |      |
| C13 FRESCO - ASSAGNY                                  |       |                                              |         |                        |                                           |         |                                   |                       |                               |                                                                       |                   |      |
| 116                                                   | C13-a | Fresco                                       |         | Fishing coconut groves | Biodiversity                              |         | Low → Low                         | High                  | Watch-keeping → Watch-keeping | Regular and light                                                     |                   |      |
| 117                                                   | C13-b | West Grand Lahou                             |         | Fishing coconut groves |                                           |         | Low  Medium → Medium              |                       |                               | Watch-keeping → Watch-keeping → Watch-keeping                         |                   |      |
| 118                                                   | C13-c | Grand Lahou, right shore and Bandama estuary |         | Fishing coconut groves | Oil & Gas Tourism                         |         | Very High → Very High → Very High |                       |                               | Regular and intensive → Regular and intensive → Regular and intensive |                   |      |
| 119                                                   | C13-d | Bandama left shore                           |         | coconut groves         | Tourism Biodiversity                      |         | Medium → Medium → Medium          |                       |                               | No monitoring  Watch-keeping                                          | Regular and light |      |
| C14 RURAL SECTOR ASSAGNY - JACQUEVILLE - ABIDJAN WEST |       |                                              |         |                        |                                           |         |                                   |                       |                               |                                                                       |                   |      |
| 120                                                   | C14-a | Assagny - Jacqueville                        |         | Fishing Agro-forestry  | Oil & Gas                                 |         | Medium → Medium → Medium          |                       |                               | No monitoring → No monitoring                                         | Watch-keeping     |      |
| 121                                                   | C14-b | Jacquerville                                 |         | Fishing Agriculture    | Oil & Gas (Tourism)                       |         | Low  Medium → Medium              |                       |                               | Watch-keeping  Regular and light → Regular and light                  |                   |      |
| 122                                                   | C14-c | Jacquerville - West Abidjan                  |         | Fishing Agriculture    | Oil & Gas Biodiversity                    |         | Medium → Medium → Medium          |                       |                               | Watch-keeping  Regular and light → Regular and light                  |                   |      |
| C15 ABIDJAN - PORT BOUET                              |       |                                              |         |                        |                                           |         |                                   |                       |                               |                                                                       |                   |      |
| 123                                                   | C15-a | Port Bouet                                   |         | Trade+                 | Tourism                                   |         | Very High → Very High → Very High |                       |                               | Regular and intensive → Regular and intensive → Regular and intensive |                   |      |
| 124                                                   | C15-b | Port Bouet East                              |         |                        | Tourism                                   |         | Very High → Very High → Very High |                       |                               | Regular and intensive → Regular and intensive → Regular and intensive |                   |      |
| C16 PERI-URBAN ZONE EAST ABIDJAN - GRAND BASSAM       |       |                                              |         |                        |                                           |         |                                   |                       |                               |                                                                       |                   |      |
| 125                                                   | C16-a | Abidjan East peri-urban zone                 |         | coconut groves         | Tourism                                   |         | High → High → High                |                       |                               | Regular and intensive → Regular and intensive → Regular and intensive |                   |      |
| 126                                                   | C16-b | Grand-Bassam West coastline                  |         | coconut groves         | Tourism Biodiversity                      |         | Very High → Very High → Very High |                       |                               | Regular and intensive → Regular and intensive → Regular and intensive |                   |      |
| 127                                                   | C16-c | Grand-Bassam                                 |         |                        | Tourism Biodiversity                      |         | High → High → High                |                       |                               | Regular and intensive → Regular and intensive → Regular and intensive |                   |      |
| 128                                                   | C16-d | Estuary of Bassam left shore                 |         | coconut groves         | Tourism Biodiversity                      |         | High → High → High                |                       |                               | Regular and intensive → Regular and intensive → Regular and intensive |                   |      |
| C17 SANDY TERRACE AND COCONUT GROVE OF EAST IVORIAN   |       |                                              |         |                        |                                           |         |                                   |                       |                               |                                                                       |                   |      |
| 129                                                   | C17-a | Grand-Bassam - Assinie                       |         | coconut groves         |                                           |         | Low → Low                         | High                  | Watch-keeping → Watch-keeping | Regular and intensive                                                 |                   |      |
| 130                                                   | C17-b | Assinie and Abi lagoon mouth                 |         |                        | Tourism Biodiversity                      |         | Very High → Very High → Very High |                       |                               | Regular and intensive → Regular and intensive → Regular and intensive |                   |      |
| 131                                                   | C17-c | East Abi lagoon                              |         | coconut groves         | Biodiversity                              |         | Low → Low → Low                   |                       |                               | Watch-keeping → Watch-keeping → Watch-keeping                         |                   |      |



## Ghana

| N°                                                              | REF    | NAME                                    | HABITAT                                                                             | STAKES      |                     |                  |                                      | HAZARDS                                                                             | CRITICALITY |      |           | MONITORING |           |                       |   |                       |   |                       |
|-----------------------------------------------------------------|--------|-----------------------------------------|-------------------------------------------------------------------------------------|-------------|---------------------|------------------|--------------------------------------|-------------------------------------------------------------------------------------|-------------|------|-----------|------------|-----------|-----------------------|---|-----------------------|---|-----------------------|
|                                                                 |        |                                         |                                                                                     |             |                     |                  |                                      |                                                                                     | 2011        | 2016 | 2020      | 2011       | 2016      | 2020                  |   |                       |   |                       |
| GH1 SANDY TERRACE AND COCONUT GROVE WEST GHANA - IVOIRIAN SIDE  |        |                                         |                                                                                     |             |                     |                  |                                      |                                                                                     |             |      |           |            |           |                       |   |                       |   |                       |
| 132                                                             | GH1-a  | Côte d'Ivoire - Bonyere border          |    | Fishing     |                     |                  | (Biodiversity)                       |    | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | → | Watch-keeping         | → | Watch-keeping         |
| 133                                                             | GH1-b  | Bonyere - Ekwe                          |    | Fishing     | Extractive Ind.s    | Tourism          | Oil & Gas                            |    | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | ↗ | Regular and light     | → | Regular and light     |
| 134                                                             | GH1-c  | Ekwe - Kikam                            |    | Fishing     |                     |                  | Tourism                              |    | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | → | Watch-keeping         | → | Watch-keeping         |
| GH2 CAP DES TROIS POINTES                                       |        |                                         |                                                                                     |             |                     |                  |                                      |                                                                                     |             |      |           |            |           |                       |   |                       |   |                       |
| 135                                                             | GH2-a  | Trois Pointes West                      |    | Fishing     |                     |                  | Tourism (Biodiversity)               |    | High        | →    | High      | →          | High      | Watch-keeping         | ↗ | Regular and light     | → | Regular and light     |
| 136                                                             | GH2-b  | Trois Pointes Center                    |    | Fishing     | Agriculture         | Oil & Gas        | Tourism (Biodiversity)               |    | High        | →    | High      | →          | High      | Watch-keeping         | ↗ | Regular and light     | → | Regular and light     |
| 137                                                             | GH2-c  | Trois Pointes East                      |    | Fishing     |                     |                  | Tourism (Biodiversity)               |    | High        | →    | High      | →          | High      | Watch-keeping         | ↗ | Regular and light     | → | Regular and light     |
| GH3 URBAN SECTOR AND PERI-URBAN EXTENSION OF SEKONDI - TAKORADI |        |                                         |                                                                                     |             |                     |                  |                                      |                                                                                     |             |      |           |            |           |                       |   |                       |   |                       |
| 138                                                             | GH3-a  | Apowa - Takoradi                        |    | Fishing     | Agriculture         |                  | Tourism                              |    | Medium      | →    | Medium    | ↗          | High      | Watch-keeping         | → | Watch-keeping         | ↗ | Regular and light     |
| 139                                                             | GH3-b  | Takoradi                                |    | Fishing     | Trade               |                  | Oil & Gas                            |    | Medium      | ↗    | High      | →          | High      | Regular and light     | → | Regular and light     | → | Regular and light     |
| 140                                                             | GH3-c  | Sekondi                                 |    | Fishing     |                     |                  | (Tourism)                            |    | Medium      | →    | Medium    | →          | Medium    | Regular and light     | → | Regular and light     | → | Regular and light     |
| 141                                                             | GH3-d  | Sekondi - Shama                         |    | Fishing     | Thermal power plant |                  | Tourism                              |    | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | ↗ | Regular and light     | ↗ | Regular and intensive |
| GH4 HINTERLAND SHAMA – ELMINA                                   |        |                                         |                                                                                     |             |                     |                  |                                      |                                                                                     |             |      |           |            |           |                       |   |                       |   |                       |
| 142                                                             | GH4-a  | Shama - Ankawanda                       |    |             |                     |                  | Tourism (Biodiversity)               |    | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | → | Watch-keeping         | ↗ | Regular and light     |
| GH5 ELMINA URBAN ZONES AND EXTENSIONS – CAPE COAST - SALTPOND   |        |                                         |                                                                                     |             |                     |                  |                                      |                                                                                     |             |      |           |            |           |                       |   |                       |   |                       |
| 143                                                             | GH5-a  | Elmina                                  |    | Fishing     |                     | Extractive Ind.s | (Tourism)                            |    | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | → | Watch-keeping         | ↗ | Regular and light     |
| 144                                                             | GH5-b  | West Cape Coast                         |    | Fishing     |                     |                  | (Tourism)                            |    | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | → | Watch-keeping         | ↗ | Regular and light     |
| 145                                                             | GH5-c  | Cape Coast                              |   | Fishing     |                     |                  | (Tourism)                            |   | Medium      | →    | Medium    | →          | Medium    | Regular and light     | → | Regular and light     | → | Regular and light     |
| 146                                                             | GH5-d  | East Cape Coast                         |  | Fishing     |                     |                  |                                      |  | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | → | Watch-keeping         | → | Watch-keeping         |
| 147                                                             | GH5-e  | Cape Coast Peri-Urban Sector - Saltpond |  | Fishing     |                     |                  | (Tourism)                            |  | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | ↗ | Regular and light     | → | Regular and light     |
| GH6 RURAL HINTERLAND OF CAPE COAST AND ACCRA URBAN ZONES        |        |                                         |                                                                                     |             |                     |                  |                                      |                                                                                     |             |      |           |            |           |                       |   |                       |   |                       |
| 148                                                             | GH6-a  | Saltpond - Mfantseman                   |  | Fishing     |                     |                  | (Biodiversity)                       |  | High        | ↘    | Medium    | →          | Medium    | Regular and light     | → | Regular and light     | → | Regular and light     |
| 149                                                             | GH6-b  | Winneba                                 |  | Fishing     |                     |                  | Biodiversity                         |  | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | → | Watch-keeping         | → | Watch-keeping         |
| GH7 ACCRA WEST URBAN AREA                                       |        |                                         |                                                                                     |             |                     |                  |                                      |                                                                                     |             |      |           |            |           |                       |   |                       |   |                       |
| 150                                                             | GH7-a  | Senya - Nyanyano                        |  | Fishing     |                     |                  |                                      |  | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | → | Watch-keeping         | ↗ | Regular and light     |
| 151                                                             | GH7-b  | Nyanyano - Accra West urban zone        |  | Fishing     | Agriculture         |                  | (Tourism)                            |  | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | ↗ | Regular and light     | → | Regular and light     |
| GH8 ACCRA, URBAN AREA AND EAST PERIPHERY                        |        |                                         |                                                                                     |             |                     |                  |                                      |                                                                                     |             |      |           |            |           |                       |   |                       |   |                       |
| 152                                                             | GH8-a  | Accra Densu delta wetland               |  | Fishing     |                     | Extractive Ind.s | Tourism Biodiversity                 |  | High        | →    | High      | →          | High      | Regular and light     | → | Regular and light     | → | Regular and light     |
| 153                                                             | GH8-b  | Accra, Center West                      |  | Fishing     |                     |                  |                                      |  | Very High   | →    | Very High | ↘          | High      | Regular and intensive | → | Regular and intensive | ↘ | Regular and light     |
| 154                                                             | GH8-c  | Accra center                            |  | Fishing     |                     |                  | Tourism                              |  | Very High   | →    | Very High | →          | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| 155                                                             | GH8-d  | Wetland break Tema Ouest - Sakumo       |  |             |                     |                  | Industries Tourism Biodiversity      |  | High        | →    | High      | ↘          | Medium    | Regular and light     | → | Regular and light     | → | Regular and light     |
| 156                                                             | GH8-e  | Tema                                    |  | Fishing     | Trade               |                  |                                      |  | Very High   | →    | Very High | →          | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| 157                                                             | GH8-f  | Prampam                                 |  | Fishing     |                     | Extractive Ind.s | (Tourism)                            |  | High        | →    | High      | →          | High      | Regular and light     | → | Regular and light     | → | Regular and light     |
| GH9 VOLTA DELTA RIGHT SHORE NINGO - ADAFOAH                     |        |                                         |                                                                                     |             |                     |                  |                                      |                                                                                     |             |      |           |            |           |                       |   |                       |   |                       |
| 158                                                             | GH9-a  | New Ningo - Lekpoguno                   |  |             |                     |                  | Extractive Ind.                      |  | Very High   | →    | Very High | ↘          | High      | Regular and intensive | → | Regular and intensive | ↘ | Regular and light     |
| 159                                                             | GH9-b  | Lekpoguno - Akplanbya                   |  |             |                     |                  | Extractive Ind. (Biodiversity)       |  | High        | →    | High      | →          | High      | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| 160                                                             | GH9-c  | Akplanbya - Totopé                      |  |             |                     |                  | Extractive Ind. Biodiversity         |  | Low         | ↗    | High      | →          | High      | Regular and intensive | → | Regular and intensive | ↘ | Regular and light     |
| 161                                                             | GH9-d  | Ada Foah                                |  | Fishing     |                     |                  | Extractive Ind. Tourism Biodiversity |  | High        | ↗    | Very High | →          | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| GH10 DELTA VOLTA LEFT SHORE                                     |        |                                         |                                                                                     |             |                     |                  |                                      |                                                                                     |             |      |           |            |           |                       |   |                       |   |                       |
| 162                                                             | GH10-a | Dzetta - Volta left shore               |  | Aquaculture |                     |                  | Oil & Gas Biodiversity               |  | Very High   | →    | Very High | →          | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| 163                                                             | GH10-b | Keta                                    |  |             |                     |                  | Oil & Gas Biodiversity               |  | Very High   | →    | Very High | →          | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| 164                                                             | GH10-c | Keta - dike                             |  |             |                     |                  | Oil & Gas Biodiversity               |  | Very High   | →    | Very High | →          | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| 165                                                             | GH10-d | Adina                                   |  |             |                     |                  | Oil & Gas Biodiversity               |  | High        | →    | High      | →          | High      | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| 166                                                             | GH10-e | East Ghana - Togo border                |  | Fishing     | Agriculture         |                  | Oil & Gas                            |  | High        | →    | High      | ↘          | Medium    | Regular and light     | ↗ | Regular and intensive | ↘ | Regular and light     |



## Togo

| N°       | REF   | NAME                          | HABITAT                                                                           | STAKES                   |           |                           |                                                                                   | HAZARDS                                                                           | CRITICALITY                                                                       |           |           | MONITORING |           |                   |           |                       |   |                       |   |                       |
|----------|-------|-------------------------------|-----------------------------------------------------------------------------------|--------------------------|-----------|---------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------|-----------|------------|-----------|-------------------|-----------|-----------------------|---|-----------------------|---|-----------------------|
|          |       |                               |                                                                                   |                          |           |                           |                                                                                   |                                                                                   | 2011                                                                              | 2016      | 2020      | 2011       | 2016      | 2020              |           |                       |   |                       |   |                       |
| TG1 TOGO |       |                               |                                                                                   |                          |           |                           |                                                                                   |                                                                                   |                                                                                   |           |           |            |           |                   |           |                       |   |                       |   |                       |
| 167      | TG1-a | Ghana - Lomé West Border      |  | Fishing                  | Oil & Gas | Biodiversity              |  |  | Medium                                                                            | →         | Medium    | →          | Medium    | Regular and light | →         | Regular and light     | → | Regular and light     |   |                       |
| 168      | TG1-b | Lomé center                   |  | Fishing Market-Gardening | Trade     | Oil & Gas                 | Tourism                                                                           | Biodiversity                                                                      |  | Accrétion | Medium    | →          | Medium    | →                 | Medium    | Regular and light     | → | Regular and light     | → | Regular and light     |
| 169      | TG1-c | urban Lomé - East port        |  | Fishing                  |           | Oil & Gas                 | Tourism                                                                           | Biodiversity                                                                      |  |           | Very High | →          | Very High | →                 | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| 170      | TG1-d | East Lomé                     |  | Fishing                  |           | Oil & Gas                 | (Tourism)                                                                         | Biodiversity                                                                      |  |           | High      | ↗          | Very High | →                 | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| 171      | TG1-e | Togoville - Agbodrafo - Aného |  | Fishing                  | Trade     | Extractive Ind. Oil & Gas |                                                                                   | Biodiversity                                                                      |  |           | Very High | →          | Very High | →                 | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |

## Benin

| N°                            | REF   | NAME                                 | HABITAT                                                                             | STAKES  |                  |           | HAZARDS   | CRITICALITY  |                                                                                                                                                                         |           | MONITORING |           |      |           |                       |                                                                                       |                       |   |                       |
|-------------------------------|-------|--------------------------------------|-------------------------------------------------------------------------------------|---------|------------------|-----------|-----------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------|-----------|------|-----------|-----------------------|---------------------------------------------------------------------------------------|-----------------------|---|-----------------------|
|                               |       |                                      |                                                                                     |         |                  |           |           | 2011         | 2016                                                                                                                                                                    | 2020      | 2011       | 2016      | 2020 |           |                       |                                                                                       |                       |   |                       |
| BJ1 GRAND POPO - WEST COTONOU |       |                                      |                                                                                     |         |                  |           |           |              |                                                                                                                                                                         |           |            |           |      |           |                       |                                                                                       |                       |   |                       |
| 172                           | BJ1-a | Togo Border - Grand Popo             |    | Fishing | Market-Gardening | Oil & Gas | Tourism   | Biodiversity |                                                                                        | Very High | →          | Very High | →    | Very High | Regular and intensive | →                                                                                     | Regular and intensive | → | Regular and intensive |
| 173                           | BJ1-b | Estuarine lagoons of Mono and Kouffo |    | Fishing |                  | Oil & Gas |           | Biodiversity |       | Very High | →          | Very High | →    | Very High | Regular and intensive | →                                                                                     | Regular and intensive | → | Regular and intensive |
| BJ2 CENTER-WEST AREA          |       |                                      |                                                                                     |         |                  |           |           |              |                                                                                                                                                                         |           |            |           |      |           |                       |                                                                                       |                       |   |                       |
| 174                           | BJ2-a | West Ouidah - Cotonou                |    | Fishing |                  | Oil & Gas | Tourism   | Biodiversity |                                                                                        | High      | →          | High      | →    | High      | Watch-keeping         |    | Regular and light     | → | Regular and light     |
| 175                           | BJ2-b | Cotonou - West airport               |    |         |                  | Oil & Gas | Tourism   |              |       | Medium    | →          | Medium    | →    | Medium    | Watch-keeping         |    | Regular and light     | → | Regular and light     |
| BJ3 CENTER-EAST AREA          |       |                                      |                                                                                     |         |                  |           |           |              |                                                                                                                                                                         |           |            |           |      |           |                       |                                                                                       |                       |   |                       |
| 176                           | BJ3-a | Cotonou - Airport to Port            |    |         |                  | Oil & Gas | (Tourism) | Biodiversity |       | High      | →          | High      | →    | High      | Regular and light     | →                                                                                     | Regular and light     | → | Regular and light     |
| 177                           | BJ3-b | Cotonou Port sector and channel      |    | Fishing | Trade +          | Oil & Gas |           | Biodiversity |       | High      | →          | High      | →    | High      | Regular and light     | →                                                                                     | Regular and light     | → | Regular and light     |
| 178                           | BJ3-c | Ambassadors sector                   |    |         |                  | Oil & Gas | (Tourism) | Biodiversity |                                                                                        | Very High | →          | Very High | ↘    | High      | Regular and intensive | →                                                                                     | Regular and intensive | → | Regular and intensive |
| BJ4 EAST AREA                 |       |                                      |                                                                                     |         |                  |           |           |              |                                                                                                                                                                         |           |            |           |      |           |                       |                                                                                       |                       |   |                       |
| 179                           | BJ4-a | East Cotonou                         |  | Fishing |                  | Oil & Gas |           | Biodiversity |   | High      | →          | High      | →    | High      | Watch-keeping         |  | Regular and intensive | → | Regular and intensive |

## São Tomé & Príncipe

| N°                                                  | REF                          | NAME                                                                                | HABITAT                                                                             | STAKES                   |               |        |           | HAZARDS        | CRITICALITY        |      |        | MONITORING |      |                       |
|-----------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------|---------------|--------|-----------|----------------|--------------------|------|--------|------------|------|-----------------------|
|                                                     |                              |                                                                                     |                                                                                     |                          |               |        |           |                | 2011               | 2016 | 2020   | 2011       | 2016 | 2020                  |
| STP1 ISLAND OF PRÍNCIPE                             |                              |                                                                                     |                                                                                     |                          |               |        |           |                |                    |      |        |            |      |                       |
| STP1-a                                              | High                         | Príncipe                                                                            |  | Chocolat<br>Noix de coco | Agro-forestry | Trade+ | Tourism   | Biodiversity   | <div>h d c</div>   |      | Medium |            |      | Regular and light     |
| STP1-b                                              | Low                          | Príncipe                                                                            |  |                          |               |        | (Tourism) | Biodiversity   | <div>c h</div>     |      | Low    |            |      | Watch-keeping         |
| STP2 ISLAND OF SÃO TOMÉ - NORTH AND EAST AREA       |                              |                                                                                     |                                                                                     |                          |               |        |           |                |                    |      |        |            |      |                       |
| STP2-a                                              | Rio Lemba - Diogo Nunes      |  | Fishing                                                                             |                          |               |        | Tourism   | Biodiversity   | <div>h d c</div>   |      | Medium |            |      | Regular and light     |
| STP2-b                                              | Diogo Nunes - Praia Melao    |  | Fishing                                                                             | Agriculture              | Trade+        |        | Tourism   | (Biodiversity) | <div>h d c</div>   |      | High   |            |      | Regular and intensive |
| STP2-c                                              | Praia Melao - Ribeira Afonso |  | Fishing                                                                             | Agro-forestry            |               |        | Tourism   | (Biodiversity) | <div>h d</div>     |      | Medium |            |      | Régulier et léger     |
| STP2-d                                              | Ribeira Afonso - Yo Grande   |  |                                                                                     |                          |               |        | Tourism   | (Biodiversity) | <div>h d c h</div> |      | Low    |            |      | Watch-keeping         |
| STP3 ISLAND OF SÃO TOMÉ - SOUTH AND SOUTH-WEST AREA |                              |                                                                                     |                                                                                     |                          |               |        |           |                |                    |      |        |            |      |                       |
|                                                     | Yo Grande - Rio Lemba        |  | Fishing                                                                             | Agriculture              |               |        | Tourism   | Biodiversity   | <div>h d c h</div> |      | Low    |            |      | Watch-keeping         |





# Mauritania

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## MR - Mauritania

The Mauritanian coastline extends from the Cap Blanc Peninsula to the Senegal River estuary on nearly 800 kilometers.

Generally, this coastline is still barely occupied and largely portrays still a pioneer front, except the two major cities Nouakchott and Nouadhibou whose seafronts are already potentially occupied and partially artificialized.

The geomorphological features of the Mauritanian coastline determine its extreme vulnerability, relating to the mobility of the shoreline and the nature of the coastal formations within this vast sedimentary basin. The fragile sedimentary stocks that have built up along the coastline, impede marine submersion, but are now threatened by the sea-level rise, combined with storm surges.

This coastline, an area of high economic diversity where fishing (coastal and continental), agriculture, energy and mining, water, tourism and transport mingle with protected areas, is classified as a World Heritage Site (PNBA).

For several years now, the Mauritanian government has been planning its coastal area by taking key actions such as promulgating several legal instruments governing environmental management (Coastal Ordinance in 2007 and the Merchant Marine Code in 2013), and developing a Mauritanian Coastal Development Master Plan (PDALM) in 2006 (updated in 2018).



## MR1

## NOUADHIBOU PENINSULA AND «LÉVRIER» BAY

The whole area is marked by the establishment of the Nouadhibou free zone<sup>1</sup>. A deep-water port is being studied. According to the information obtained, the free zone would not only concern the Nouadhibou Peninsula, but also the eastern part of the Baie du Lévrier that is considered as an extremely vulnerable ecosystem.

The mineral port of Nouadhibou is currently being extended in order to host vessels of up to 250,000 tonnages. The Nouadhibou port is located in the Baie du Lévrier, and consists of several piers and developed wharfs. It includes a mining terminal that facilitates the export of iron ore from the northern mines of the country through the Point Central port (managed by the National Industrial and Mining Company (SNIM)). It should be noted that this mineral port is located near the Cap Blanc reserve.

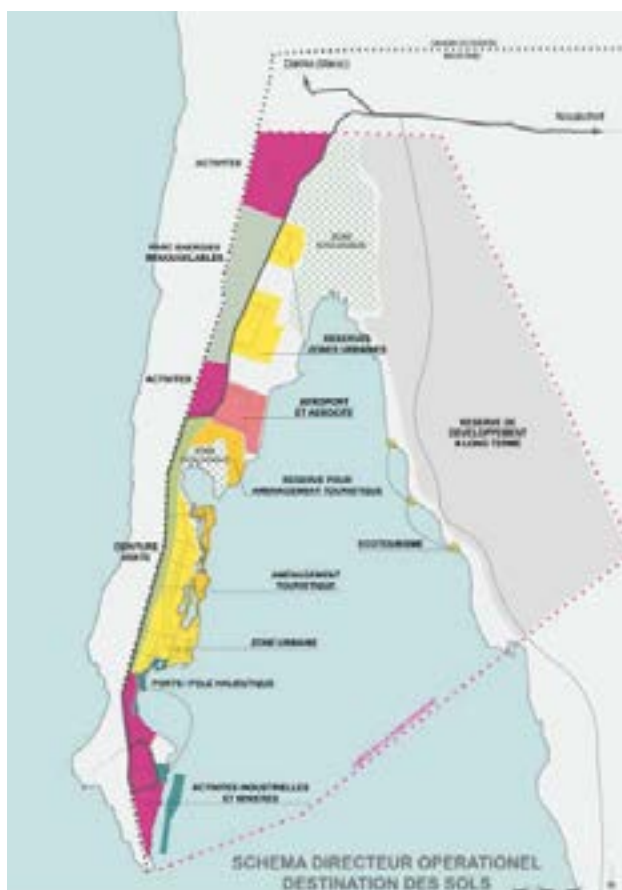
The construction of a new wharf of more than 600 m has just been completed. Wreck removal operations in the port's roadstead and access channel were completed between 2011 and 2012. The port is ISO 9001 certified.

Extending the Nouadhibou fishing port and building nearby an agro-industrial processing unit are also remarkable developments in this vulnerable area.

Mining activities in this area are also growing, particularly at the Tasiast gold mine, whose extension was formally relaunched in November 2015. Mauritania exports significant iron ore quantity from the Nouadhibou mining terminal. The production is concentrated in the northern area in state-controlled mines (SNIM), with several new iron ore mines being planned. Other current operations are focused on copper and gold. The water required for these mining activities would be captured from the Baie du Lévrier.

A new road has also been built between the Nouakchott-Nouadhibou section and the coast towards the Mamghar village. Its route is largely located within the Banc d'Arguin National Park. The socio-economic impacts are of great importance in promoting fishery products for the Imraguen people and in developing ecotourism in the area. Some information related to this route is highlighted in an assessment report of the UNESCO World Heritage to which this national park belongs. The city of Chami on the edge of this park is growing rapidly, including the new location of the protected area facilities.

There is an extension of the Nouadhibou town towards the North and South, as well as an extension of the center of Tanit and the Chami town towards the ocean (North). There is also increased mining activities, regarding especially the dark sand along the coastline, which impacts the coastal sedimentary stock.



*Operational Master Plan of the Free Zone officially adopted by the Higher Council for Strategic Orientation (CSOS) of the Free Zone Authority (chaired by the President of the Republic)*

<sup>1</sup> Act 2013-001 of January 2, 2013 / <http://www.ndbfreezone.mr/>



| MR1-a                               | 1 - CAP BLANC                                                                                                                                                                                                                                                                                                            |                    |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                          |                    |
| DIAGNOSTIC                          | Rocky coastline, Cap Blanc satellite reserve near a small population of monk seals ( <i>Monachus monachus</i> ).<br>Human occupancy almost inexistent.                                                                                                                                                                   |                    |
| DYNAMICS                            | No observation, migration of the sandbank that caused the grounding of a vessel that is presently getting wrecked and responsible for the observed migration.<br>Reducing the sandbank rise                                                                                                                              |                    |
| STAKES                              | Pollution risks related to the Nouadhibou port traffic and the nearby mineral port.                                                                                                                                                                                                                                      |                    |
| RECOMMENDATIONS                     | Strict site protection.<br>Pollution risks surveillance.                                                                                                                                                                                                                                                                 |                    |
| MONITORING                          | No recommendation                                                                                                                                                                                                                                                                                                        | CRITICALITY Low    |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                          |                    |
| EVOLUTION OF STAKES                 | Current developments around the city of Nouadhibou (free zone) and at the level of the SNIM mining port extension may result in significant environmental impacts at the Cap Blanc site.                                                                                                                                 |                    |
| CURRENT PROJECTS                    | Monitoring impacts related to the Cansado port evolution (SNIM).                                                                                                                                                                                                                                                         |                    |
| HAZARDS                             | -                                                                                                                                                                                                                                                                                                                        |                    |
| MONITORING                          | Watchkeeping                                                                                                                                                                                                                                                                                                             | CRITICALITY Medium |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                          |                    |
| EVOLUTION OF STAKES                 | Fish processing plant.<br>Current developments around the city of Nouadhibou (free zone) and at the level of the SNIM mining port extension may result in significant environmental impacts at the Cap Blanc site. Monitoring impacts related to the Cansado port evolution (SNIM) and other evolving port facilities.   |                    |
| CURRENT PROJECTS                    | "Monk Seal Conservation Program at Cap Blanc" <sup>2</sup> Program (MAVA Foundation).                                                                                                                                                                                                                                    |                    |
| OUTSTANDING NATURAL AREAS           | <b>Cap Blanc Satellite Reserve</b> <ul style="list-style-type: none"><li>• WDPA ID : 5174</li><li>• Affected sector: MR1-a</li><li>• Creation: April 2, 1986 (Decree n°86-060)</li><li>• Annex to the Banc d'Arguin National Park (Cf. sector MR2-a Banc d'Arguin National Park)</li><li>• World Heritage Site</li></ul> |                    |
| HAZARDS                             | Coastal erosion.<br>Pollution (wastewater, fish processing plant, ore dust from the SNIM Central point).<br>Grounding risk for vessels accessing to Nouadhibou ports.                                                                                                                                                    |                    |
| RECOMMENDATIONS                     | Establishing continuous environmental monitoring, in particular that of monk seals. Particular attention to the quality of the water as the water evacuation from the bay crosses this part (Cap Blanc) according to the currentology.<br>Strategic environmental assessment of the Nouadhibou free zone.                |                    |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                        | High               |

<sup>2</sup> <http://mava-foundation.org/grants/monk-seal-conservation-program-at-cap-blanc/>





| MR1-b                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2 - CANSADO POINT AND BAY |  |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                           |  |
| DIAGNOSTIC                          | Rocky plain (sandstone).<br>Cansado city and mining port.<br>Oil terminal.<br>Landscape-quality bay site.<br>Urban beach of Nouadhibou.                                                                                                                                                                                                                                                                                                                                                                                                   |                           |  |
| DYNAMICS                            | No survey.<br>Coastal erosion of the rocky coastline by block and small perched beaches                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                           |  |
| STAKES                              | Pollution risks from industrial activities.<br>Grounding and dismantling of wrecks in the Cansado bay.                                                                                                                                                                                                                                                                                                                                                                                                                                    |                           |  |
| RECOMMENDATIONS                     | Pollution risks surveillance.<br>Planning impact studies to establish a concerted development area if new industrial facilities are considered.                                                                                                                                                                                                                                                                                                                                                                                           |                           |  |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY Low           |  |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                           |  |
| EVOLUTION OF STAKES                 | Current developments around the city of Nouadhibou (free zone) and at the level of the SNIM mining port extension may result in significant environmental impacts at the Cap Blanc site.                                                                                                                                                                                                                                                                                                                                                  |                           |  |
| CURRENT PROJECTS                    | Monitoring impacts related to the Cansado port evolution (SNIM).                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                           |  |
| HAZARDS                             | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                           |  |
| MONITORING                          | Watchkeeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY Medium        |  |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                           |  |
| EVOLUTION OF STAKES                 | Extending the Cansado mineral port.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                           |  |
| PORT FACILITIES                     | "Current developments in this sector are essentially marked by the extension of the Estime mineral port: <ul style="list-style-type: none"><li>• The construction of a new wharf of more than 600 m has just been completed.</li><li>• Wreck removal operations in the port's roadstead and access channel were achieved between 2011 and 2012. The port is ISO 9001 certified.</li><li>• One free zone directly related to the port is being developed.</li><li>• Riprap to build a pier between the mineral port and Cansado.</li></ul> |                           |  |
| HAZARDS                             | Coastal erosion.<br>Pollution (waste water, fish processing plant).<br>Changing meteorological factors (wind regime).                                                                                                                                                                                                                                                                                                                                                                                                                     |                           |  |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY Medium        |  |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                           |  |
| EVOLUTION OF STAKES                 | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                           |  |
| CURRENT PROJECTS                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                           |  |
| OUTSTANDING NATURAL AREAS           | No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                           |  |
| HAZARDS                             | Coastal erosion.<br>Pollution (waste water, fish processing plant).                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                           |  |
| RECOMMENDATIONS                     | Strategic environmental assessment of the Nouadhibou free zone.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                           |  |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY Medium        |  |



| MR1-c                               | 3 – URBAN LITTORAL AND PORT OF NOUADHIBOU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |
| DIAGNOSTIC                          | Sandy spits of the Banc d'Arguin and sandstone formations of about 14.5 km of coastline, separated from the urban areas of Nouadhibou by salty wetlands.<br>Scattered but rapidly densifying residential habitat.<br>Important port and industrial facilities associated.<br>Narrow, discontinuous, low-lying sand and sandstone formations that can be equipped.<br>Tourist beaches and sites potential partially occupied already. Significant risks of marine intrusion in the event of storm surge, from the coastline, but especially from wet depressions.<br>Heritage of wetlands and marshes with unique and connected cordgrass and eelgrass stands, key elements of Nouadhibou's natural heritage.<br>Fish processing worksite related to the fishing port of the Baie du Repos. |                    |
| DYNAMICS                            | No report.<br>Sedimentary dynamics (littoral drift) on the spits of the Bountiya area.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |
| STAKES                              | Treatment of effluents from both port and industrial activities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |
| RECOMMENDATIONS                     | Sanitation plan for the Nouadhibou City technically validated (considering overall sanitation solutions involving all effluents).<br>Developing and signaling access channels to port areas.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY Medium |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |
| EVOLUTION OF STAKES                 | Extending the Estime mineral port.<br>Extending the fishing port, agro-industrial facilities.<br>Important excavations to build a wharf.<br>Extending fishmeal plants on the coast of the Nouadhibou City<br>Extending plants along the sea (excavation)..                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |
| PORT FACILITIES                     | Current developments in this sector are essentially marked by the extension of the Estime mineral port (the construction of a new wharf of more than 600m has just been achieved).<br>Wreck removal operations in the port's roadstead and access channel were completed between 2011 and 2012. The port is ISO 9001 certified.<br>One free zone directly related to the port is being developed. Riprap to build a pier between the mineral port and Cansado.                                                                                                                                                                                                                                                                                                                             |                    |
| HAZARDS                             | -Extending the Estime mineral port.<br>Extending the fishing port, agro-industrial facilities.<br>Important excavations to build a wharf.<br>Extending fishmeal manufacturing plants on the coastline of the Nouadhibou City                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY Medium |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |
| EVOLUTION OF STAKES                 | Developing the free zone around the artisanal fishing port.<br>Strong densification of the expected facilities under the free zone master plan, requiring intensive management of effluents and waste.<br>The complex of the still unoccupied coastline from point Rey to point Flore would be developed in low density of constructions which will, however, remain located in risky areas.<br>Only the wide wet depression connected to the thin cordon of wet depressions bordering the south of the Baie de l'Etoile would be preserved in conditions that are probably difficult given the density of the activities planned in this sector, which could be described as urban.                                                                                                       |                    |
| CURRENT PROJECTS                    | CWest Africa Coastal Areas Resilience Investment Project – WACA ResIP <sup>3</sup> . <ul style="list-style-type: none"><li>• Nouadhibou Littoral Development Guideline planned in 2020.</li><li>• Operating plan of the Nouadhibou free zone.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |
| OUTSTANDING NATURAL AREAS           | Protected Area Project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |
| HAZARDS                             | rCoastal erosion.<br>Industrial pollution.<br>Urbanization.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |
| RECOMMENDATIONS                     | Implementing rigorous environmental monitoring (water quality and substrate) focusing on production sites (plant) and ports.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY High   |

<sup>3</sup> <https://www.wacaprogram.org/>



| MR1-d-e                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 4 – NORTH NOUADHIBOU, BAIE DE L'ETOILE<br>AND BAIE DU LEVRIER |  |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|--|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                               |  |
| DIAGNOSTIC                          | <p>Baie de l'Etoile: wetland system with a claimed conservation status. Outstanding natural ecosystem, tourist and residential facilities on the south shore.</p> <p>South of the Baie de l'Etoile: sandy spit separated from the Nouadhibou town of by a salty wetland depression (cordgrass stands), scattered residential habitat.</p> <p>Baie du Lévrier: Shoreline sometimes sandy, sometimes muddy, leading to a shallow marine environment located at a short distance from the coastal road (2 to 4km) – direct = 21km. An area practically unpopulated yet, but partially (West shore) in the process of rapid land appropriation. Probable spawning and breeding area. Unoccupied East shore, Early stages of land appropriation on the West shore around Nouadhibou. Important and diverse archaeological deposits.</p> <p>Traditional pastoral activities on the East shore (salt cure).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                               |  |
| DYNAMICS                            | Hydro-sedimentary dynamics governing the evolution of sedimentary spits.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                               |  |
| STAKES                              | <p>Privatizing the seafront around the Baie de l'Etoile (risks in the event of marine storm surge).</p> <p>Pollution and risks of alteration of the Baie de l'Etoile wetlands.</p> <p>Baie du Lévrier: accumulation risks of pollutants from port and urban activities.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                               |  |
| RECOMMENDATIONS                     | <p>Strict protection of all sites, both biological and landscape heritage. Controlling urban development around Nouadhibou. Developing a coastal development guideline or a sector plan. Achieving the Baie de l'Etoile classification.</p> <p>Baie du Lévrier: Strict protection of all sites, both biological and landscape heritage. Controlling urban development around Nouadhibou.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                               |  |
| OBSERVATIONS                        | A classification decree draft is being completed in order to sign and strongly revitalize the COS DAL of the Baie de l'Etoile with the recommended involvement in observing the teams of the Nouadhibou commune and international and national NGOs (IUCN and local NGO).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                               |  |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY Medium                                            |  |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                               |  |
| EVOLUTION OF STAKES                 | <p>The Baie du Lévrier eastern shore's sector (MR1-e), given the absence of stakes, was associated with the entire Banc d'Arguin. The evolution of mining stakes on this shore and the fact that both the East and West shores are directly influenced by the pressures and pollution from the Nouadhibou facilities motivate the association of the MR1-d and MR1-e sectors, although they remain differentiated due to the distinct levels of concentration of the obviously more important stakes on the West shore.</p> <p>Current developments in this sector are marked by the development of mining operations and associated facilities, including the seawater intake activity in the Baie du Lévrier.</p> <p>Monitoring impacts related to the extension of the fishing port and agro-industrial facilities, risks of biological and chemical pollution, as well as the extension of the Cansado mining port.</p> <p>Privatizing the seafront around the Baie de l'Etoile (risks in the event of marine storm surge). Pollution and risks of alteration of the Baie de l'Etoile wetlands.</p> <p>Baie du Lévrier: risks of accumulation of pollutants from port and urban activities in the Baie du Lévrier, especially as the Nouadhibou free zone master plan is planning the establishment of the new airport, associated facilities, of three residential areas and an activity zone. These peri-urban developments and activity zones are located at short distance from the bottom of the Baie du Lévrier.</p> <p>Even if this Baie du Lévrier shore is considered in the Nouadhibou free zone master plan as a space to be preserved, the environmental impacts of the multiple activities of the free zone must be anticipated</p> |                                                               |  |
| HAZARDS                             | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                               |  |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY Medium                                            |  |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                               |  |
| EVOLUTION OF STAKES                 | <p>Current developments in this sector are essentially marked by the development of mining operations and associated facilities, including the seawater intake activity in the Baie du Lévrier.</p> <p>The Baie du Lévrier eastern shore's sector (MR1-e), given the absence of stakes, was associated with the entire Banc d'Arguin. The evolution of mining stakes on this shore and the fact that both the East and West shores are directly influenced by the pressures and pollution from the Nouadhibou facilities motivate the association of the MR1-d and MR1-e sectors, although they remain differentiated due to the distinct levels of concentration of the obviously more important stakes on the West shore.</p> <p>Monitoring impacts related to the extension of the fishing port and agro-industrial facilities, risks of biological and chemical pollution, as well as the extension of the Cansado mining port.</p> <p>Installing piers and pontoons by fish processing plants that can modify water circulation within the Bay.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                               |  |



|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| CURRENT PROJECTS          | <p>C"Monk Seal Conservation Program at Cap Blanc"<sup>4</sup> Program (MAVA Foundation).<br/> West Africa Coastal Areas Resilience Investment Project - WACA ResIP.<br/> Installing a large waste water treatment unit.<br/> Desalination plants.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |
| OUTSTANDING NATURAL AREAS | <p><b>Baie de l'Etoile Protected Area</b></p> <ul style="list-style-type: none"> <li>• Affected sector:MR1-d</li> <li>• Classification: ongoing</li> <li>• No ID WDPA</li> <li>• The Baie de l'Etoile conservation dynamics was formally initiated in 2010 with the creation of the Orientation and Monitoring Commission of the Coastal Development Guideline (DAL) of the Baie de l'Etoile (Joint Order n°2346/MDEDD/MPPEM establishing the Orientation and Monitoring Commission of the Coastal Development Guideline of the Nouadhibou Baie de l'Etoile and setting its functioning rules).</li> <li>• A «development and management plan for a multipurpose protected marine area in the Baie de l'Etoile» was developed and proposed in December 2013.</li> <li>• A «scientific report on the study of the Baie de l'Etoile» was prepared by IMROP and IUCN in January 2014.</li> </ul>                                                                                                                                                                                                                       |                  |
| HAZARDS                   | <p>Coastal erosion.<br/> Industrial pollution.<br/> Domestic waste water-related pollution (Cansado sewers, septic pits).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |
| RECOMMENDATIONS           | <p>Implementation of the Baie de l'Etoile Littoral Development Guidelines.<br/> Achieving the Baie de l'Etoile classification. Strict protection of all sites of the Baie du Lévrier, both biological and landscape heritage.<br/> Controlling urban sprawl around Nouadhibou as part of the free zone master plan implementation.<br/> Aligning illegal occupations on the DPM.<br/> Anticipating the development of the site by establishing: (i) a land reserve; (ii) developing a study of a local guideline to develop the coastline of the Baie de l'Etoile articulated with it.<br/> Strictly controlling, maintaining and preserving traditional pastoral activities with loads compatible with the undeveloped resources (pasture and water). Increased surveillance in case of new pastoral hydraulic facilities.<br/> Continuing archaeological research. Protecting sites and possible tourist development for the most outstanding ones. This activity must be supervised and focused on the hosting facilities deployed near the free zone and the Chami City to be managed at the Banc d'Arguin.</p> |                  |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY High |

<sup>4</sup> <http://mava-foundation.org/grants/monk-seal-conservation-program-at-cap-blanc/>



## MR2 BANC D'ARGUIN – NORTH NOUAKCHOTT

The MR2 area is essentially centered on the Banc d'Arguin National Park. The developments observed mainly concern:

- Developing the Chami town on the eastern border of the Banc d'Arguin National Park, in which the management facilities of the BANP have been established.
- Building a road linking Mamghar to the Nouakchott - Nouadhibou section. This road is mostly located within the BA
- Building the Tanit fishing port, which can accommodate about 300 pirogues, is a project worth 80 million Euros.



| MR2-a                               | 6 - BANC D'ARGUIN (BANP)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |
| DIAGNOSTIC                          | Land and marine complex of high ecological and fishing value that has justified its classification as a World Heritage National Park, which is currently being developed for tourism compatible with conservation objectives.<br>Imraguen populations of the BANP, numerous spontaneous settlement sites along the edge of the Park on the road connecting Nouakchott to Nouadhibou.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |
| DYNAMICS                            | Complex, large fossil delta, widely documented by the PACOBA project <sup>5</sup> .<br>Essentially made up of coastal areas of very low elevation, except for some sandstone micro-cliffs. The BANP shores («sand rivers») are particularly sensitive to the sea-level rise combined with storm surges. Some Imraguen villages are now threatened and undergo periodic submersions, which may already justify some relocations.<br>Sea-level rise can also weaken the sedimentary stocks that are established from the Nouakchott sea level. This degradation of certain sandy cordons leads to the reconnection of depressions with the sea and the reactivation of lagoons. In the next decade, this dynamic could lead to local reconfigurations of the coastline physiognomy in and outside the Banc d'Arguin.                      |                    |
| STAKES                              | Conserving the Banc d'Arguin ecological complex in a context of increasing economic pressures and commercial incentives, particularly regarding the fishery products from the Park.<br>Controlling access conditions, particularly concerning the prohibition of shallow water trawling.<br>Developing tourist facilities.<br>Nesting sites for endemic subspecies (spoonbills), risk of submersion for certain villages (Iwik and R'gueiba).                                                                                                                                                                                                                                                                                                                                                                                           |                    |
| RECOMMENDATIONS                     | Recommended involvement of BANP teams in monitoring.<br>Application of the BANP Development and Management Plan.<br>Observatory of the Banc d'Arguin set up under the PACOBA project.<br>Installing a sentinel device for sea-level observation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY Low    |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |
| EVOLUTION OF STAKES                 | Developing mining operations and associated facilities, including a planned seawater intake activity near the park (TASIAST).<br>Developing a wind turbine power plant.<br>Considering the distant impacts of the Nouadhibou port.<br>Building a new road linking Mamghar to the Nouakchott-Nouadhibou section.<br>The growth of the Chami City may constitute an attractive pole in the direct limit of the park.                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |
| HAZARDS                             | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY Medium |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |
| EVOLUTION OF STAKES                 | Conserving the Banc d'Arguin ecological complex in a context of increasing economic pressures and commercial incentives, particularly regarding the fishery products from the Park.<br>Controlling access conditions, particularly concerning the prohibition of shallow water trawling. Developing tourist facilities.<br>Nesting sites for endemic subspecies (spoonbills).<br>Risks of submersion for certain villages (Iwik and R'Gueiba).<br>Important developments in the planned city of Chami, whose population would turn around 15,000 inhabitants.<br>Gradual increase in the population of small settlements points along the main road axis.<br>Managing environmental pressures, if not anticipated, related to the proximity of the free zone and the Chami town.<br>Tourism development (ecotourism).<br>Sport fishing. |                    |
| CURRENT PROJECTS                    | «Managing and Conserving the Banc d'Arguin Ecosystems (GEBA)» Project (MAVA Foundation) <sup>6</sup> .<br>Regional Project for the Coastal Facilities Impacts Reduction on West African Ecosystems (PRISE).<br>WA5-Regulating coastal infrastructure development <sup>7</sup> (MAVA Foundation).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |

<sup>5</sup> PACOBA Project (Project to deepen scientific knowledge on the Banc d'Arguin ecosystems) is an ongoing cooperation program (2007-2010) between the French Ministry of Foreign Affairs, the Mauritanian Institute of Oceanographic Research and Fisheries (IMROP) and the Banc d'Arguin National Park (BANP).

<sup>6</sup> <http://mava-foundation.org/grants/gestion-et-conservation-des-ecosystemes-du-banc-darguin-geba/>

<sup>7</sup> <http://mava-foundation.org/grants/projet-de-reduction-de-limpact-des-infrastructures-sur-les-ecosystemes-cotiers-en-afrique-de-louest-pri-1-outils-et-renforcement-des-capacites/>  
<http://prise.prcmarine.org/en>



| MR2-a                     | 6 - BANC D'ARGUIN (BANP)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           | <p>West Africa Coastal Areas Resilience Investment Project - WACA ResIP<sup>8</sup>.<br/> BirdLife International's Alcyon II project for the Wetlands and Coastal Birds Action Plan (PAZHOC) (funded by the MAVA Foundation, the BANP and the NGO Nature Mauritania):</p> <ul style="list-style-type: none"> <li>• Training of field agents, park eco-guides and volunteers on seabird monitoring in the BANP.</li> </ul> <p>GRID Arendal<sup>9</sup>.<br/> BACoMaB Trust Fund<sup>10</sup> (Sustainable Funding Mechanism to Safeguard Coastal and Marine Biodiversity in Mauritania). The actions carried out on a recurrent basis at the BANP level are:</p> <ul style="list-style-type: none"> <li>• Supporting the marine and coastal surveillance system,</li> <li>• Supporting the shared governance activities,</li> <li>• Supporting the development of a BANP monitoring dashboard.</li> </ul> <p>Regarding the «small grants», one of them is dedicated to «the study on the economic value of the ecosystem services provided by the BANP ecosystem» (BACoMaB granted an amount of €175,000, funded by the FFEM funding). This study should contribute in particular to quantify the contribution of the Park's ecosystems to the renewal of fishery resources and to the capture and storage of marine carbon (Blue Carbon).</p> <p>Community development activity in the communes of Benichab and Chami (WACA ResIP).<br/> Ecosystem restoration activity at Nouamghar Point (WACA ResIP).</p>                                                                                                                                     |
| OUTSTANDING NATURAL AREAS | <p><b>Banc d'Arguin National Park (IUCN Category II)</b></p> <ul style="list-style-type: none"> <li>• WDPA ID : 797</li> <li>• Affected sectors: MR1-e / MR2-a / MR2-b</li> <li>• Classification: June 24, 1976 (Decree n°76/147/P.R)</li> <li>• Visits have been regulated by Order n°R-132 of August 11, 1986 regulating visits to the Banc d'Arguin National Park and the Cap Blanc Satellite Reserve.</li> <li>• Act n°2000/024 of January 19, 2000 on the Banc d'Arguin National Park specified the delimitation, the modalities of development, conservation, preservation and management of the park, the penal provisions and surveillance.</li> <li>• The park organization and functioning were specified by Decree n°2006-058 of June 14, 2006 setting the organization and functioning rules of the Banc d'Arguin National Park.</li> <li>• The applicable rules of Act n°2000/024 of January 19, 2000 were defined by Decree n°2006-068 of July 3, 2006.</li> <li>• The Development and Management Plan 2010 - 2014 completed in December 2009 and adopted by the Board of Directors of the park on January 28, 2010.</li> </ul> <p><b>Banc d'Arguin Ramsar Site</b></p> <ul style="list-style-type: none"> <li>• ZHII ID : 1MR001 - 250 / WDPA ID : 17726</li> <li>• Affected sectors: MR1-e / MR2-a / MR2-b</li> <li>• Designation on October 22, 1982 (1,200,000 ha).</li> </ul> <p><b>Banc d'Arguin World Heritage Site</b></p> <ul style="list-style-type: none"> <li>• UNESCO WH ID : 506 / UNESCO WH WDPA ID : 20388</li> <li>• Affected sectors: MR1-e / MR2-a / MR2-b</li> <li>• Natural criteria (ix) and (x).</li> </ul> |
| HAZARDS                   | <p>Coastal erosion (urbanization).<br/> Pollution.<br/> Marine submersion.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| RECOMMENDATIONS           | <p>Need to update the RAMSAR fact sheet, to publish a report on the state of biodiversity and ecological habitat degradation, to understand the impact of climate change, solid waste and plastics on the BANP. Developing a territorial prospective work site, the implementation of which is admittedly very late given the observed developments, would at least enable to consider the intensification of threats in the future. Installing a sentinel device to observe the sea-level evolution.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                           | CRITICALITY High                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

<sup>8</sup> <https://www.wacaprogram.org/>

<sup>9</sup> GRID Arendal, a Norwegian foundation collaborating with the United Nations Environment Organization.

<sup>10</sup> BACoMaB Trust Fund, a foundation under the English law, recognized as a «Charity» in the United Kingdom, with a headquarters agreement allowing it to carry out its activities in Mauritania, where it has been recognized as a public utility since December 2010. At all beneficiary sites, the activities supported by the BACoMaB Trust Fund aim at:

- Promoting the conservation, protection and improvement of the physical and natural environment of the Banc d'Arguin National Park, of the Diawling National Park and other coastal and marine areas in Mauritania.
- Promoting, for the benefit of the populations, the sustainable development of the «beneficiary areas» by:
  - ✓ Preserving, conserving and protecting the environment and the reasonable use of the natural resources of the beneficiary areas;
  - ✓ Reducing poverty and improving the living conditions of the populations in the beneficiary areas.
  - ✓ Promoting the means for sustainable economic development and revitalizing the beneficiary areas.
- Promoting the education of the populations in the field of biodiversity, conservation and sustainable management of the beneficiary areas.

BACoMaB also has a «Small Grants» window to support other actors working in the beneficiary areas or working for their sustainable management.



| MR2-b                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 7 - MAMGHAR – MAJHRAT |  |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |  |
| DIAGNOSTIC                          | Sandy shoreline backed by a complex of dunes and interdune spaces with a vigorous landscape. At low tide, this shoreline is used by car, for lack of an easy access road.<br>Attractive location, for being close to the BANP without suffering from all the constraints.<br>A few settlement points, including mostly permanent and temporary fishing camps.<br>Intensifying octopus fishing following the development of this species in this area.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |  |
| DYNAMICS                            | Variable, coastline subject to littoral drift, some vulnerable points in case of storm surges.<br>Probably significant wind sedimentary inflows moving through the regional littoral drift.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |  |
| STAKES                              | Lack of drinking water limiting development prospects.<br>Protecting fixed vegetation in a context of nomadic livestock farming.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |  |
| RECOMMENDATIONS                     | Recommended involvement of BANP teams in monitoring.<br>Application of the BANP Development and Management Plan.<br>Observatory of the Banc d'Arguin set up under the PACOBA project.<br>Installing a sentinel device for sea-level observation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |  |
| MONITORING                          | No recommendation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY Low       |  |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |  |
| EVOLUTION OF STAKES                 | Dynamic coastal erosion these recent years.<br>Few developments, but significant traffic on the runways along the coastline: <ul style="list-style-type: none"><li>• Modest development of small scattered fishing camps.</li><li>• Establishing a road linking Mamghar to the Nouadhibou-Nouakchott section and crossing part of the Banc d'Arguin National Park.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |  |
| HAZARDS                             | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |  |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY Medium    |  |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |  |
| EVOLUTION OF STAKES                 | There may be a risk of unsupervised development of tourist activities resulting from the transit of all-terrain vehicles through the beaches, uncontrolled fishing landing points, and fish trading based on the resources exploited in particular by incursions of motorized boats into the Banc d'Arguin.<br>These developments are facilitated by the access to the coastal road at Mhajrat level.<br>This sector can indeed become an alternative to the location of various activities (i) associated with the resources of the park, but not compatible with the specific status and constraints of the park (ii) activities whose development would be hampered by the constraints of protecting the fragile barrier beach further south. These include in particular motorized itinerant camping facilitated by the continuous access to the beach by 4x4 vehicles, the fish trade, and the small-scale processing of fishery products from the BANP.<br>Mhajrat is expected to host a Developed Landing Point (PDA) around which an integrated development pole can be developed. |                       |  |
| CURRENT PROJECTS                    | Wind power, economic development hub, solar.<br>The Master Plan for the development of fishing facilities in Mauritania (25-year horizon) established in 2014 plans: <ul style="list-style-type: none"><li>• creating a port in the north of M'hajratt</li><li>• strengthening the presence of the administration at the Mamghar landing site by creating, in particular, an «administrative block», housing for the agents and associated equipment, and premises for the security services (police and/or gendarmerie).</li><li>• recalling the need for a seawater desalination unit in Mamghar expressed in the (mentioned in the CDMT<sup>11</sup> of the MPEM 2008-2012)</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                   |                       |  |
| OUTSTANDING NATURAL AREAS           | No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |  |
| HAZARDS                             | Coastal erosion.<br>Solid waste pollution (plastic).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |  |
| RECOMMENDATIONS                     | Raising awareness of fishermen and coastal populations for a better management of solid waste, especially plastic.<br>Protecting fixed vegetation in a context of nomadic livestock farming.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |  |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY Medium    |  |

<sup>11</sup> Overall Medium-Term Expenditure Framework





| MR2-c                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 8 - TANIT – SEBKHRA N'DRAMCHA |  |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                               |  |
| DIAGNOSTIC                          | Sandy shoreline backed by unstable and low-lying dune formations. At low tide, this shoreline is used by car, for lack of an easy access road.<br>Hinterland characterized by the Sebkhra N'Dramcha.<br>Tanit fishing port project.<br>Very small resident population grouped in a few settlement points.                                                                                                                                                                                                                                                                                                                                  |                               |  |
| DYNAMICS                            | Variable, coastline subject to littoral drift, some vulnerable points in case of storm surges.<br>Wind sedimentary inflows very reduced around the great Sebkhra.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                               |  |
| STAKES                              | Lack of drinking water limiting development prospects.<br>Search for viable alternatives to develop Sebkhra N'Dramcha.<br>Protecting fixed vegetation in a context of nomadic livestock farming.<br>Supervising fishermen's landing sites to better manage the coastal area and, consequently, protect the coastal dune                                                                                                                                                                                                                                                                                                                    |                               |  |
| RECOMMENDATIONS                     | Under the assumption of starting the Tanit port project, anticipating developments on the outskirts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                               |  |
| MONITORING                          | No recommendation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY Low               |  |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                               |  |
| EVOLUTION OF STAKES                 | Under the assumption of starting the Tanit port project, anticipating developments on the outskirts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                               |  |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY Low               |  |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                               |  |
| EVOLUTION OF STAKES                 | The current developments in this sector are essentially marked by the establishment of the Tanit fishing port, the construction of which was launched in 2014. It should be able to accommodate about 360 artisanal and coastal fishing units, including 300 pirogues. The Tanit port has been the subject of a subdi- vision plan established by the MPEM, and is part of the development strategy of integrated fishing poles. Applying for an operating permit by the International Mining Group company to exploit metalliferous minerals contained at the coastal cordon level (and mainly in the coastal dunes).<br>Oil exploration. |                               |  |
| HAZARDS                             | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                               |  |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY Medium            |  |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                               |  |
| EVOLUTION OF STAKES                 | Finalizing the Tanit fishing port building.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                               |  |
| CURRENT PROJECTS                    | High-voltage electricity.<br>Fishmeal manufacturing plant.<br>Freezing plants, other plants.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                               |  |
| CURRENT PROJECTS                    | No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                               |  |
| HAZARDS                             | Coastal erosion.<br>Solid and liquid waste pollution.<br>Algal and jellyfish proliferation noticed in recent years.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                               |  |
| RECOMMENDATIONS                     | Anticipating (planning - DAL) developments on the outskirts of Tanit and other population centers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |  |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CRITICALITY Medium            |  |



TANIT PORT INFRASTRUCTURE (2016)





| MR2-d                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 9 - DJREIDA        |  |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |  |
| DIAGNOSTIC                          | Sandy shoreline backed by unstable dune formations of variable altitude. At low tide, this shoreline is used by car, for lack of an easy access road.<br>In the southern part reaching Nouakchott, marine terrace with a good development readiness.<br>In this sector, the new airport project of Djreida.                                                                                                                                                                                                                                                                                        |                    |  |
| DYNAMICS                            | Variable, coastline subject to littoral drift, some vulnerable points in case of storm surges.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |  |
| STAKES                              | Protecting fixed vegetation in a context of nomadic livestock farming.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |  |
| RECOMMENDATIONS                     | Anticipating a probable residential development (land reserve) in the north of Nouakchott induced by the Nouakchott-Nouadhibou road axis.<br>Airport project in Djreida.                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |  |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CRITICALITY Low    |  |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |  |
| EVOLUTION OF STAKES                 | Current developments in this sector are essentially marked by the development of the new airport in the area expected by the SDLAO.<br>Shell sand extraction.                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |  |
| COASTAL PROTECTION                  | Fixing dunes in several points.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |  |
| HAZARDS                             | Dune progression requiring fixation works.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |  |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY Medium |  |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |  |
| EVOLUTION OF STAKES                 | Completed - operating airport<br>Developing leisure, industrial, agricultural (small-scale livestock farming, etc.) coastal facilities.<br>Required compliance with the precautionary principle to avoid triggering rapid erosion processes: <ul style="list-style-type: none"><li>• Complying with the dune cordon formations.</li><li>• Preventing the coastline privatization in the whole sector.</li></ul>                                                                                                                                                                                    |                    |  |
| CURRENT PROJECTS                    | Saudi military base project (to be confirmed).<br>Construction projects for a congress center, hotels, inns (Soutan, Nicolas, Rovehotel).                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |  |
| OUTSTANDING NATURAL AREAS           | No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |  |
| HAZARDS                             | Coastal erosion.<br>Solid waste pollution (plastic).<br>Weakening the coastal dune by permanent human presence (fishing sites, tourism, motor sports, etc.).                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |  |
| RECOMMENDATIONS                     | Since the residential developments mentioned in 2005 were not anticipated, it is important that the DPM is at least respected. This space is to be integrated into the Nouakchott's DAL, in order to consider that the future multiplication of coastal facilities does not eventually lead to the same difficulties as those experienced in the capital city.<br>The land reserve of unallocated areas (Differed Development Area - ZAD) would be a wise action, allowing for future allocations to be made once the major spatial orientations for the development of this space are determined. |                    |  |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY Medium |  |



PIONEER FACILITIES ON THE DUNE CORDON IN THE NORTH OF NOUAKCHOTT



**MR3****NOUAKCHOTT**

The long south-north depression of Aftout es-Saheli, parallel to the shore at a short distance, which runs along the Mauritanian coast from the Senegal River Delta to Nouakchott is to be noted. This long «gutter» increases considerably the risk of large submersion in the event of a major marine intrusion.

Building the port of Nouakchott with a pier perpendicular to the littoral drift flow has been responsible for serious erosion issues in the south of the port currently under rehabilitation.



| MR3-a                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 10 - NORTH NOUAKCHOTT |                  |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |                  |
| DIAGNOSTIC                          | Coastal portion of the Nouakchott urban space.<br>Very important fishing center in the northern part, Wharf.<br>Despite the strong accretion observed in the north of the dike of the Nouakchott port, the coastal cordon is generally quite low, even locally very low.<br>Conquest of the Public Maritime Domain in the north of the fishermen's port.<br>Walls delimiting «concessions» on the beach.                                                                                                                                                                                       |                       |                  |
| DYNAMICS                            | To the north of the sector (area known as the «cabins»), a strong recessed coastline was observed.<br>In spite of the existence of the port and its pier further south, presence of a berm at the top of the beach, exposing indurate materials in front of the dune.<br>Between the fishermen's port and the wharf, a narrow barrier beach with local saddles favoring marine intrusion in case of storm surge.                                                                                                                                                                               |                       |                  |
| STAKES                              | Sand extraction in several points.<br>Implementing buildings (hotels in particular) on the dune.<br>Strong presence leading to the collapse of the dune cordon.<br>Development of the urban coastline and protection of the dune cordon.<br>Peri-urban district project on 5 km of coast that could affect the cordon and the scarce natural vegetation.                                                                                                                                                                                                                                       |                       |                  |
| RECOMMENDATIONS                     | Developing the urban coastline access and protecting the dune cordon.<br>Servicing plan for vulnerable areas.<br>Prohibiting sand extraction.<br>Prohibiting buildings.<br>Protecting the fixing vegetation.                                                                                                                                                                                                                                                                                                                                                                                   |                       |                  |
| MONITORING                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | gular and light       | CRITICALITY High |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |                  |
| EVOLUTION OF STAKES                 | Continuing urban expansion from Nouakchott to the north.<br>Modifying the main pier/jetty of the port by a perpendicular facility in the second half of 2015.                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |                  |
| COASTAL PROTECTION                  | Fixing dunes in several points.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |                  |
| HAZARDS                             | Strong erosion.<br>Anarchic occupation of the maritime domain.<br>Deconcerted management of the coastal area.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |                  |
| MONITORING                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Regular and intensive | CRITICALITY High |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |                  |
| EVOLUTION OF STAKES                 | Current developments in this sector are recent and concern mainly the densification of the housing at the northern mouth of Nouakchott, which may result in an anarchic occupation of the coastline, and the extension of residential districts in wet depressions in the Sebkhra and Ryad districts.<br>Other important developments concern: <ul style="list-style-type: none"><li>• Expanding and equipping the Nouakchott Fish Market.</li><li>• Works at the port of Nouakchott.</li></ul> Sand extraction on the dune cordon has ceased following a strengthened regulation and control. |                       |                  |
| CURRENT PROJECTS                    | West Africa Coastal Areas Resilience Investment Project - WACA ResIP <sup>12</sup> . <ul style="list-style-type: none"><li>• Support for Tervagh Zeina's joint community activities,</li><li>• Nouakchott Coastal Management Guideline - North and South sectors,</li><li>• Filling breaches, fixing dunes, developing crossing structures.</li></ul> Developing urban drainage.                                                                                                                                                                                                               |                       |                  |
| OUTSTANDING NATURAL AREAS           | No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |                  |
| HAZARDS                             | Coastal erosion.<br>Marine submersion.<br>Solid and liquid pollution.<br>Deterioration of the protective green cover of the border dune.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |                  |
| RECOMMENDATIONS                     | Developing the urban coastline access and protecting the dune cordon.<br>Servicing plan for vulnerable areas.<br>Prohibiting sand extraction.<br>Prohibiting buildings on the dune system and preserving the DPM.<br>Protecting the fixing vegetation.<br>Deepening the knowledge on the functioning of the Nouakchott water table.<br>Deepening the knowledge on the wind power supply of the dune cordon of the Nouakchott coastline.<br>Filling the breaches in the dune cordon as a transitional action.                                                                                   |                       |                  |
| MONITORING                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Regular and intensive | CRITICALITY High |

<sup>12</sup> <https://www.wacaprogram.org/>



THE NOUAKCHOTT FISH MARKET / NOUAKCHOTT FISHING PORT IS NOW HOSTING APPROXIMATELY 1,646 SMALL-SCALE AND COASTAL FISHING UNITS.







## NOUAKCHOTT AND ASSOCIATED FACILITIES



Above, the evolution of the Nouakchott port and associated facilities between 2011 (top) and 2015 (bottom). The main evolutions concern: (i) Building of a new wharf (2013) (ii) extending the pier/protection dyke by 5km towards the west and (iii) building a pier/riprap in the south of the port to mitigate erosion.





| MR3-b                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 11 - SOUTH NOUAKCHOTT – PK28 |  |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |  |
| DIAGNOSTIC                          | Coastal portion of Nouakchott's urban space highly subject to erosion.<br>Some protective developments.<br>Very thin coastal cordon, disappearing at several points.<br>Large wet depression at a short distance from the shoreline, which can be connected to the sea in case of marine intrusion from the lowest points.                                                                                                                                                                                                                                                                                                                                                                                                                                          |                              |  |
| DYNAMICS                            | Strong erosion, area deprived of sedimentary inflows by the port pier.<br>Significant marine intrusions already noted.<br>Scouring and heaving of the protective spur.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                              |  |
| STAKES                              | Very high risks of marine intrusion with submersion of the precarious Sebkhra districts and probable flooding of the depression near Aftout es Saheli.<br>Deteriorating facilities in the south of the port.<br>Risks of water table rising, which could become permanently exposed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |  |
| RECOMMENDATIONS                     | Consolidating and improving existing anti-erosion facilities.<br>Relocating populations of the most threatened sectors.<br>Implementing an early warning system and flood risk prevention plan.<br>Totally protecting the dune formations cordon and the fixing vegetation. Prohibiting any building.<br>Considering by-pass solutions at the Port level.                                                                                                                                                                                                                                                                                                                                                                                                           |                              |  |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY Very high        |  |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |  |
| EVOLUTION OF STAKES                 | Continuing the urban sprawl from Nouakchott toward the south.<br>Extension work of the port of Nouakchott.<br>In the extreme south of the sector: completing a tourist complex in 2014.<br>Regarding the strategy of integrated development hubs for the fishing sector, a development of facilities at PK 28 is noted, which includes the construction of half a dozen fish processing plants on the beach in the south of the sector from 2011 to 2015. The occupation of PK 28, of a few hundred meters in 2005, has now grown to more than 3 km.<br>Launching in 2017 at PK 28 the construction of a fishing port on free land capable of receiving catches estimated at 400,000 tons.                                                                          |                              |  |
| PORT FACILITIES                     | The port of Nouakchott (or the Sino-Mauritanian Friendship Port) is located in the south of Nouakchott City, on the Atlantic coast. It consists of a pier/jetty in the north which has led to an accretion phenomenon in the north of the port, and erosion in the southern part (a pier/dyke has also been established in this area in 2011 to mitigate this phenomenon: T-shaped riprap).<br>The port extension works were started in September 2009 and were carried out by the China Road and Bridge Corporation – SNCTPC. The construction of an oil wharf, a breakwater and a 5km protective dike enabled to increase its capacity from 3 to 6 million tons per year.<br>The works were inaugurated in August 2014. Extension Cost: 220 million Chinese loan. |                              |  |
| COASTAL PROTECTION                  | Breach warping operations of the dune cordon by the Directorate of Protected Areas and Littorals (DAPL/ MESD).<br>Reinforcing the dune cordon.<br>Draining and treating rainwater evacuation in the lowest Sebkhras.<br>Construction of a pier/dike (T-shaped riprap) in 2011 to mitigate the erosion phenomenon induced by the port facilities in the south of the port.                                                                                                                                                                                                                                                                                                                                                                                           |                              |  |
| HAZARDS                             | Strong erosion.<br>Marine submersion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                              |  |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY Very high        |  |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |  |
| EVOLUTION OF STAKES                 | Extending the City of Nouakchott.<br>Developing fish processing plants (around PK 28 – North)<br>Creating a fishery pole at PK 28.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |  |
| CURRENT PROJECTS                    | West Africa Coastal Areas Resilience Investment Project – WACA ResIP <sup>13</sup> : <ul style="list-style-type: none"><li>• Supporting joint community activities for El Mina, Sebkhra and Tévragh Zeina;</li><li>• Coastal Management Guideline (DAL) of Nouakchott – North and South sectors.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                              |  |

<sup>13</sup> <https://www.wacaprogram.org/>



| MR3-b                     | 11 - SOUTH NOUAKCHOTT - PK28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| OUTSTANDING NATURAL AREAS | No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
| HAZARDS                   | Coastal erosion.<br>Marine submersion.<br>Green cover deterioration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| RECOMMENDATIONS           | Consolidating and improving existing anti-erosion facilities.<br>Relocating populations of the most threatened sectors.<br>Implementing an early warning system and flood risk prevention plan.<br>Totally protecting the dune formations cordon and the fixing vegetation. Prohibiting any building.<br>Considering by-pass solutions at the Autonomous Port of Nouakchott, through complementary studies.<br>Completing the Nouakchott coastal DAL with a natural risks prevention plan.<br>Completing the DAL for the integrated development hub.<br>Controlling the total prohibition of any material extraction from the whole cordon.<br>Warping by mechanical means the cordon of the breaches and saddles at least at the IGN +4 level.<br>Defenses (as transitional actions) in the south of the Autonomous Port of Nouakchott.<br>Stabilizing the cordon in its primary function of protecting the coast by specific revegetation actions (vegetable material that cannot be used for other purposes).<br>Totally protecting the cordon and traffic plan (presence and traffic prohibited outside the equipped tracks). Developing a service plan for «vulnerable areas» on the beaches, equipping related activities, waste management, etc.<br>Studying and assessing by-passing alternatives in order to reduce the silting upstream of the Autonomous Port of Nouakchott and the retreat of the coastline downstream.<br>Relocating industrial facility projects in the Nouakchott Autonomous Port area along the port-center link to the Ryiad district.<br>Classifying in non-constructible sites the lowest areas and those most threatened by the risk of various floods (marine intrusions, exceptional down-powers, rising water tables).<br>Investigative works to improve the understanding of the Nouakchott's water table functioning.<br>bited grazing or natural reserve of the high-risk flood zone located in the south of the Nouakchott Autonomous Port-Ryiad district section. |                       |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY Very high |



## MR4

SOUTH MAURITANIA  
SENEGAL RIVER DELTA

The long south-north depression of Aftout es-Saheli, parallel to the shore and at a short distance from it, which runs along the Mauritanian coast from the Senegal River Delta to Nouakchott. This long «gutter» increases considerably the risk of large submersion in the event of a major marine intrusion.

The whole area is marked by a certain development of tourist activities with the establishment of some host facilities. At the same time, mining activities of dune sand extraction are also noted. In the southern part, oil exploitation continues.

The recent discovery of an important gas field on the border with Senegal, off the coast of Saint-Louis is also to be noted.



| MR4-a                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 12 - PK28 – SOUTH TIGUENT <sup>14</sup> |  |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|--|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                         |  |
| DIAGNOSTIC                          | Sandy coast backed by a narrow cordon (sometimes less than 100 m) bordered to the east by the Aftout es Saheli depression occasionally flooded.<br>Low human occupancy concentrated on the four points served (fishing poles).<br>Rapid growth of the Legweishis pole reinforced by the recent opening up of roads.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                         |  |
| DYNAMICS                            | High natural instability, fragility of dune formations.<br>Sedentarization of populations in these easily accessible coastal hubs will also result in increased pressure on the perennial vegetation of vulnerable areas due to sedentary livestock farming activities in huts not subject to water availability restrictions, and the impacts of which must be controlled.                                                                                                                                                                                                                                                                                                                                                                                                          |                                         |  |
| STAKES                              | Preserving the dune fixing vegetation in a sedentarization context of the populations around the few villages, with a livestock farming activity less subject to the water availability constraints.<br>Risks of marine intrusions in the Aftout marine depression still present locally.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                         |  |
| RECOMMENDATIONS                     | Consolidating the equipment around the few villages, protecting strictly the coastal dune vegetation.<br>Limiting buildings and urban sprawl in the areas between villages.<br>Controlling material extraction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                         |  |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY Medium                      |  |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                         |  |
| EVOLUTION OF STAKES                 | Building a hotel and a plant should help to make this sector more attractive for other developments.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                         |  |
| EXTRACTIVE ACTIVITIES               | Prospecting to extract metallic minerals contained in the dune cordon.<br>Oil and gas prospecting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                         |  |
| HAZARDS                             | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |  |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY Medium                      |  |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                         |  |
| EVOLUTION OF STAKES                 | Completed and operating hotel<br>Small-scale fishing landing area.<br>The Master Plan for the development of fishing facilities in Mauritania (25-year horizon) established in 2014 plans: <ul style="list-style-type: none"><li>• «Strengthening the presence of the Administration at the landing sites».</li><li>• «Building a wharf capable of hosting 40 coastal units or purse seines and with mechanical equipment (suckers) for landing operations».</li><li>• Creating «a pole valuing small pelagics» including especially an artisanal fishing Professional Training Center.</li></ul> Offshore oil and gas prospecting.<br>Prospecting (and exploitation) to extract metalliferous minerals contained in the coastal sand (essentially at the level of the dune cordon). |                                         |  |
| CURRENT PROJECTS                    | West Africa Coastal Areas Resilience Investment Project - WACA ResIP <sup>15</sup> .<br>Community development activities of the Tiguent commune (WACA ResIP).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                         |  |
| OUTSTANDING NATURAL AREAS           | No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                         |  |
| HAZARDS                             | Erosion.<br>Solid waste pollution (plastic).<br>Extracting coastal sand (mainly at the dune cordon) to value metallic minerals by the MTR company (with an exploitation permit) and by the Haitian company (without an exploitation permit) in 2019. Exploration and exploitation activities are stopped by ministerial order since September 19, 2019.                                                                                                                                                                                                                                                                                                                                                                                                                              |                                         |  |
| RECOMMENDATIONS                     | Involving the Directorate of Protected Areas and Littoral (DAPL) in the validation of all the actions to combat coastal erosion, the data collecting methods to monitor the coastline and the identification of vulnerable areas on the dune cordon.<br>Implementing the DAL to supervise the development of the growing hubs: <ul style="list-style-type: none"><li>• Consolidating the equipment around the few villages, protecting strictly the coastal dune vegetation.</li><li>• Limiting buildings and urban sprawl in the areas between villages. Controlling material extraction.</li><li>• Complying with the DPM for all near-shore facilities.</li></ul>                                                                                                                 |                                         |  |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY High                        |  |

<sup>14</sup> The exact delimitation of this sector will have to be confirmed during the next regional technical events.

<sup>15</sup> <https://www.wacaprogram.org/>



| MR4-b                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 13 - SOUTH TIGUENT – CHOTT BOUL |                    |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|--------------------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |                    |
| DIAGNOSTIC                          | Direct coastline slightly curved. Larger sandy formations (1 to 2km) between the shore and the Aftout depression.<br>Sector further from the asphalt road connecting with Nouakchott, therefore relatively landlocked, out of traffic through the beach.<br>Chat Tboul RAMSAR site, former mouth of an arm of the Senegal River. This site is of ornithological interest, as well as the marshes of Tumbos I and II (or North and South), located back from the border dune, which are home to a nesting population of lesser flamingos. These marshes are bordered on their western shore by Acacia stands located at the foot of the border dune, and whose regeneration capacities are significant in a landlocked context where pastoral pressure is still moderate. |                                 |                    |
| DYNAMICS                            | Sector more stable than the previous ones, however, subject to coastal drift and active wind transport.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                 |                    |
| STAKES                              | Oil prospecting?<br>Developing discovery tourism related to the proximity of the Senegal River Biosphere Reserve?<br>Densifying human occupancy remains unlikely.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                 |                    |
| RECOMMENDATIONS                     | Preserving natural environments as part of the Senegal Delta Transboundary Biosphere Reserve (RBTDS).<br>Recommended involvement of the Directorate of Protected Areas and Littorals and the Diawling National Park (DNP) teams in the monitoring (wildlife with focus on the avifauna).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                 |                    |
| MONITORING                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Watch-keeping                   | CRITICALITY Low    |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |                    |
| EVOLUTION OF STAKES                 | Developing a few tourist-oriented sites with limited capacity .<br>Developing a fishing hub at PK 144 in the south of Nouakchott.<br>Developing coastal tracks linking the development pole to the Nouakchott - Rosso road axis.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                 |                    |
| EXTRACTIVE ACTIVITIES               | Dark sand extraction.<br>Intensifying oil and gas prospecting.<br>Aftout water pipeline.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                 |                    |
| HAZARDS                             | Strong erosion.<br>Marine submersion.<br>Littoral domain occupied (fisheries, mining, livestock farming etc.).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 |                    |
| MONITORING                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Regular and light               | CRITICALITY Medium |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |                    |
| EVOLUTION OF STAKES                 | Small-scale fishing landing areas.<br>Developing a discovery tourism related to the proximity of the Senegal River Biosphere Reserve. Densifying human occupancy will remain moderate except for strong modifications and new attractiveness related to the future delta multi-use port, and gas exploration facilities.<br>Prospecting to extract metalliferous minerals contained in the coastal sand (essentially at the level of the dune cordon).                                                                                                                                                                                                                                                                                                                   |                                 |                    |
| CURRENT PROJECTS                    | Supporting offshore oil exploitation<br>The DAL of N'Diogo, currently being developed, plans: <ul style="list-style-type: none"><li>• A N'Diogo community project,</li><li>• Fixing the dune cordon.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 |                    |
| OUTSTANDING NATURAL AREAS           | <b>Chat Tboul Ramsar Site</b> <ul style="list-style-type: none"><li>• ZHII ID : 1MR003 – 250 / WDPA ID: 900595</li><li>• Affected sectors:MR4-c / MR4-d</li><li>• Designation on November 10, 2000 (15,500 ha).</li><li>• Presents an ornithological interest, as well as the marshes of Tumbos I and II (or North and South), located back from the border dune, which are home to a nesting population of lesser flamingos.</li></ul>                                                                                                                                                                                                                                                                                                                                  |                                 |                    |
| HAZARDS                             | Erosion.<br>Marine submersion.<br>Deterioration of the marine turtles habitat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                 |                    |
| RECOMMENDATIONS                     | Recommended involvement of the Directorate of Protected Area and Littoral, and the Diawling National Park teams in the monitoring (wildlife and focus on the avifauna): <ul style="list-style-type: none"><li>• Implementing the Diawling Development and Management Plan.</li><li>• Adopting a legal status for the Chat Tboul Ramsar site.</li></ul> Strategic environmental assessment of the multipurpose port of N'Diogo.                                                                                                                                                                                                                                                                                                                                           |                                 |                    |
| MONITORING                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Regular and light               | CRITICALITY High   |



| MR4-c                               | 14 – CHOTT BOUL – GHARA (RBTDS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |
| DIAGNOSTIC                          | <p>This sector is part and parcel of the Senegal Delta Transboundary Biosphere Reserve (RBTDS) classified by UNESCO on June 27, 2005. The main conservation core is the Diawling National Park. Seasonal re-watering of the Diawling National Park basins using OMVS structures has enabled a spectacular ecological restoration of this complex since 1996. It is a vast flood plain, scattered with clay basins, whose monotony is broken by a few terraces, levees and dunes. A dike and sluice system structures the space of basins on either side of the river.</p> <p>The altitude is generally very low and peaks at about twenty meters.</p> <p>Some areas are located below the sea level (up to 0.5m).</p> <p>Significant migratory avifauna parking areas.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |
| DYNAMICS                            | <p>A large seafront border dune, however, certainly unstable and subject to significant wind transport, and closely depending on the management of freshwater inflows.</p> <p>The area subject to the influence of tides (including salt water) seems to have expanded following the opening of the breach in the Langue de Barbarie in nearby Senegal, thus disrupting various activities, particularly fishing activities related to brackish environments.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |
| STAKES                              | <p>Conserving a unique complex of wetlands of international importance for the migratory avifauna.</p> <p>Developing a tourist facility compatible with the site preservation constraints, and taking advantage of the proximity of Saint-Louis and the favorable context of the RBTDS.</p> <p>Drinking water supply issues.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |
| RECOMMENDATIONS                     | <p>Implementing the RBTDS development and management plan.</p> <p>POLMAR Plan and actions to combat oil spills.</p> <p>Recommended involvement of the Diawling National Park teams in the monitoring.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CRITICALITY Medium |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |
| EVOLUTION OF STAKES                 | Multi-use port project being discussed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |
| EXTRACTIVE ACTIVITIES               | <p>Prospecting to extract metalliferous minerals contained in the coastal sand (essentially at the level of the dune cordon).</p> <p>Oil and gas prospecting.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |
| HAZARDS                             | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CRITICALITY Medium |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |
| EVOLUTION OF STAKES                 | <p>Since December 2016, the Mauritanian Government has launched a <b>project to build a multi-purpose port in the South (without a prior environmental and social impact study)</b>, 7 km in the north of Mouly, 4 km in the west of the limit of the DNP (Diawling-Tichillitt Basin) and 6 km in the south of the Chat Tboul reserve and within the RBTDS, right bank. Its cost is estimated at \$ 352 million, on the State's own funds. The work was started by the Chinese company « Polytechnology » but is currently interrupted due to design flaws (regular crossing of the dike). It will host «military vessels, fishing, commercial and utility vessels for supply, loading and unloading operations, with a shipyard offering equipment maintenance, servicing and repair opportunities». Thus, it will harbor several components: <i>«a military port with wharfs dockable from both sides and a naval base. A fishing port composed of 7 landing wharfs. A shipyard with a capacity of 70 ships per year. A commercial wharf capable of receiving 180-meter long boats. An artisanal fishing landing point»</i> (Minister of Defense, Diallo Mamadou Bathia, 2016).</p> <p>In the Commune of N'Diogo, the environmental constraints for the construction of berthing facilities are significant, because the area is already vulnerable, from a sedimentary perspective and the sea threatens seriously the existing village facilities. The port should have been, in advance, designed to the south of the main town of the municipality in order to limit the impacts (erosion in the south of the facilities) and integrated into the existing urbanization. The multipurpose port project should be accompanied by significant investments in basic and structuring facilities (essential to the functioning of the port activity) to create a development pole:</p> <ul style="list-style-type: none"><li>• Connecting the site to water and electricity networks;</li><li>• Opening an asphalt road (practicable in any season) allowing access to the very landlocked site from Keur Macène;</li><li>• Creating land reserves to develop fish processing activities and value the products landed at the port;</li><li>• Creating a residential area 6 km to the north-east.</li></ul> <p>This port was built without a prior ESIA to the work. It is therefore necessary to set up an operational management of the direct and indirect impacts of this infrastructure.</p> <p>Prospecting to extract metalliferous minerals contained in the coastal sand (essentially at the level of the dune cordon) and in the dredging materials in connection with the construction of the military port of N'Diogo.</p> |                    |



|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CURRENT PROJECTS          | <p>West Africa Coastal Areas Resilience Investment Project – WACA ResIP<sup>17</sup>.</p> <ul style="list-style-type: none"> <li>• Fixing the dune cordon,</li> <li>• Fixing, reinforcing, regenerating mangroves,</li> <li>• Rehabilitating, extending the existing dyke.</li> </ul> <p>BACoMaB Trust Fund<sup>18</sup> (Sustainable Funding Mechanism to Safeguard Coastal and Marine Biodiversity in Mauritania) that participates financially in the sustainable management of the hydrological balances of the Park, the restoration and conservation of habitats, species, and biodiversity through regular monitoring and surveillance and promoting co-management and sustainable exploitation practices represent challenges for the DNP, requiring additional financial means to the annual governmental subsidies. The complementarity between the rehabilitation works of the hydraulic structures funded by KfW and the monitoring activities funded by BACoMaB, have led to a more efficient flooding scenario in 2016, the first results of which are visible.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| OUTSTANDING NATURAL AREAS | <p><b>Chat Tboul Ramsar Site</b></p> <ul style="list-style-type: none"> <li>• ZHII ID : 1MR003 – 250 / WDPa ID: 900595</li> <li>• Affected sectors:MR4-c / MR4-d</li> <li>• Designation on November 10, 2000 (15,500 ha).</li> </ul> <p><b>Diawling National Park</b></p> <ul style="list-style-type: none"> <li>• WDPa ID : 9310</li> <li>• Affected sectors:MR4-c / MR4-d</li> <li>• Classification: January 14, 1991 (Decree n°91-005)</li> <li>• The internal regulation was approved by Order n°R-204 of April 2, 2000 approving the internal regulation of the Diawling National Park.</li> <li>• A 1996-2001 master plan to develop the Diawling National Park and its peripheral zone was elaborated in December 2001.</li> </ul> <p><b>Diawling Ramsar Site</b></p> <ul style="list-style-type: none"> <li>• ZHII ID : 1MR002 – 666 / WDPa ID : 95349</li> <li>• Affected sectors:MR4-c / MR4-d</li> <li>• Designation on August 23, 1994 (15,600 ha).</li> <li>• Entry in the Montreux register on February 28, 2002.</li> </ul> <p><b>Senegal River Delta Transboundary Biosphere Reserve (Mauritania)</b></p> <ul style="list-style-type: none"> <li>• WDPa ID : 902500</li> <li>• Affected sectors:MR4-C / MR4-d / SN1-a / SN1-b</li> <li>• The Senegal River Delta Transboundary Biosphere Reserve (Mauritania-Senegal) was included in the World Network of Biosphere Reserves by the International Coordinating Council of the UNESCO's Man and Biosphere Program on June 29, 2005.</li> <li>• It includes in particular the following outstanding areas: <ul style="list-style-type: none"> <li>✓ Mauritania: Diawling NP, Chat Tboul Ramsar Site, Moedina PF.</li> <li>✓ Senegal: Langue de Barbarie NP, Gandon NCR, Mpal PF, Mpal – Merinaguene RSP, Massara-Foulane PF, Tilene PF, MakaDiana PF, Djoudj NBP, Naere PF.</li> </ul> </li> </ul> |
| HAZARDS                   | <p>Coastal erosion.</p> <p>Pollution from hydrocarbon extraction activities</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| RECOMMENDATIONS           | <p>Implementing the development and management plans for the RBTDS and the Diawling National Park. Extending the status of the DNP to certain peripheral zones in order to cover the RBTDS core areas. Updating the RAMSAR fact sheet of the Chat TBoul site.</p> <p>Involving the Directorate of Protected Areas and Littorals in all sand extraction, and oil and gas prospecting processes.</p> <p>Strategic environmental assessment of the multi-use port.</p> <p>POLMAR Plan and actions to combat oil spills.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| CRITICALITY               | Very high                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

<sup>17</sup> <https://www.wacaprogram.org/>

<sup>18</sup> BACoMaB Trust Fund, a foundation under the English law, recognized as a «Charity» in the United Kingdom, with a headquarters agreement allowing it to carry out its activities in Mauritania, where it has been recognized as a public utility since December 2010. At all beneficiary sites, the activities supported by the BACoMaB Trust Fund aim at:

- Promoting the conservation, protection and improvement of the physical and natural environment of the Banc d'Arguin National Park, of the Diawling National Park and other coastal and marine areas in Mauritania.
- Promoting, for the benefit of the populations, the sustainable development of the «beneficiary areas» by:
  - ✓ Preserving, conserving and protecting the environment and the reasonable use of the natural resources of the beneficiary areas;
  - ✓ Reducing poverty and improving the living conditions of the populations in the beneficiary areas.
  - ✓ Promoting the means for sustainable economic development and revitalizing the beneficiary areas.
- Promoting the education of the populations in the field of biodiversity, conservation and sustainable management of the beneficiary areas.

BACoMaB also has a «Small Grants» window to support other actors working in the beneficiary areas or working for their sustainable management.



| MR4-d                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 15 - N'DIAGO |        |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |              |        |
| DIAGNOSTIC                          | Landlocked sector on a very narrow barrier beach.<br>A few villages (Mboyo, N'Diogo) composed mainly of fishermen.<br>Natural mangrove areas of the Mboyo Islands of regional importance, especially for the reproduction of migratory mule populations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |              |        |
| DYNAMICS                            | Very narrow barrier beach (about 200 m) bordered by recessed floodplains.<br>Very unstable area, even if the volume of the border dune is sometimes large. Also, some districts of N'Diogo are nowadays exposed to submersion and erosion phenomena.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |              |        |
| STAKES                              | Preserving the Mboyo Islands' mangroves.<br>Providing drinking water to the populations living in the sector.<br>Some populations in sites at risk in the event of storm surge.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |              |        |
| RECOMMENDATIONS                     | Limiting human occupancy extension.<br>Actions to preserve mangrove stands.<br>Involving the scientific and technical teams of the Directorate of Protected Areas and Littorals, RBTDS and DNP in the monitoring (avifauna).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |              |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY  | Low    |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |              |        |
| EVOLUTION OF STAKES                 | Oil and gas prospecting: discovery of a significant gas field off the coast of Saint-Louis, straddling the Mauritania-Senegal border (KOSMOS ENERGY).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |              |        |
| HAZARDS                             | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |              |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY  | Medium |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |              |        |
| EVOLUTION OF STAKES                 | Establishing oil and gas exploitation facilities.<br>Prospecting to exploit coastal sand (essentially at the level of the dune cordon) to value metallic minerals.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |        |
| CURRENT PROJECTS                    | West Africa Coastal Areas Resilience Investment Project - WACA ResIP .<br>DAPL / WACA ResIP: <ul style="list-style-type: none"><li>• Guideline to Develop the N'Diogo Littoral planned by the DAPL in 2021 under the WACA/BM project.</li><li>• Community project of N'Diogo.</li><li>• Fixing the dune cordon of the N'Diogo town.</li><li>• Restoring mangroves.</li><li>• Combating Typha.</li><li>• Rehabilitating, extending the existing dike.</li></ul> Building the port of N'Diogo (2020).                                                                                                                                                                                                                                                                                           |              |        |
| OUTSTANDING NATURAL AREAS           | Senegal River Delta Transboundary Biosphere Reserve (Mauritania) <ul style="list-style-type: none"><li>• WDPA ID : 902500</li><li>• Affected sectors:MR4-C / MR4-d / SN1-a / SN1-b</li><li>• The Senegal River Delta Transboundary Biosphere Reserve (Mauritania-Senegal) was included in the World Network of Biosphere Reserves by the International Coordinating Council of the UNESCO's Man and Biosphere Program on June 29, 2005.</li><li>• It includes in particular the following protected areas:<ul style="list-style-type: none"><li>✓ Mauritania: Diawling NP, Chat Tboul Ramsar Site, Moedina PF.</li><li>✓ Senegal: Langue de Barbarie NP, Gandon NCR, Mpal PF, Mpal - Merinaguene RSP, Massara-Fou-lane PF, Tilene PF, MakaDiana PF, Djoudj NBP, Naere PF.</li></ul></li></ul> |              |        |
| HAZARDS                             | Coastal erosion.<br>Pollution.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |        |
| RECOMMENDATIONS                     | Involving the Directorate of Protected Areas and Littoral in all the processes of the sand extraction, and oil and gas prospecting project. Preventing impacts related to the implementation of gas facilities (floating liquefied natural gas facilities) at sea in the right of the Senegalese-Mauritanian border and which should include the establishment of a 1000 m pier at 8km from the coast.<br>Actions to preserve mangrove stands.<br>Strategic environmental assessment of floating gas facilities.<br>Limiting human occupancy extension.                                                                                                                                                                                                                                       |              |        |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY  | High   |





## SUMMARY TABLE

| HABITAT |  |  |  |  |  |  |                                                                                   |                                                                                    |                                                                                     |                                                                                       |                                                                                     |
|---------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| STAKES  | <b>Fishing</b><br>Fishing port<br><small>Land use areas</small>                   | <b>Rice-growing</b>                                                               | <b>Palm oil</b><br>Palm plantation                                                | <b>Trade</b><br>Commercial port                                                   | <b>Trade+</b><br>Commercial port<br>Airport                                       | <b>Oil &amp; Gas</b><br>Exploration<br>Exploitation                               | <b>Extractive ind.</b><br>Salt, metal-bearing sand,<br>gold                       | <b>Tourism</b>                                                                     | <b>(Tourism)</b><br>Unexploited outstanding<br>areas                                | <b>Biodiversity</b><br>Outstanding areas<br><small>(biodiversity, landscapes)</small> |                                                                                     |
| HAZARDS | <b>h</b><br>Soil erosion                                                          | <b>h</b><br>Coastal erosion                                                       | <b>d</b><br>Marine submersion                                                     | <b>c</b><br>Pluvial and/or fluvial flooding                                       |  |  |  |  |  | <b>n</b><br>Industrial risk                                                           |  |

| N°                                           | REF   | NAME                                  | HABITAT | STAKES  |                 |                | HAZARDS      | CRITICALITY |           |           | MONITORING            |                       |                       |                       |
|----------------------------------------------|-------|---------------------------------------|---------|---------|-----------------|----------------|--------------|-------------|-----------|-----------|-----------------------|-----------------------|-----------------------|-----------------------|
|                                              |       |                                       |         |         |                 |                |              | 2011        | 2016      | 2020      | 2011                  | 2016                  | 2020                  |                       |
| MR1 NOUADHIBOU AND BAIE DU LÉVRIER PENINSULA |       |                                       |         |         |                 |                |              |             |           |           |                       |                       |                       |                       |
| 1                                            | MR1-a | Cap Blanc                             |         | Fishing |                 | Biodiversity   |              | Low         | Medium    | High      | No monitoring         | Watch-keeping         | Regular and light     |                       |
| 2                                            | MR1-b | Cansado Spit and Bay                  |         | Trade   | Oil & Gas       |                |              | Low         | Medium    | High      | Watch-keeping         | Regular and light     | Regular and light     |                       |
| 3                                            | MR1-c | Urban coastline and Nouadhibou port   |         | Fishing | Trade           | (Biodiversity) |              | Medium      | Medium    | High      | Regular and light     | Regular and light     | Regular and light     |                       |
| 4                                            | MR1-d | Nouadhibou North and Baie de l'Étoile |         |         |                 | Biodiversity   |              | Medium      | Medium    | High      | Regular and intensive | Regular and intensive | Regular and intensive |                       |
| 5                                            | MR1-e | Baie du Lévrier                       |         |         |                 | Biodiversity   |              | Medium      | Medium    | High      | Regular and intensive | Regular and intensive | Regular and intensive |                       |
| MR2 BANC D'ARGUIN – NORTH NOUAKCHOTT         |       |                                       |         |         |                 |                |              |             |           |           |                       |                       |                       |                       |
| 6                                            | MR2-a | Banc d'Arguin (PNBA)                  |         | Fishing | Tourism         | Biodiversity   |              | Low         | Medium    | Medium    | Regular and light     | Regular and light     | Regular and light     |                       |
| 7                                            | MR2-b | Mamghar – Majhrat                     |         | Fishing | Tourism         |                |              | Low         | Medium    | Medium    | No monitoring         | Regular and light     | Regular and light     |                       |
| 8                                            | MR2-c | Tanit – Sebkhra N'Dramcha             |         | Fishing | Extractive Ind. | Trade          |              | Low         | Medium    | Medium    | Watch-keeping         | Regular and light     | Regular and intensive |                       |
| 9                                            | MR2-d | Djeidrat                              |         | Fishing | Tourism         | Trade+         |              | Low         | Medium    | Medium    | Watch-keeping         | Regular and light     | Regular and light     |                       |
| MR3 NOUAKCHOTT                               |       |                                       |         |         |                 |                |              |             |           |           |                       |                       |                       |                       |
| 10                                           | MR3-a | North Nouakchott                      |         | Fishing | Tourism         | Trade+         |              | High        | High      | High      | Regular and light     | Regular and intensive | Regular and intensive |                       |
| 11                                           | MR3-b | South Nouakchott                      |         | Fishing | Extractive Ind. |                |              | Very High   | Very High | Very High | Regular and intensive | Regular and intensive | Regular and intensive |                       |
| MR4 SOUTH MAURITANIA & RIVER SENEGAL DELTA   |       |                                       |         |         |                 |                |              |             |           |           |                       |                       |                       |                       |
| 12                                           | MR4-a | PK 28 - South Tiguent                 |         | Fishing | Extractive Ind. | Tourism        | Oil & Gas    |             | Medium    | Medium    | High                  | Regular and light     | Regular and light     | Regular and light     |
| 13                                           | MR4-b | SouthTiguent - Chott Boul             |         | Fishing | Extractive Ind. | Tourism        |              |             | Low       | Medium    | High                  | Watch-keeping         | Regular and light     | Regular and light     |
| 14                                           | MR4-c | Chott Boul - Ghara (RBTDS)            |         | Trade   | Extractive Ind. | Tourism        | Biodiversity |             | Low       | Medium    | Medium                | Regular and light     | Regular and light     | Regular and intensive |
| 15                                           | MR4-d | Ndiago                                |         | Fishing | Oil & Gas       | Tourism        | Biodiversity |             | Low       | Medium    | High                  | Regular and light     | Regular and light     | Regular and intensive |





# SN-SENEGAL (North)

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## SN-Senegal (North)

The coastal area of Senegal covers about 198,000 km<sup>2</sup>, with various ecosystems (sandy and rocky coasts, wetlands, mangroves and sandy islands). This coastal area is subject to a high concentration of human settlements with 60% of the population and economic activities such as fishing, market gardening and tourism. Seventy percent of the vegetables consumed in the country are produced in the coastal «Niayes». Ninety percent of industrial establishments are located in the coastal zone and contribute 68 percent of the country's GDP<sup>1</sup>.

A large part of the Senegalese coast is affected by increasing erosion. At the same time, coastal stakes are developing, leading to increasingly frequent risk situations.

Senegal has integrated coastal zone plans for certain segments of the coast that are the instrument for coordinated action on coastal development, including management of coastal erosion, flooding, and pollution (GOPA Consultants et Pescares, 2013)<sup>2</sup>.

<sup>1</sup> Extract from <https://www.wacaprogram.org/fr/country/senegal>.

<sup>2</sup> GOPA Consultants and Pescares, 2013. Sénégal. Établissement de la stratégie nationale de gestion intégrée des zones côtières. Document stratégique. Contrat de service n° CRIS/DCI-ENV/2011/274 – 083 EuropeAid/130397/D/SER/SN. 80p. Annexes



## SN1

## SAINT-LOUIS-GANDIOLAIS-GRANDE COTE

A progression of the saltwater intrusion is observed throughout the Gandiolais region, particularly following the opening of the Langue de Barbarie breach. The sea-level rise is certainly not the only reason for what seems to be a generalized observation. The effects of intensive pumping in freshwater duckweed must also be considered.

The completion of the Rufisque-Saint-Louis axis should contribute to boosting developments on the Grande Côte.

It is also worth noting the discovery of a major gas field off the coast of Saint-Louis, straddling the border with Mauritania: exploitation is scheduled for 2020.

However, a climate change adaptation plan for the period 2015-2020 has been developed in conjunction with the Conseil local de Pêche Artisanale de Saint-Louis with support from the CSE and the USAID-funded COMFISH project<sup>3</sup>.

<sup>3</sup> Collaborative Management for a Sustainable Fisheries Future in Senegal



| SN1-a                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 16- SAINT-LOUIS'S URBAN, PERI-URBAN AND HERITAGE SECTOR |  |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|--|
| ASELINE – 2010                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                         |  |
| DIAGNOSTIC                            | <p>Complex sector including the urban pole of Saint-Louis and the historical island of Saint-Louis, the Langue de Barbarie, a thin and long sandy spit and the low areas on the left bank of the river. Many sandy islands.</p> <p>Strong fishing and tourist activity.</p> <p>The opening of a breach in the Langue de Barbarie in 2003 following the threat of submersion of the city of Saint-Louis, has profoundly modified a set of particularly complex hydrological and sedimentary balances, characterizing a (pseudo) deltaic set of vast extent and very low elevation. These modifications affect today a good part of the economic activities (fishing, tourism, market gardening, salt production). The concentration of populations in the city itself, but also and especially in the outlying villages and neighborhoods (Guet Ndar, Ndar-Toute, Goxxu mbac, - 57% of the inhabitants of Saint-Louis commune) determines a high-risk situation. Still uncertain location of a future ore port linked to the objective of navigability of the Senegal River (OMVS).</p> |                                                         |  |
| DYNAMICS                              | <p>Rapid erosion observed in several sites, but also locally in accretion.</p> <p>The reconfiguration of the mouth following the opening of the breach is still underway with changes directly affecting not only the exposed seafront, but also the «inner coastline» of the river banks, with a strong progression of the intertidal space.</p> <p>Wind erosion is also intense, leading to silting of infrastructure. The sector is generally low and quite unstable.</p> <p>Disappearance of the village Doun Baba Dieye located in front of the breach, reduction of the surface of the islet of birds (from 2ha to 0.5 ha in less than 10 years), collapse of houses in Goxxu mbacc and Guet Ndar in 2010.</p> <p>The initial breach would now be more or less in equilibrium, with seasonal oscillations noted. This new mouth is about 2 km wide.</p>                                                                                                                                                                                                                          |                                                         |  |
| STAKES                                | <p>Reduction of the risks for the exposed populations, preservation of the heritage of Saint-Louis, but also of the whole original system of life of the delta largely dependent on the gradient of salinity and the configuration of the delta.</p> <p>Requalification and reorganization of landing areas and fish processing sites at landing.</p> <p>Different protection solutions are examined with a main alternative out of the non-intervention consisting in consolidating the existing breach by also securing its depth (protection against the floods of Saint-Louis, advantage for the fishermen), but at the price of a degradation of the natural environments of the delta, or the attempt to restore the initial situation<sup>4</sup>.</p>                                                                                                                                                                                                                                                                                                                          |                                                         |  |
| ACTIONS                               | <p>Ensuring the safety of exposed populations, including relocation.</p> <p>Submersion risk prevention plan.</p> <p>Study of possible solutions for coastal protection and development (especially for the historic city of Saint-Louis), taking into account the strong dynamics of the delta spaces.</p> <p>Support for the relocation of affected economic activities.</p> <p>Redesign of a tourism development plan taking into account the evolution of the Langue de Barbarie to be integrated into a sector scheme.</p> <p>Note: Strong involvement of the St. Louis municipal team that can play a leading role in observation and monitoring if supported by competent technical and scientific resources.</p>                                                                                                                                                                                                                                                                                                                                                                |                                                         |  |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY Very high                                   |  |
| EVOLUTION OVER THE 2010 – 2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                         |  |
| EVOLUTION OF STAKES                   | <p>Port project and river dredging.</p> <p>Implementation of the Saint-Louis – Rufisque road.</p> <p>Investment in infrastructure for irrigation.</p> <p>Tourist development project.</p> <p>Discovery of a major gas field off St. Louis: 450 billion m³.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                         |  |
| HAZARDS                               | <p>Numerous episodes of submersion, including recent ones (over 100 to 150m with destruction of houses)</p> <p>Gradual widening of the breach.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                         |  |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY Very high                                   |  |

<sup>4</sup> U.S. Army Corps of Engineers. Barry K.M. & N.C. Kraus. 2009. – Stability of Blocked River Mouth on West Coast of Africa: Inlet of Senegal River Estuary. Coastal and Hydraulics Laboratory. ERDC CHL TR-09-20. 56p.



| SN1-a                                 | 16- SAINT-LOUIS'S URBAN, PERI-URBAN AND HERITAGE SECTOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EVOLUTION OVER THE PERIOD 2016 - 2020 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| EVOLUTION OF STAKES                   | <p>Main Study of Design and Operationalization of an Environmental Monitoring and Modeling System of the Coastal Zone of Saint-Louis.</p> <p>Complementary mission consisting in searching for development solutions to secure the urbanized littoral zone of Saint-Louis.</p> <p>Study of the Urban Master Plan through numerical simulation models, including hydro-sedimentary processes.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| CURRENT PROJECTS                      | <p>West Africa Coastal Areas Resilience Investment Project - WACA ResIP<sup>5</sup> (World Bank Group).</p> <ul style="list-style-type: none"> <li>Joint committee process: preservation of ecosystems and revival of eco-tourism in the RBTDS, capacity building of countries on the management of environmental risks related to oil exploitation through the Master GAED and monitoring of the coastline in the transboundary sector (in connection with the project «Strengthening Trans-boundary Cooperation for Improved Ecosystem Management and Restoration in the Senegal delta (Mauritania and Senegal)» - GEF-6,</li> <li>Saint-Louis: development of the citizen engagement plan,</li> <li>Support for the implementation of social sub-projects (IGA) in partnership with SERRP</li> <li>Description of ongoing projects and initiatives that may influence the development strategy of the urbanized coastal area of Saint-Louis,</li> <li>Multi-year action plans for ecosystem restoration (PNLB and AMP of Saint-Louis)</li> <li>Saint-Louis Emergency Recovery and Resilience Project - SERRP (World Bank Group)<sup>6</sup>.</li> </ul> <p>Development and financing of sub-projects (PROSES and PICS) to improve the living conditions of local communities</p> <p>Temporary relocation of the affected families of Guet Ndar in the Diougop site</p> <p>Stormwater Management Program-PROGEP<sup>7</sup> (World Bank Group)</p> <p>Cities-IAP: Sustainable Cities Initiative<sup>8</sup> (GEF Investing in our planet).</p> <p>Urban Master Plan of Saint-Louis.</p> <p>Integrated Water Resources Management Project - IWRP<sup>9</sup> (OMVS).</p> <p>Fight against coastal erosion of the Saint-Louis coastline<sup>10</sup> (AFD).</p> <p>Regional infrastructure program for the Senegal River including the construction of a river-sea port in Saint-Louis<sup>11</sup> (OMVS).</p> <p>Coastal Protection Project in Saint-Louis - PPCS (Government / AFD). Execution (completed) by the Eiffage-CSE group.</p> |
| OUTSTANDING NATURAL AREAS             | <p><b>Senegal River Delta Transboundary Biosphere Reserve (Mauritania-Senegal)</b></p> <ul style="list-style-type: none"> <li>WDPA ID : 902502</li> <li>Affected sectors: MR4-c / MR4-d / SN1-a / SN1-b</li> <li>Designation on June 29, 2005 by the International Coordinating Council of the UNESCO Man and the Biosphere Programme</li> <li>It includes the following OUTSTANDING NATURAL AREAS : <ul style="list-style-type: none"> <li>✓ Mauritania: Diawling NP, Chat Tboul Ramsar site, Moedina CF.</li> <li>✓ Senegal: Langue de Barbarie NP, NCR of Gandon, CF of Mpal, SWR of Mpal</li> </ul> </li> </ul> <p><b>Djoudj National Bird Sanctuary</b></p> <ul style="list-style-type: none"> <li>WDPA ID : 867</li> <li>Classification: April 14, 1971 (Decree No. 71/411 on the classification in the forest domain and creation of the Djoudj National Bird Sanctuary (Senegal River Delta) and an adjacent area on its periphery (13,000 ha))</li> <li>The first classification decree was modified on December 10, 1975 by Decree 75 - 1222 repealing and replacing articles 2 and 3 of Decree No. 71-411 of April 14, 1971 on the classification in the forest domain and creation of the Djoudj National Bird Sanctuary (Senegal River Delta) and an adjacent area on its periphery (16,000 ha).</li> <li>A five-year integrated management plan for the Djoudj National Bird Sanctuary and its periphery 1994-1999 was finalized in June 1994.</li> <li>The 2010 - 2014 management plan of the Djoudj National Park was finalized in March 2010.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

<sup>5</sup> <https://www.wacaprogram.org/>

<sup>6</sup> <http://documents.worldbank.org/curated/en/823891528601503799/Senegal-Saint-Louis-Emergency-Recovery-and-Resilience-Project>

<sup>7</sup> <http://documents.worldbank.org/curated/en/773191468304224914/Senegal-Stormwater-Management-and-Climate-Change-Adaptation-Project>

<sup>8</sup> <https://www.thegef.org/project/cities-iap-sustainable-cities-initiative>

<sup>9</sup> <http://www.omvs.org/content/le-pgire-0>

<sup>10</sup> <https://www.afd.fr/fr/carte-des-projets/lutter-contre-lerosion-cotiere-du-littoral-de-saint-louis>

<sup>11</sup> <http://www.omvs.org/content/les-programmes>



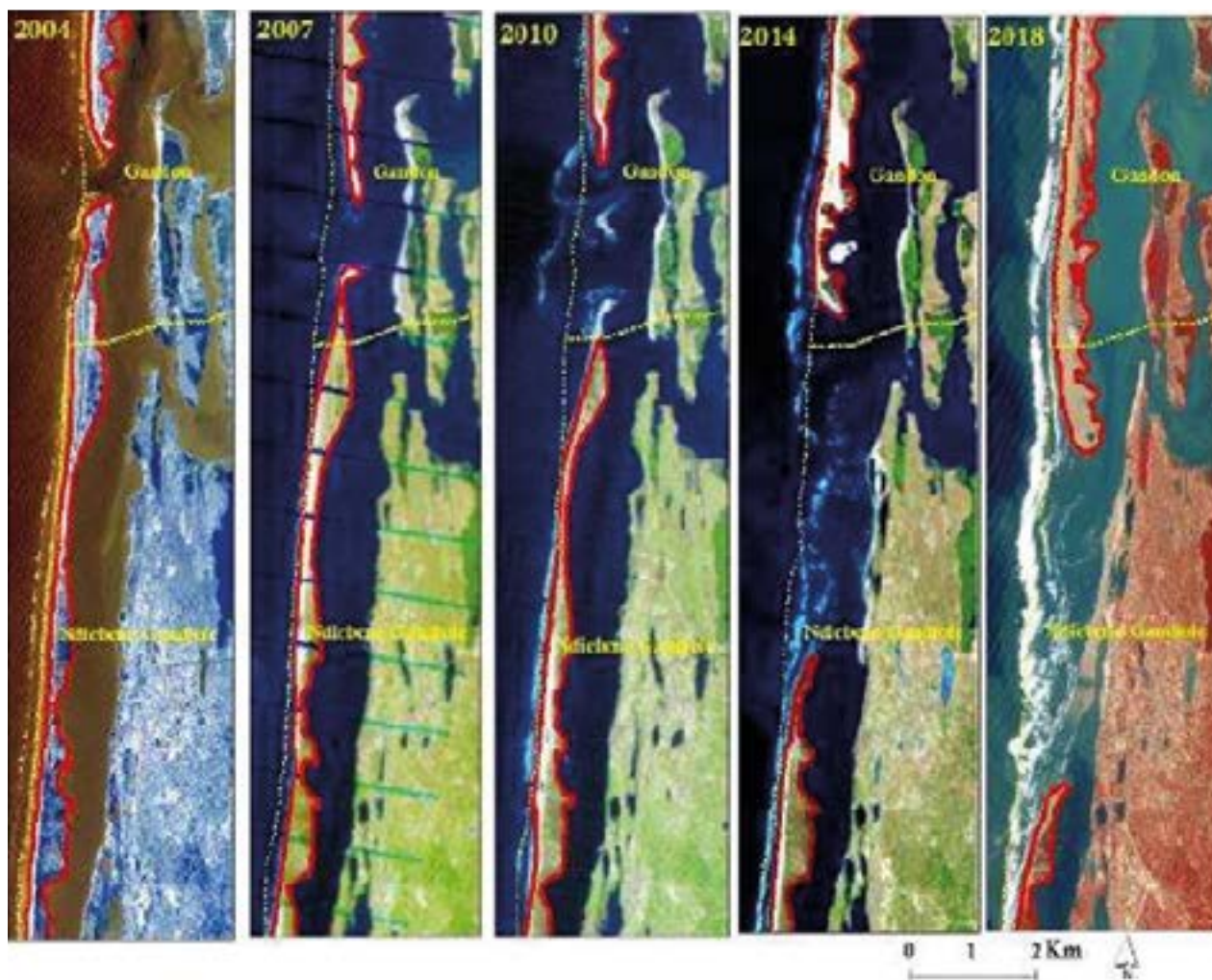
## SN-Senegal (North)

|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                              |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
|            | <b>Nature Reserve of Djoudj</b> <ul style="list-style-type: none"> <li>Classification: February 26, 1962 (Decree n°62-065 (3ha))</li> </ul> <b>Ramsar site of Djoudj</b> <ul style="list-style-type: none"> <li>ZHII ID : 1SN001 – 138 / WDPA ID : 68151</li> <li>Designation on July 11, 1977 (16,000 ha)</li> <li>Inscription on the Montreux list on 4 July 1990 and withdrawn on 16 June 1993.</li> </ul> <b>Djoudj Bird Sanctuary World Heritage Site</b> <ul style="list-style-type: none"> <li>WDPA ID : 2578 / UNESCO WH ID : 25</li> <li>Affected sectors: MR4-c / MR4-d / SN1-a / SN1-b</li> <li>The Djoudj Bird Sanctuary was inscribed on the UNESCO World Heritage List under criteria (vii) and (x) in 1981.</li> </ul> |                              |
| HAZARDS    | Coastal and wind erosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                              |
| MONITORING | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>CRITICALITY</b> Very high |





ENLARGEMENT DYNAMICS OF THE ST. LOUIS BREACH FROM 2004 TO 2018 (SOURCE CSE, 2019)





| SN1-b                                 | 17 - SOUTH SAINT-LOUIS-INSULARIZED LANGUE DE BARBA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BASELINE - 2010                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| DIAGNOSTIC                            | Thin and long sandy belt in an almost insular situation since the opening of the breach in 2003. Today, once again connected to the mainland with the gradual filling of the old river mouth.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| DYNAMICS                              | Strong wind erosion, silting of market gardening basins and tourist facilities.<br>Alternation of sites in erosion and accretion.<br>Filling in of the old Senegal River outlet at the southern end of the sector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| STAKES                                | Viability of the two tourist establishments located south of the breach.<br>Organic pollution and salinization of the «arm of water» located between the spit of land and the mainland since the filling of the old river outlet.<br>Preservation of the Langue de Barbarie National Park and particularly of the Ile aux Oiseaux (area reduced from 2ha to 0.5ha).<br>Sustainability of vegetable production in a context of progressive salinization of coastal freshwater duckweed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| ACTIONS                               | Ensuring the safety of exposed populations, including relocation.<br>Submersion risk prevention plan.<br>Study of possible solutions for coastal protection and development (especially for the historic city of Saint-Louis), taking into account the strong dynamics of the delta spaces.<br>Support for the relocation of affected economic activities.<br>Redesign of a tourism development plan taking into account the evolution of the Langue de Barbarie to be integrated into a sector scheme.<br>Note: Strong involvement of the Langue de Barbarie National Park team that can play a leading role in observation and monitoring if supported by competent technical and scientific resources.                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| CRITICALITY                           | High                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| EVOLUTION OVER THE 2010-2016 PERIOD   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| EVOLUTION OF STAKES                   | Implementation of the Saint-Louis - Rufisque road.<br>Investment in infrastructure for irrigation.<br>Tourist development project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| HAZARDS                               | Progressive fragmentation of the Langue de Barbarie and natural opening of a second breach.<br>Salinization of groundwater and impacts on market gardening and access to drinking water in the Gandiols.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| CRITICALITY                           | High                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| EVOLUTION OVER THE PERIOD 2016 - 2020 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| EVOLUTION OF STAKES                   | Main Study of Design and Operationalization of an Environmental Monitoring and Modeling System of the Coastal Zone of Saint-Louis.<br>Complementary mission consisting in searching for development solutions to secure the urbanized littoral zone of Saint-Louis.<br>Study of the Urban Master Plan through numerical simulation models, including hydro-sedimentary processes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| CURRENT PROJECTS                      | West Africa Coastal Areas Resilience Investment Project - WACA ResIP (World Bank Group). <ul style="list-style-type: none"> <li>Regeneration of the ecosystems of the Langue de Barbarie National Park (SERRP Project),</li> <li>Description of ongoing projects and initiatives that may influence the development strategy of the urbanized coastal area of Saint-Louis, (PROGEP project document),</li> <li>Detailed description of activities,</li> <li>Plan with a detailed description of the intermediate and final products to be achieved.</li> </ul> Project «Monitoring of coastal risks and soft solutions in Benin, Senegal and Togo - intervention at Pilote Barre» <sup>13</sup> (WACA FFEM): fixation of coastal dunes by the «typhavelles» method: <i>Typha australis</i> palisades.<br>Saint-Louis Emergency Recovery and Resilience Project - SERRP (World Bank Group) <sup>14</sup> .<br>Stormwater Management Program-PROGEP <sup>15</sup> (World Bank Group)<br>Cities-IAP: Sustainable Cities Initiative <sup>16</sup> (GEF Investing in our planet). <ul style="list-style-type: none"> <li>Urban Master Plan of Saint-Louis.</li> </ul> |

<sup>12</sup> <https://www.wacaprogram.org/><sup>13</sup> <https://www.ffem.fr/fr/carte-des-projets/suivi-des-risques-cotiers-et-solutions-douces-au-benin-senegal-et-togo><sup>14</sup> <http://documents.worldbank.org/curated/en/823891528601503799/Senegal-Saint-Louis-Emergency-Recovery-and-Resilience-Project><sup>15</sup> <http://documents.worldbank.org/curated/en/773191468304224914/Senegal-Stormwater-Management-and-Climate-Change-Adaptation-Project><sup>16</sup> <https://www.thegef.org/project/cities-iap-sustainable-cities-initiative>

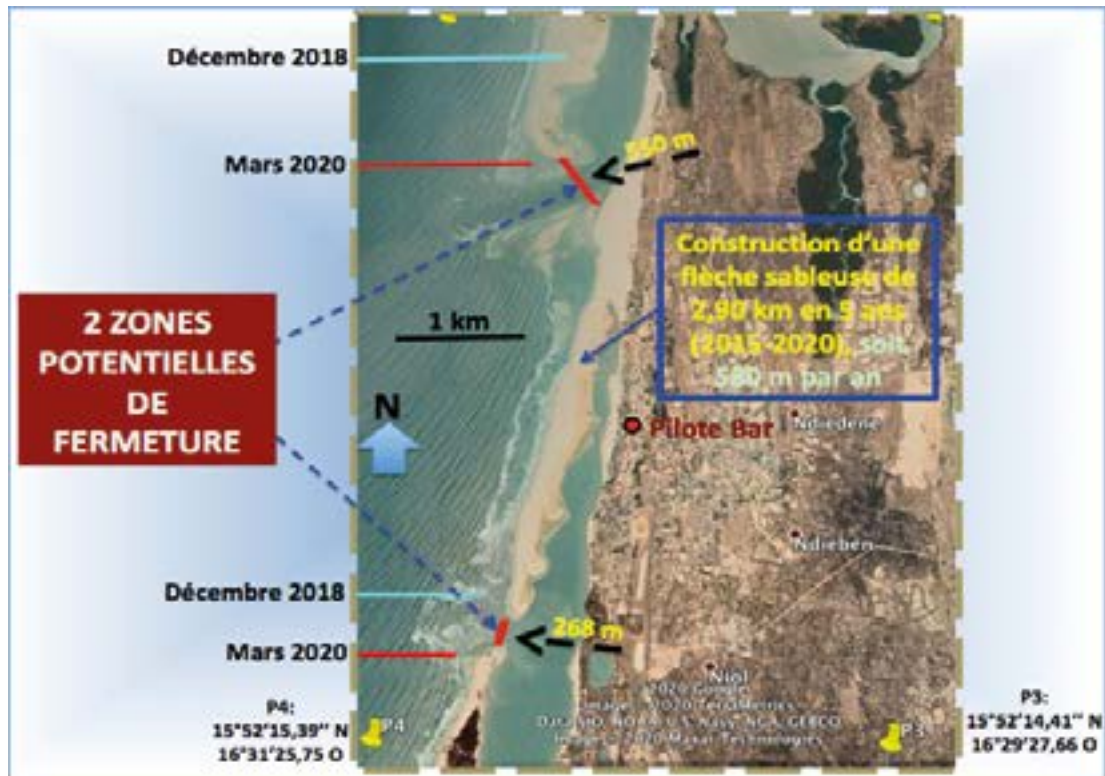


|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OUTSTANDING NATURAL AREAS | <p><b>Gueumbeul Special Wildlife Reserve (IUCN Category IV)</b></p> <ul style="list-style-type: none"> <li>• WDPA ID : 11653</li> <li>• Classification: 1983.</li> </ul> <p><b>Ramsar site of Gueumbeul</b></p> <ul style="list-style-type: none"> <li>• ZHII ID : 1SN004 – 338 / WDPA ID : 68154</li> <li>• Affected sector: SN1-b</li> <li>• Designation on 29 September 1986 (720 ha)</li> </ul> <p><b>Langue de Barbarie National Park (IUCN Category II)</b></p> <ul style="list-style-type: none"> <li>• WDPA ID : 869</li> <li>• Affected sector: SN1-b</li> <li>• Classification: 9 January 1976 (Decree n°76/0016)</li> <li>• The rules of procedure were determined by the order n°007165/24 JUNE 76/PM/DGT.</li> </ul> <p><b>Saint-Louis Marine Protected Area</b></p> <ul style="list-style-type: none"> <li>• WDPA ID : 352704</li> <li>• Affected sector: SN1-b</li> <li>• Classification: 4 November 2004 (Decree n°2004-1408)</li> <li>• The development and Management plan for the Saint-Louis MPA has been revised for the period 2014-2018.</li> <li>• The governance bodies of the Saint-Louis MPA were created on January 20, 2015 by prefectural decree n°0024/PSL/AMP, they include an Orientation Committee, a Management Committee and a Scientific and Technical Committee (for the Scientific Committee: prefectural decree n°25/PSL/AMP).</li> <li>• The MPA's rules of procedure were validated through prefectural decree No. 0026/PSL/AMP on January 20, 2015.</li> </ul> <p><b>Gandon Community Nature Reserve</b></p> <ul style="list-style-type: none"> <li>• WDPA ID: non-existent</li> <li>• Affected sector: SN1-b</li> <li>• The deliberation of the Rural Council of Gandon n°05/CRG/ARR/RAD of July 16, 2003 concerning the classification of a land of 2,000 ha as a Community Nature Reserve was approved by prefectural decree on July 23, 2003.</li> <li>• Not registered in WDPA.</li> </ul> |
| HAZARDS                   | <p>Salinization of groundwater and impacts on market gardening and access to drinking water in the Gandiolais.</p> <p>Progressive fragmentation of the Langue de Barbarie and natural opening of a second breach.</p> <p>Natural closure dynamics of the Saint-Louis breach: Only 550 m wide separates the distal part of the northern segment of the Langue de Barbarie spit from the base of the Pilote Barre sandy spit. The closure of the breach will prevent communication between the Senegal River and the Atlantic Ocean. This situation will have as a direct consequence, a reappearance of the flood risk of fluvial origin on the districts of the commune of Saint-Louis.</p> <p>Construction of the Pilote Barre spit and creation of a coastal lagoon behind the Pilote Barre spit. This protects the village of Pilot Barre from the risks of erosion and submersion. On the other hand, the closure of the mouth of the Pilote Barre lagoon will lead to a total isolation of the water body, which will inevitably evolve into an evaporite basin, with multiple economic consequences. The populations of the villages of Pilote Barre, Tassinère, Ndiébene Gandiole, Ndiol, etc. will no longer have direct access to the sea for their economic activities.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| RECOMMENDATIONS           | <p>Soft solutions, such as planting trees with suitable species, to fix the Pilot Barre spit can be helpful. The use and valorization of local materials, such as typha, to develop dune fixation methods would also be very beneficial. The «Typhavelle» device (WACA FFEM) is a technique that could be tested. Dredging operations should also be considered, especially during the dry and cold season (December to February) to avoid closing the Pilote Barre lagoon. The sediments from the dredging could be reused to recharge the eroding sectors on the Langue de Barbarie.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| MONITORING                | <p><b>Regular and intensive</b></p> <p><b>CRITICALITY Very high</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |





## ST. LOUIS



The morpho-sedimentary system of Pilote Barre: identification of a potential closure zone of each mouth. Construction dynamics of the Pilote Barre spit and creation of a coastal lagoon (Source: études techniques WACA FFEM, CSE 2020).



Installation of *Typha australis* (typhavelles) palisade to fix the coastal dunes of the Langue de Barbarie in the Saint-Louis MPA (WACA FFEM)



| SN1-c                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 18 - GRANDE CÔTE - NIAYES |        |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------|
| BASELINE - 2010                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                           |        |
| DIAGNOSTIC                            | Very monotonous coastline.<br>Scattered market gardening in the Niayes.<br>Some tourist sites such as Mboro plage, with residential settlements linked to the presence of phosphate mining areas.<br>Ambitious planning and economic development project of the Niayes (Grande Côte Development Master Plan) centered around the new city located between Lompoul and Diogo, balancing the Dakar-Saint-Louis bi-polarity.<br>The Grande Côte Development Master Plan includes 5 poles: (i) Urban development and territory structuring pole (ii) Agro Pole, (iii) Eco Pole, technopole (iv) Industrial network (v) Tourist poles.                                                                                                                                                                                                                                                                                                                        |                           |        |
| DYNAMICS                              | Strong wind erosion nevertheless weighted by the important reforestation of filaos.<br>Siltling of the Niayes.<br>Progression of the saltwater wedge noted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                           |        |
| STAKES                                | Important in the perspective of the application of the Grande Côte Master Plan, with : <ul style="list-style-type: none"><li>• Development of mining (zircon),</li><li>• Implementation of a scenic route,</li><li>• Tourist, agricultural, industrial development, etc., with competing uses to be reconciled in the same space.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                           |        |
| ACTIONS                               | Maintenance and preservation of dune fixation vegetation (filaos strips).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                           |        |
| MONITORING                            | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY               | Low    |
| EVOLUTION OVER THE 2010 - 2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                           |        |
| EVOLUTION OF STAKES                   | Following the Grande côte Master Plan, this sector is undergoing some developments: <ul style="list-style-type: none"><li>• Construction of a pontoon in Lompoul,</li><li>• Construction of thermal power plants,</li><li>• Final phase of prospecting for zircon mining.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                           |        |
| EXTRACTIVE ACTIVITIES                 | The «Grande Côte» zircon mine of Mineral Deposits and Eramet is currently in operation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                           |        |
| HAZARDS                               | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                           |        |
| MONITORING                            | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY               | Medium |
| EVOLUTION OVER THE PERIOD 2016 - 2020 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                           |        |
| EVOLUTION OF STAKES                   | No major developments noted since 2016.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                           |        |
| CURRENT PROJECTS                      | New concession for zircon mining granted to Afrique Invest.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                           |        |
| OUTSTANDING NATURAL AREAS             | <b>Darou Khoudoss Community Nature Reserve</b> <ul style="list-style-type: none"><li>• WDPA ID: non-existent</li><li>• Affected sector: SN1-c</li><li>• The deliberation of the Darou Khoudoss Rural Council n°04 of October 15, 2003 relating to the classification of a land of 1,500 ha as a Community Nature Reserve was approved by the prefectoral decree n°07/AM Region of Thiès / Department of Tivaouane / Arrondissement of Méouane.</li><li>• Not registered in WDPA.</li></ul> <b>Notto Gouye Diama Community Nature Reserve</b> <ul style="list-style-type: none"><li>• Notto Gouye Diama CNR: WDPA ID: non-existent</li><li>• Affected sector: SN1-c</li><li>• The deliberation of the Rural Council of Notto Gouye Diama n°03 of July 03, 2003 concerning the allocation of a land of 1,180 ha as a Community Nature Reserve was approved by prefectural order n°21/1P on September 04, 2003.</li><li>• Not registered in WDPA.</li></ul> |                           |        |
| HAZARDS                               | Advance of the saltwater wedge.<br>Coastal erosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                           |        |
| RECOMMENDATIONS                       | Dune stabilization and reforestation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                           |        |
| MONITORING                            | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY               | Medium |



| SN1-d                                 | 19 - KAYAR-GUEDIAWAYE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BASELINE - 2010                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
| DIAGNOSTIC                            | Important market gardening sector.<br>Kayar fishing center. Straight coastline.<br>Extension zones from the outskirts of Dakar to Guédiawaye.<br>Large landfill of Mbeubeuss (Malika) and area of intensive extraction of construction sand.<br>Note: High priority related to Malika's environmental issues.                                                                                                                                                                                                                                                                                                                                                             |                       |
| DYNAMICS                              | Wind erosion always present in spite of the filaos alignments.<br>Observed progression of the saltwater wedge.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |
| STAKES                                | Urban conquest on the approach to the Dakar agglomeration.<br>Sanitation of Malika - resorption of the open landfill.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
| ACTIONS                               | Control of land and urban expansion, particularly with regard to the stakes of the latter with respect to the protection of the filaos strip. If necessary, sector scheme to be anticipated.<br>Analysis of the impacts of sand extraction.                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |
| MONITORING                            | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY High      |
| EVOLUTION OVER THE 2010 - 2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
| EVOLUTION OF STAKES                   | Development of urbanization with the construction of housing estates for the resettlement of people displaced by the toll highway, retreat of the agricultural space.<br>Drainage of rainwater to lakes.<br>Project for the construction of a tide gauge plant (Norwegian project).<br>Ongoing construction of the 3rd section of the North Bypass Road (VDN): the Guédiawaye portion was paved in 2015.                                                                                                                                                                                                                                                                  |                       |
| EXTRACTIVE ACTIVITIES                 | Dune sand samples.<br>Integrated Coastal Zone Management (ICZM 1) project funded by the EU from 2012 to 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |
| HAZARDS                               | Recurrence of flooding                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY High      |
| EVOLUTION OVER THE PERIOD 2016 - 2020 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
| EVOLUTION OF STAKES                   | Classification of the «Grande Niaye» as a protected wetland by the MEDD <sup>17</sup> .<br>Decommissioning of an area of 78 ha on the strip of filaos assigned to private individuals and to the commune of Yeumbeul Nord for the construction of human settlements.<br>Oil exploration (offshore): Block called Yaakar which extends off Kayar with BP as operator. The operation has not yet started, but the prospecting is complete.                                                                                                                                                                                                                                  |                       |
| CURRENT PROJECTS                      | West Africa Coastal Areas Resilience Investment Project - WACA ResIP <sup>18</sup> (World Bank Group).<br>Study underway to define adaptation solutions within the framework of WACA ResIP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |
| OUTSTANDING NATURAL AREAS             | <b>Kayar Marine Protected Area</b> <ul style="list-style-type: none"><li>• Kayar Marine Protected Area</li><li>• WDPA ID : 3527065</li><li>• Affected sector: SN1-d</li><li>• Classification: 4 November 2004 (Decree n°2004-1408)</li><li>• A diagnostic assessment for the elaboration of a development and management plan for the Kayar MPA was finalized in March 2007.</li><li>• The Management Committee of the Kayar MPA was created and its statutes validated by Prefectoral Order No. 139 of the Department of Thies on November 3, 2010.</li><li>• The development and Management plan for the Kayar MPA has been revised for the period 2014-2018.</li></ul> |                       |
| HAZARDS                               | Recurrence of flooding.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |
| RECOMMENDATIONS                       | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY Very high |

<sup>17</sup> <http://prcmarine.org/fr/la-grande-niaye-abritant-le-technopole-classee-zone-humide-protegee>.

<sup>18</sup> <https://www.wacaprogram.org/>



## SN2

## DAKAR

The entire coastline of Dakar is artificialized. Erosion affects both the cliffs of the Cape Verde peninsula and the beaches of Hann Bay. Important stakes, especially urban, are concentrated and distributed along the coastline in an almost uninterrupted manner, especially on the eastern and western corniches.

| SN2-a                                 | 20 - DAKAR NORTH DUNE COAST CAMBERENE - YOFF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |      |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------|
| BASELINE - 2010                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |      |
| DIAGNOSTIC                            | Important seaside line of Dakar, fishing landings, urbanization in conquest to the top of the beach, wastewater and solid waste discharges.<br>Extraction of materials.<br>Exposure to swell. Uncoordinated individual coastal protection initiatives.                                                                                                                                                                                                                                                                                                                                                                                              |             |      |
| DYNAMICS                              | Rapidly eroding area on the outskirts of Yoff, possibly to be related to the removal of sand from Malika.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |      |
| STAKES                                | Viability of an old and traditional landing site of Lebou fishermen in the face of erosion and the shrinking of the parking space for pirogues.<br>Habitat and populations at risk in the event of a surge.                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |      |
| ACTIONS                               | Protective measures can be envisaged, but should be associated with a global sector scheme for the northern coastline of Dakar.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |      |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY | High |
| EVOLUTION OVER THE 2010 - 2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |      |
| EVOLUTION OF STAKES                   | Important progression of the urbanization of the seaside.<br>Beach walls, significant landscape impacts.<br>Work on the creation of the VDN 2 <sup>nd</sup> section.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |      |
| PROJECTS                              | Sites where dune sand is collected for construction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |      |
| PROTECTION                            | Several works, often old and scattered (Hotel des Almadies and the King-Fadh Hotel).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |      |
| HAZARDS                               | Beach erosion, collapse of rocky formations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |      |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY | high |
| EVOLUTION OVER THE PERIOD 2016 - 2020 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |      |
| EVOLUTION OF STAKES                   | Increasing urbanization of the coastline (construction of hotels) with anarchic occupation of the Public Maritime Domain (DPM).<br>Extension of the third section of the VDN (VDN 3): highway linking Dakar to its distant suburbs such as Malika, between Golf de Guédiawaye and Tivaouane Peulh.                                                                                                                                                                                                                                                                                                                                                  |             |      |
| CURRENT PROJECTS                      | 1. Dakar-Blaise Diagne Airport (AIBD) Regional Express Train (TER): When Phase 1 is commissioned, the TER will carry up to 115,000 passengers per day and will serve 13 stations and stops between the suburbs of Dakar and the new town of Diamniadio. The fourteenth (14th) station, that of Blaise Diagne International Airport, will be served at the end of the Phase 2 work.<br>As a structuring public transport project to provide a sustainable solution to road congestion in the capital, the State of Senegal, through the Executive Council for Urban Transport in Dakar (CETUD), is banking on the «Bus Rapid Transit» (BRT) project. |             |      |
| OUTSTANDING NATURAL AREAS             | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |      |
| HAZARDS                               | Coastal erosion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |      |
| RECOMMENDATIONS                       | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |      |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY | High |





DAKAR-AIBD REGIONAL EXPRESS TRAIN (PHASE 1)



VDN EXTENSION (VDN 3)







| SN2-b                                 | 21 - DAKAR ROCKY COAST WEST YOFF-CAP MANUEL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BASELINE - 2010                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
| DIAGNOSTIC                            | <p>Rugged ablation coastline with cliffs, capes and coves, of very heterogeneous topography alternating gentle slopes and vigorous reliefs. This heterogeneity is related to the very diversified substrate, essentially rocky, fractured and altered. Dolerites, basalts, infrabasaltic sands, clay-marl and silty cliffs constitute a complex geological ensemble.</p> <p>Dense urbanization essentially tourist and residential in its northern and central part (Ngor, Almadies, Mamelles); denser and older in the central parts (Mermoz, Fann). Residential neighborhoods in the southern part of Cap Manuel. Urbanization up to the seaside in the North and in the South, limited by the corniche recently developed in the central part.</p> <p>Almost complete privatization of this rugged coastline is underway.</p> <p>Sector strongly exposed to oceanic swells of North-West dominance.</p> <p>Numerous embankments and individual protective structures, without overall coherence.</p> |                       |
| DYNAMICS                              | <p>Varied and differential forms of erosion observed, to be related to the lithological discontinuities of the fractured formations and weakened by the coming and infiltration of water of continental origin. Generally, collapses in various forms, landslides, gullies.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
| STAKES                                | <p>Viability of recent developments of the corniche and high value-added tourism investments.</p> <p>Safety of populations at risk (cliff edge habitat).</p> <p>Development and preservation of the scenic and landscaped corniche corridor as a public domain accessible to urban populations.</p> <p>Revegetation of embankments and cliff tops.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| ACTIONS                               | <p>Inconstructibility to be respected in all sites at risk.</p> <p>Improved storm-water and wastewater collection and drainage at the most sensitive sites.</p> <p>Temporal and viability perspectives to be taken into account in the impact studies, which should be carried out for each new establishment in this sector.</p> <p>The requalification along with the withdrawal of certain exposed neighborhoods will be considered.</p> <p>Protective structures justified by the density of the stakes, but to be put in coherence in an overall scheme.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY High      |
| EVOLUTION OVER THE 2010 - 2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
| EVOLUTION OF STAKES                   | <p>Important progression of the seaside urbanization (residences, hotels, shops).</p> <p>Illegal removal of basaltic materials from the cliffs.</p> <p>Construction of a fishing wharf in Soumbédioune.</p> <p>Embankments on the sea at the level of the amusement park «Magic land» (between Terrou Bi hotel and Soumbédioune beach).</p> <p>Seawater desalination plant project in Mamelles / Ouakam.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |
| EXTRACTIVE ACTIVITIES                 | <p>Cliff reinforcement works.</p> <p>Breakwater of the marina of the Terrou Bi hotel.</p> <p>Riprap facing the Radisson Hotel.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |
| HAZARDS                               | <p>Acceleration of erosion at several points, especially in front of UCAD.</p> <p>Landslides.</p> <p>Exceptional heavy swell events (&gt; decadal) with surge in 2013 and 2014.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY Very high |
| EVOLUTION OVER THE PERIOD 2016 - 2020 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
| EVOLUTION OF STAKES                   | <p>Important progression of the seaside urbanization (residences, hotels, shops).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |
| CURRENT PROJECTS                      | <p>West Africa Coastal Areas Resilience Investment Project - WACA ResIP (World Bank Group).</p> <ul style="list-style-type: none"><li>• Protection and stabilization of the Western Corniches of Dakar and Gorée Island.</li><li>• Construction project of a coastal cell on the Mermoz coastline.</li><li>• Protection project of the residences les alizées.</li></ul> <p>Construction project of a coastal cell on the Mermoz coastline.</p> <p>Protection project of the residences les alizées.</p> <p>Construction project of a dyke on the western corniche of Dakar by WATERFRONT SA. for the protection of its buildings.</p> <p>Rehabilitation project of mole 3 of the autonomous port of Dakar.</p> <p>Construction project of the wastewater treatment plant of the West Corniche of Dakar.</p>                                                                                                                                                                                            |                       |

<sup>19</sup> <https://www.wacaprogram.org/>



| SN2-b                     | 21 - DAKAR ROCKY COAST WEST YOFF-CAP MANUEL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| OUTSTANDING NATURAL AREAS | <p><b>Parc National des Îles de la Madeleine (IUCN Category II)</b></p> <ul style="list-style-type: none"> <li>• WDPA ID : 870</li> <li>• Affected sector: SN2-b</li> <li>• Classification: 16 January 1976 (Decree n°76/0033)</li> <li>• The rules of procedure were determined by the Order n°007164/24 JUNE / PM / DGT.</li> <li>• The boundaries of the PN des îles de la Madeleine are not available in WDPA.</li> </ul> <p><b>Proposed World Heritage Site of the Parc National des Îles de la Madeleine</b></p> <ul style="list-style-type: none"> <li>• WH ID: 2077</li> <li>• Affected sector: SN2-b</li> <li>• The Parc National des Îles de la Madeleine has been on the tentative list of World Heritage Sites that Senegal intends to propose for inscription since 2005.</li> </ul> |                       |
| HAZARDS                   | Recurrence of flooding.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY Very high |



| SN2-c                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 22 - BAY OF HANN-RUFISQUEL |           |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------|
| BASELINE - 2010                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            |           |
| DIAGNOSTIC                            | <p>This sector includes the port of Dakar, the urban beach and the bay of Hann and the coastline from Rufisque to Bargny:</p> <ul style="list-style-type: none"><li>• 87% of Dakar's industries are located in this sector.</li><li>• The area is densely populated and occupied up to the shore.</li><li>• Numerous protective structures, riprap, groins, protective walls, often altered or destabilized.</li><li>• Dyke construction project underway.</li><li>• Populations largely exposed in case of surge, despite the geographical situation somewhat protected from swells.</li><li>• The topographical situation of Rufisque also determines the risk of continental flooding.</li></ul> |                            |           |
| DYNAMICS                              | <p>Generalized erosion except perhaps at the level of the Diokoul thermal power plant (cooling water supply channel acting as a groin).</p> <p>Estimated retreat between 1 and 2 meters per year depending on the site.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                            |           |
| STAKES                                | <p>Although there is still room for development, retreat will be the eventual solution, at an obviously high cost given the density of the stakes.</p> <p>Major problems of pollution of urban, industrial and organic origin in the bay of Hann, generating a situation of real health risk for the riparian populations.</p> <p>The port of Dakar has, on the scale of the sub-region, significant development potential as a hub port capable of handling growing container traffic, and various extensions are to be planned.</p>                                                                                                                                                               |                            |           |
| ACTIONS                               | <p>Developments to be considered, but, except radical solutions (and hardly perennial) of fixation of the coastline, the retreat and the requalification of the districts in sea front are hardly avoidable.</p> <p>Actions are already undertaken to reduce pollution levels in Hann Bay.</p>                                                                                                                                                                                                                                                                                                                                                                                                      |                            |           |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY                | Very high |
| EVOLUTION OVER THE 2010 - 2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            |           |
| EVOLUTION OF STAKES                   | <p>Strong progression of urbanization in the Thiaroye-Mbao area.</p> <p>Area of transformation of fishery products (beach of Bata).</p> <p>Storm-water and industrial waste treatment project (Hann Bay depollution project).</p> <p>«Port du futur» project.</p> <p>Construction of a bulk carrier mole.</p> <p>Urban restructuring following the sanitation project in Hann and Petit Mbao.</p> <p>Installation of a thermal power plant.</p>                                                                                                                                                                                                                                                     |                            |           |
| PORT INFRASTRUCTURE                   | <p>The autonomous port of Dakar is located in the bay of Hann in Dakar, it consists of an inner harbor and several moles protected by two piers to the north and south of the port entrance. It includes a phosphate ore terminal, an oil terminal and a fishing area.</p> <p>The concession of the container terminal of the port of Dakar was awarded to Dubai Ports World in 2007 for a period of 25 years following 80 years of management by the Bolloré Group.</p> <p>It is the third port in West Africa (after Abidjan and Lagos).</p>                                                                                                                                                      |                            |           |
| PROJECTS                              | <p>Offshore oil extraction.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            |           |
| PROTECTION                            | <p>Construction of the Rufisque (Thiawène) dyke (5 m x 730 m) work started in May 2012 and inaugurated in July 2013.</p> <p>Diokoul dyke project.</p> <p>Gorée Island protection project.</p> <p>Existence of old structures to the north and south of the port: breakwater (i) of the eastern corniche and (ii) of the hydrobase (built before 1942)</p> <p>Some isolated groins in the bay of Hann facing Rufisque and Grand Mbao.</p>                                                                                                                                                                                                                                                            |                            |           |
| HAZARDS                               | <p>Pronounced erosion, pollution of Hann Bay.</p> <p>Exceptional episodes of strong swell (&gt; decennial) with surge in 2013 and 2014 having affected the protections put in place.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |           |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY                | Very high |
| EVOLUTION OVER THE PERIOD 2016 - 2020 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            |           |


**SN-Senegal (North)**

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| EVOLUTION OF STAKES       | <p>Evolution protection (State funding): Consolidation of the East Corniche road south of the Port (AGEROUTE project).<br/>Earthworks carried out for the extension of the port of Dakar</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
| CURRENT PROJECTS          | <p>West Africa Coastal Areas Resilience Investment Project – WACA ResIP<sup>20</sup> (World Bank Group).</p> <ul style="list-style-type: none"> <li>• Protection of Gorée Island</li> <li>• Feasibility Study for the Protection and Stabilization of the East and West Cornices of Dakar and Gorée Island</li> </ul> <p>Growth and Export Development Project (World Bank Group).<br/>Hann Bay depollution project (AFD and EIB).<br/>Project to exploit drill cuttings from an exploration well on the Rufisque deep offshore block (TOTAL).<br/>Project for the establishment of an unloading and loading terminal for oil products off Mbao.</p> |                       |
| OUTSTANDING NATURAL AREAS | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |
| HAZARDS                   | <p>Coastal erosion<br/>Marine submersion<br/>Flood<br/>Urban and industrial pollution</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY Very high |

<sup>20</sup> <https://www.wacaprogram.org/>



AUTONOMOUS PORT OF DAKAR (EARTHWORKS)



**SN3****PETITE CÔTE**

The observed level of impacts related to coastal erosion, and the responsibility in these impacts of protection decisions taken individually and uncoordinated in a context of (i) low sediment supply (ii) low sediment reserves (iii) extraction of probably large volumes of sand (iv) seasonal variation in the direction of swells, plead for a complete review of the development modalities of the Petite Côte, within the framework of a coherent sectoral scheme arbitrating the conflicts of use.

The reconquest of land control and the regulation of the spontaneous development of erosion control (operated on the public domain) are prerequisites that seem unavoidable before considering new protection investments. These «spontaneous» developments are also to be associated with the de facto «privatization» of the Public Maritime Domain, which is increasingly marked on the Petite Côte.

The same applies to projects for the extension of tourist areas, which will hardly be able to do without taking better account of the coastline dynamics, given the experience acquired. These developments are also an opportunity to develop a new doctrine for coastal tourism development. The construction of an airport and a future ore port in Bargny, with the southern extension of Dakar, will not simplify the management of erosion on the Petite Côte, which is characterized by low levels of sedimentary input.

In Senegal, tourism produces 4.6% of GDP and represents 100,000 jobs. It is the second sector for foreign currency inflows after fishing. A survey conducted by MOLOA has shown to what extent this sector on the pole site of Saly is damaged, particularly because of erosion due to the exposure of hotel buildings along the beach.

The future opening of the Bargny international airport and the Diamniadio/Ndiass Special Economic Zone (SEZ) should result in an influx of people and rapid development of the entire sector, as anticipated by the Master Plan for Territorial Planning and Development of the Dakar - Thiès - Mbour area drawn up in January 2015.



| SN3-a                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 23 – BARGNY – YENE – NDIOGOM |           |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----------|
| BASELINE – 2010                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                              |           |
| DIAGNOSTIC                            | Quasi-urban, linear sector. It is often characterized by a very narrow, but almost continuous strip (even in a coastline backed by a wetland) of beachfront residences, with some included traditional villages.<br>Rocky coastline located south of the sector.                                                                                                                                                                                                                                             |                              |           |
| DYNAMICS                              | Widespread erosion as witnessed by the numerous protective developments.                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |           |
| STAKES                                | General stakes of the Petite Côte (Little Coast), numerous protective developments, dikes, walls, riprap of individual residences.<br>Materials available nearby.<br>Very probable growth and extension of the coastal habitat inland beyond the coastal road.<br>Uncertain future of low-lying areas near the south of Bargny based on the growth of future space-demanding activities in Dakar (accessible land, especially with embankment). In particular, future settlements of the Dakar mineral port. |                              |           |
| ACTIONS                               | Potential consistency of the protections on the sector level, but more probably embankment and complete artificialization of the coastline, in order to defer a retreat probably inevitable in the long term.                                                                                                                                                                                                                                                                                                |                              |           |
| MONITORING                            | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY                  | High      |
| EVOLUTION OVER THE 2010 – 2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                              |           |
| EVOLUTION OF STAKES                   | Project to build a mineral port and a coal-fired thermal power plant in Sendou.<br>Diamniadio Development Pole / Ndiass Integrated SEZ.<br>The urban expansion reaches the southern enclave of Bargny which was relatively unoccupied.                                                                                                                                                                                                                                                                       |                              |           |
| HAZARDS                               | Severe erosion.<br>Exceptional episodes of strong swell (> decennial) with surges in 2013 and 2014 that affected the protections established.                                                                                                                                                                                                                                                                                                                                                                |                              |           |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY                  | Very high |
| EVOLUTION OVER THE PERIOD 2016 – 2020 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                              |           |
| EVOLUTION OF STAKES                   | Currently building the Bargny mineral port <sup>21</sup> (Senegal Minergy Port).<br>Abandoning the coal-fired thermal power plant project in Bargny – moving towards a gas-fired power plant project.                                                                                                                                                                                                                                                                                                        |                              |           |
| CURRENT PROJECTS                      | WWest Africa Coastal Areas Resilience Investment Project – WACA ResIP <sup>22</sup> (World Bank Group).<br>>> Study to define the adaptation options under the WACA ResIP.<br>Project to redevelop old quarries in Bargny.<br>Project to implement the mineral and bulk port of Sendou.<br>Project to build the port of Ndayane.                                                                                                                                                                             |                              |           |
| OUTSTANDING NATURAL AREAS             | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                              |           |
| HAZARDS                               | Severe erosion.<br>Episodic marine submersion.                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                              |           |
| RECOMMENDATIONS                       | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                              |           |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY                  | Very high |

<sup>21</sup> <https://smptsenegal.com/en/>

<sup>22</sup> <https://www.wacaprogram.org/>





MINERAL PORT OF BARGNY





| SN3-b                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 24 - POPENGUINE |      |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------|
| BASELINE - 2010                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 |      |
| DIAGNOSTIC                            | Very particular coastline, coast with segments of cliffs with cuirasses, substratum in movable depth, natural tendency to collapse.<br>Alternating small cliffs and more or less narrow beaches.<br>Surrounding landscape almost devoid of vegetation (outcropping cuirasses).<br>Local availability of riprap material allowing easily any individual protection initiative: protective dike of a village hamlet (fishing), some residences bordering the small cliffs with collapse risks.<br>In the North, still barely urbanized, numerous land plots subdivided and closed awaiting construction, scattered residences on the seafront, etc. |                 |      |
| DYNAMICS                              | Very dynamic coastline and narrow unstable beaches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |      |
| STAKES                                | Anticipated occupation of the unstable coastline where the expansion dynamics are ongoing.<br>Effectiveness and viability over time of the dam walls and protective ripraps.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |
| ACTIONS                               | Preventive measures for at risk-facilities in situ.<br>Recommended sector plan, considering the nature of the substrata and the collapse risks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 |      |
| MONITORING                            | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY     | High |
| EVOLUTION OVER THE 2010 – 2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 |      |
| EVOLUTION OF STAKES                   | Project to build the marina of Ndayane.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |      |
| HAZARDS                               | Severe erosion.<br>Exceptional episodes of strong swell (> decennial) with surges in 2013 and 2014.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |      |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY     | High |
| EVOLUTION OVER THE PERIOD 2016 – 2020 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 |      |
| EVOLUTION OF STAKES                   | No evolution of stakes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |      |
| CURRENT PROJECTS                      | No projects registered                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |      |
| OUTSTANDING NATURAL AREAS             | <b>Nature Reserve of Popenguine</b> <ul style="list-style-type: none"><li>• WDPA ID : 12263</li><li>• Affected sector:SN3-b</li><li>• Creation: May 21, 1996 (Decree n°86/605).</li><li>• The rules of procedure were determined by Decree n°0053-3 JANV.87/MPN on the rules of procedure of the Popenguine Nature Reserve</li><li>• The Popenguine NR has no limitations in the WDPA.</li></ul>                                                                                                                                                                                                                                                  |                 |      |
| HAZARDS                               | Coastal erosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |      |
| RECOMMENDATIONS                       | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |      |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY     | High |



| SN3-c                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 25 - SALLY – PORTUDAL – SOMONE |           |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------|
| BASELINE – 2010                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                |           |
| DIAGNOSTIC                            | Coastal strip almost totally developed and artificialized: hotel complexes, holiday homes and village enclaves.<br>Coastline evolving significantly, the northern beach of Somone, with six riprap spurs, a small marina with piers, various protections, walls and beach ripraps.<br>Several coves visibly eroded.<br>Obvious land-use conflict between tourism and fisheries in a context of continuous reduced beach width.                                                                                                                                                                                                                                                                                                                                                                |                                |           |
| DYNAMICS                              | Widespread erosion throughout the sector.<br>Some accreting sites upstream of protection facilities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                |           |
| STAKES                                | A coordinated beachfront plan required to avoid disturbing the fragile balance of the coastal current dynamics.<br>Involving the various stakeholders and a broadened awareness of all the relevant actors in terms of risk prevention.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                |           |
| ACTIONS                               | Preventive measures for at risk-facilities in situ.<br>Recommended sector plan, with assessed and harmonized spontaneous protections.<br>Considering developments under a coordinated overall approach.<br>In any case, regaining land control is a prerequisite.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                |           |
| MONITORING                            | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY                    | Very high |
| EVOLUTION OVER THE 2010 – 2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                |           |
| EVOLUTION OF STAKES                   | Project to build tourist facilities (SAPCO).<br>Developing artificial beaches on terraces with a beach wall accentuating erosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                |           |
| PROJECTS                              | Project to build various protective facilities (World Bank Group).<br>Multiplying uncoordinated individual protection actions including ripraps in the west of <i>Hotel Lamantin</i> between 2010 and 2013 and at the artisanal port of Saly in 2015.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                |           |
| HAZARDS                               | Widespread erosion, beach disappearance.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |           |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY                    | High      |
| EVOLUTION OVER THE PERIOD 2016 – 2020 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                |           |
| EVOLUTION OF STAKES                   | Developing coastal protection by building 10 breakwaters, 3 T-shaped spurs and a sand nourishment operation (World Bank Group – Tourism and Enterprise Development Project).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                |           |
| CURRENT PROJECTS                      | Tourism and Enterprise Development Project (World Bank Group).<br>Retention pond and borehole enhancement Project – BARVAFOR → Dredging the Somone Lagoon (Kingdom of Belgium).<br>Tourism and Business Development Project .Component 1 "Sustainable development of tourist destinations" – Subcomponent 2 "Saly Beach Renovation". <ul style="list-style-type: none"><li>About 800 m of protected beach</li><li>Establishing two spurs of 20 to 25 m long,</li><li>Beach nourishing with sand pumped from the sea bed (16,000 m3).</li></ul> Building breakwaters.<br>Project to assess the projected impacts of climate change on tourism developing areas in Senegal and the adaptation and resilience strategy for the Petite Côte (Little Coast) and Basse Casamance (Lower Casamance). |                                |           |



| SN3-c                     | 25 - SALY – PORTUDAL – SOMONE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| OUTSTANDING NATURAL AREAS | <b>Nature Reserve of Community Interest of Somone</b> <ul style="list-style-type: none"> <li>• WDPA ID : nonexistent</li> <li>• Affected sector: SN3-c</li> <li>• Creation: 25 October 1999 following the prefectural approval of deliberation n°003/CRS of the Rural Council of Sindia as of July 19, 1999.</li> <li>• The rules of procedure were specified by the Mbour prefectural decree n°0033/ASD of October 22, 2008.</li> <li>• The decree establishing the governing bodies of the NRCI was issued on January 18, 2013. The Management Committee was established as of March 2013.</li> <li>• A development and management plan was updated for the 2014-2018 period.</li> <li>• The Somone NRCI has no limitations in the WDPA.</li> </ul> |                       |
| HAZARDS                   | Coastal erosion.<br>Salinized land.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY Very high |

## SALY – BREAKWATERS ESTABLISHED (TOURISM PROJECT)





| SN3-d                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 26 - MBOUR URBAN SECTOR |           |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                         |           |
| DIAGNOSTIC                          | A growing city (on the outskirts), with many plots surrounded by low walls awaiting construction. Important quasi-satellite agglomeration located 60 kilometers from Dakar, local tourist hub, rural area close to the groundnut zones.<br>Important fishing port (fresh fish markets and trucks).<br>Very undulating coastline of beautiful beaches with marked coves, evolving permanently in eroded/accreted sections.<br>Balance of currents very sensitive to any modification of the coastline.<br>Beach expansion as early as possible, sometimes in two stages from extensions built on the maritime domain adjacent to an initial concession.<br>The hotel area closes largely the public access to the beach. |                         |           |
| DYNAMICS                            | Very dynamic coastline, eroded/accreted segments largely caused by the existing facilities and developments on the seafront.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |           |
| STAKES                              | Consequences of individual protection decisions without overall consistency.<br>Maintaining the tourist attractiveness of the sector with a constantly diminishing beach heritage.<br>Obvious privatization of a long beach linear.<br>Effectiveness and viability over time of the dam walls and protective ripraps.<br>For the future, the access to the beach for the populations running the risk of having only the urban beach for fishery landing with its diverse nuisances.                                                                                                                                                                                                                                    |                         |           |
| ACTIONS                             | Recommended sector plan for consistency and compliance with the functionality of the developments.<br>Embankment in certain extreme cases when required by the stakes and under an overall plan.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                         |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY             | Very high |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                         |           |
| EVOLUTION OF STAKES                 | Significant extension of the agglomeration                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                         |           |
| COASTAL PROTECTION                  | Many protective facilities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                         |           |
| HAZARDS                             | Widespread erosion, beach disappearance.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                         |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY             | Very high |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                         |           |
| EVOLUTION OF STAKES                 | Study to identify the appropriate adaptation options (Ministry of Tourism).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                         |           |
| CURRENT PROJECTS                    | Project to assess the projected impacts of climate change on tourism developing areas in Senegal and the adaptation and resilience strategy for the Petite Côte (Little Coast) and Basse Casamance (Lower Casamance).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                         |           |
| OUTSTANDING NATURAL AREAS           | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                         |           |
| HAZARDS                             | Widespread erosion, beach disappearance.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                         |           |
| RECOMMENDATIONS                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                         |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY             | Very high |



| SN3-e                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 27 – MBOUR – POINTE SARENE |           |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |           |
| DIAGNOSTIC                          | The striking phenomenon is the expansion of settlements of all sizes, closed and fenced; the protected natural vegetation is tending to close access to the coastline, the only openings of the original village enclaves (with fishery and fish drying activities – Warang).<br>Good connection by the asphalted coastal road to Joal.<br>The coastline has an undulating longitudinal profile where eroding and accreting sectors alternate.                                   |                            |           |
| DYNAMICS                            | Average erosion of 1 m/year (source: Case study). Very important in Warang, and also downstream of the spur protecting the Aldiana Club beach.                                                                                                                                                                                                                                                                                                                                   |                            |           |
| STAKES                              | No important hotel industry, holiday homes, some of them are very close to the beach, with a wall, a section of riprap for individual protection.<br>Complete lack of coordination of individual protection actions.<br>Projection in the land development of the southern zone of the residential urbanization segments to preserve access to the beaches for the inland populations, in order to avoid a complete privatization of the coastline outside the village enclaves. |                            |           |
| ACTIONS                             | Recommended sector plan for consistency and compliance with the functionality of the developments.<br>Embankment in certain extreme cases when required by the stakes and under an overall plan.<br>Projection in the land development of the southern zone of the residential urbanization segments to preserve access to the beaches for the inland populations, in order to avoid a complete privatization of the coastline outside the village enclaves.                     |                            |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY                | High      |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |           |
| EVOLUTION OF STAKES                 | Significant extension of the Mbour agglomeration<br>Tourist development project of Pointe Sarene by SAPCO: roadwork under development                                                                                                                                                                                                                                                                                                                                            |                            |           |
| HAZARDS                             | Widespread erosion, beach disappearance.                                                                                                                                                                                                                                                                                                                                                                                                                                         |                            |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY                | Very high |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |           |
| EVOLUTION OF STAKES                 | Developing a hotel chain in Pointe Sarene, and identifying the overall adaptation option in the area.                                                                                                                                                                                                                                                                                                                                                                            |                            |           |
| CURRENT PROJECTS                    | Project to assess the projected impacts of climate change on tourism developing areas in Senegal and the adaptation and resilience strategy for the Petite Côte (Little Coast) and Basse Casamance (Lower Casamance).<br>Project to develop an integrated tourist zone in Pointe Sarene.                                                                                                                                                                                         |                            |           |
| OUTSTANDING NATURAL AREAS           | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |           |
| HAZARDS                             | Coastal erosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                            |           |
| RECOMMENDATIONS                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY                | Very high |



| SN3-f                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 28 - NORTH JOAL – MBODIENE BEACH |        |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |        |
| DIAGNOSTIC                          | This segment marks the end of the tourist and residential settlement of the Petite Côte, with vast residential concessions and the last luxury hotel settlements.<br>One of them closes the coastline on several hundred hectares.<br>Apart from the hotel complex built in a potentially flood-prone zone south of the Pointe Sarene village, most of the hotels and holiday homes have been set back, thus reducing the risks of settling closer to the shore. Ongoing sprawl in the hinterland around Mbodiene. The functioning of the estuarine zone is largely disrupted by the blocked inflows to the east of the Pointe Sarene village. |                                  |        |
| DYNAMICS                            | The coastline in south Pointe Sarene takes the shape of a narrow lido ending in a sandy spit near Joal. Unstable coastline. This spit is part of the old estuary of the coastal river, whose functioning has been deeply altered by the construction of a dam at the level of the North Mbodiene tourist complex.                                                                                                                                                                                                                                                                                                                              |                                  |        |
| STAKES                              | Controlled development of residential and hotel buildings in this complex sector bordered by wetlands, also forming sedimentary reserves.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                  |        |
| ACTIONS                             | Preserving the wetland complex.<br>Locating potential secluded tourist and residential development zones.<br>Land control in order to avoid the sprawl of this large urbanization segment before Joal and Sine Saloum.                                                                                                                                                                                                                                                                                                                                                                                                                         |                                  |        |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY                      | Medium |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |        |
| EVOLUTION OF STAKES                 | Dike behind Joal.<br>Desalination projects.<br>Migration of the Mbodiene lagoon mouth affecting the two tourist complexes in south Mbodiene.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |        |
| HAZARDS                             | Localized erosion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                  |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY                      | Medium |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |        |
| EVOLUTION OF STAKES                 | New tourist zone and new socio-economic stakes with the Akon City Project with especially an urbanization that will inevitably increase.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                  |        |
| CURRENT PROJECTS                    | Project to assess the projected impacts of climate change on tourism developing areas in Senegal and the adaptation and resilience strategy for the Petite Côte (Little Coast) and Basse Casamance (Lower Casamance).<br>Developing and settling new tourist facilities.                                                                                                                                                                                                                                                                                                                                                                       |                                  |        |
| OUTSTANDING NATURAL AREAS           | <b>Marine Protected Area of Joal Fadiouth</b> <ul style="list-style-type: none"><li>• WDPA ID : 352706</li><li>• Affected sectors: SN3-f / SN3-g / SN4-a / SN4-b</li><li>• Classification : November 4, 2004 (Decree n°2004-1408)</li><li>• A 2009-2013 management plan for the Joal-Fadiouth MPA was completed in September 2008 and a document review for the 2014-2018 period is in effect.</li></ul>                                                                                                                                                                                                                                       |                                  |        |
| HAZARDS                             | Localized erosion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                  |        |
| RECOMMENDATIONS                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                  |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY                      | High   |





| SN3-g                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 29 - JOAL   |      |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |      |
| DIAGNOSTIC                          | Growing city forming a conurbation with Fadiouth.<br>Very important center for fishery collection and fish processing, salting, cooling, smoking with air pollution, etc.<br>No wharf facilities, landings on the urban beach, with a considerable concentration of boats.<br>The cape serves relatively as a shelter. A number of scattered buildings are located on the beach, more or less protected by walls and coatings exposed to storms. |             |      |
| DYNAMICS                            | Straight coastline, undulating trend with local accretion/erosion.<br>Relatively unstable sector.                                                                                                                                                                                                                                                                                                                                                |             |      |
| STAKES                              | Controlled construction on the beach (in order to avoid the situation observed in Fadiouth, see next).                                                                                                                                                                                                                                                                                                                                           |             |      |
| ACTIONS                             | Informing local residents and authorities about the risks associated with building densification.                                                                                                                                                                                                                                                                                                                                                |             |      |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY | High |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |      |
| EVOLUTION OF STAKES                 | Improving the fishery wharf and processing fishery products, Pointe Fignon tourist development.                                                                                                                                                                                                                                                                                                                                                  |             |      |
| COASTAL PROTECTION                  | Building protection facilities for the fishing port over the 2012-2013 period.                                                                                                                                                                                                                                                                                                                                                                   |             |      |
| HAZARDS                             | Localized erosion affecting fishery facilities.                                                                                                                                                                                                                                                                                                                                                                                                  |             |      |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY | High |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |      |
| EVOLUTION OF STAKES                 | Tourist development in Mbodiene, which will directly affect the Joal area.                                                                                                                                                                                                                                                                                                                                                                       |             |      |
| CURRENT PROJECTS                    | Project to assess the projected impacts of climate change on tourism developing areas in Senegal and the adaptation and resilience strategy for the Petite Côte (Little Coast) and Basse Casamance (Lower Casamance).                                                                                                                                                                                                                            |             |      |
| OUTSTANDING NATURAL AREAS           | <b>Marine Protected Area of Joal Fadiouth</b> <ul style="list-style-type: none"><li>• WDPA ID : 352706</li><li>• Affected sectors: SN3-f / SN3-g / SN4-a / SN4-b</li><li>• Classification : November 4, 2004 (Decree n°2004-1408)</li><li>• A 2009-2013 management plan for the Joal-Fadiouth MPA was completed in September 2008 and a document review for the 2014-2018 period is in effect.</li></ul>                                         |             |      |
| HAZARDS                             | Localized erosion                                                                                                                                                                                                                                                                                                                                                                                                                                |             |      |
| RECOMMENDATIONS                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |      |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY | High |



## SN4

## SINE SALOUM

| SN4-a                               | 30 – PENINSULA AND ISLAND OF FADIOUTH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |
| DIAGNOSTIC                          | <p>Continuous cordon and urbanized terraces with Joal in a more continental context. Interesting site, but fragile and exposed.</p> <p>Narrow beach in places built up to the tidal edge.</p> <p>Only the vast pirogue landing cove, extending to the port of Joal, has preserved a beach segment between the densely built-up area and the sea.</p> <p>On the residential point, three hotels and residences, built on the tidal edge, with protective facilities (walls, coatings).</p> <p>The extreme, non-built point is partly vegetated (to be protected) and jeopardized of disappearing. Vast salt production area.</p> <p>A densely urbanized island (shellfish island), but more sheltered from storm swells connected by foot-bridges (i) to the peninsula; (ii) to the nearby cemetery island.</p> <p>The peninsula is connected to the northeast by a dike trail crossing salty wetlands.</p> |                  |
| DYNAMICS                            | Unstable and eroding sector                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |
| STAKES                              | <p>Potential developed buildings in a high-risk situation on the end of the peninsula, which is already visibly “pre-subdivided”.</p> <p>Maintaining in the future the current building footprint in a situation where the retreat of the coast-line is more than likely.</p> <p>The most threatened sector seems to be located in the residential part with walls/coatings on the beach.</p> <p>The extreme point should be more vigorously vegetated with Filao trees (the low woody vegetation seems to be vigorously solicited for firewood, given what remains of the mangrove).</p> <p>As the buildable urban site is saturated, the future extension (added to the one referred to Fadiouth) is likely to address the area more or less reclaimed by the dike road (but mostly occupied by fish drying activities).</p> <p>Potential future embankments on the salt flat islands?</p>               |                  |
| ACTIONS                             | <p>Preserving the natural vegetation, especially on the extreme point of the Fadiouth Peninsula.</p> <p>Prohibiting material extraction throughout the sector and adjacent sectors.</p> <p>Vigilance to avoid developing uncoordinated individual protection initiatives.</p> <p>Potential study of a protection plan for the whole sector.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CRITICALITY High |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |
| EVOLUTION OF STAKES                 | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |
| HAZARDS                             | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY High |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |
| EVOLUTION OF STAKES                 | Developing the new tourist area of Mbodiene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |
| CURRENT PROJECTS                    | <p>Regional Project for Reduced Coastal Facilities Impacts on West African Ecosystems.– PRISE – WA5: Regulating coastal infrastructure development<sup>26</sup> (MAVA Foundation for Nature).</p> <p>Project to support Senegal’s Marine Protected Areas policy by sustainably conserving and developing the mangroves in Casamance and Sine Saloum<sup>27</sup> (AFD).</p> <p>“Mangrove Capital Africa” Program – The “Saloum Delta in Senegal”<sup>28</sup> Component (DOB Ecology).</p>                                                                                                                                                                                                                                                                                                                                                                                                                 |                  |

<sup>26</sup> <http://mava-foundation.org/grants/projet-de-reduction-de-limpact-des-infrastructures-sur-les-ecosystemes-cotiers-en-afrique-de-louest-poise-1-outils-et-renforcement-des-capacites>  
<http://prise.prcmarine.org/en>

<sup>27</sup> <https://www.afd.fr/fr/carte-des-projets/appuyer-la-politique-daires-marines-proteges-du-senegal?origin=/fr/carte-des-projets?page=all&view=start>

<sup>28</sup> <https://www.dobecology.nl/ecology/programmes/mangrove-capital-africa/>



| SN4-a                     | 30 – PENINSULA AND ISLAND OF FADIOUTH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
|                           | <p>Support Program to Preserve Biodiversity and Fragile Ecosystems, Regional Governance and Climate Change in West Africa – PAPBio» (ROC/FED/039-269) officially launched on July 25, 2019. Under this program, several projects are being implemented, including the "Regional Project for Strengthened Mangrove Ecosystems" (EU, ECOWAS and WAEMU, 11th EDF)<sup>29</sup> which aims at strengthening the protection status of mangrove areas and creating income-generating activities in 9 coastal countries of the West African sub-region. This project is currently in its diagnostic phase.</p> <p>Saloum Delta Integrated Biodiversity Management (GIBioD)<sup>30</sup> (MAVA Nature Foundation).</p> <p>Project to assess the projected impacts of climate change on tourism developing areas in Senegal and the adaptation and resilience strategy for the Petite Côte (Little Coast) and Basse Casamance (Lower Casamance).</p> <p>Developing and settling new tourist facilities.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |
| OUTSTANDING NATURAL AREAS | <p><b>Marine Protected Area of Joal Fadiouth</b></p> <ul style="list-style-type: none"> <li>• WDPA ID : 352706</li> <li>• Affected sectors: SN3-f / SN3-g / SN4-a / SN4-b</li> <li>• Classification : November 4, 2004 (Decree n°2004-1408)</li> <li>• A 2009-2013 management plan for the Joal-Fadiouth MPA was completed in September 2008 and a document review for the 2014-2018 period is in effect.</li> </ul> <p><b>Saloum Delta Ramsar Site</b></p> <ul style="list-style-type: none"> <li>• ZHII ID : 1SN003 – 288 / WDPA ID : 68153</li> <li>• Affected sectors: SN4-a / SN4-b / SN4-c / SN4-d / SN4-e</li> <li>• Designed on April 3, 1984 (73,000 ha).</li> <li>• A process to classify the Niimi-Saloum complex as a transboundary Ramsar site was initiated in 2008.</li> </ul> <p><b>Saloum Delta Biosphere Reserve</b></p> <ul style="list-style-type: none"> <li>• WDPA ID : 3044</li> <li>• Affected sectors: SN4-a / SN4-b / SN4-c / SN4-d / SN4-e</li> <li>• Part of the Saloum Delta joined the international network of biosphere reserves in 1980.</li> </ul> <p><b>Saloum Delta World Heritage Site</b></p> <ul style="list-style-type: none"> <li>• WH ID : 1359</li> <li>• Affected sectors: SN4-a / SN4-b / SN4-c / SN4-d / SN4-e</li> <li>• The UNESCO World Heritage Committee registered the Saloum Delta as a cultural landscape in the World Heritage List under criteria (iii), (iv), and (v), and referred the registration proposal of the Saloum Delta under criterion (x) to enable Senegal to pursue additional studies on endangered species and biological diversity (Decision 35/COM/8B.14, June 2011).</li> </ul> <p><b>Transboundary Ramsar Site of the Saloum-Niimi Complex</b></p> <ul style="list-style-type: none"> <li>• WDPA ID : nonexistent</li> <li>• Affected sectors: SN4-a / SN4-b / SN4-c / SN4-d / SN4-e</li> </ul> |                  |
| HAZARDS                   | <p>Lastal erosion.</p> <p>Salinized soil</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY High |

<sup>29</sup> <https://www.iucn.org/fr/news/afrique-centrale-et-occidentale/201910/un-projet-regional-pour-le-renforcement-des-ecosystemes-de-mangroves>

<sup>30</sup> <http://mava-foundation.org/grants/gestion-integree-de-la-biodiversite-du-delta-du-saloum-gibiod/>



| SN4-b                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 31 – SOUTH FADIOUTH |        |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |        |
| DIAGNOSTIC                          | Physiographically diversified coastline (narrow and discontinuous sandy cordons, mud flats, tidal flats, etc.).<br>A landlocked area (a trail alongside and then crossing the area in a difficult situation, wet and flood-prone areas) and basically unoccupied.<br>Limited tourist developments are not to be excluded in the future.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                     |        |
| DYNAMICS                            | Very unstable sector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |        |
| STAKES                              | Preserving an unbuildable area of wetlands of biological interest.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     |        |
| ACTIONS                             | Maintaining in urbanized segment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                     |        |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY         | Medium |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |        |
| EVOLUTION OF STAKES                 | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |        |
| HAZARDS                             | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |        |
| MONITORING                          | RRegular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY         | Medium |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |        |
| EVOLUTION OF STAKES                 | Developing the new tourist area of Mbodiene.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                     |        |
| CURRENT PROJECTS                    | Regional Project for Reduced Coastal Facilities Impacts on West African Ecosystems (PRISE). – WA5:Regulating coastal infrastructure development <sup>31</sup> (MAVA Foundation for Nature).<br>Project to support Senegal's Marine Protected Areas policy by sustainably conserving and developing the mangroves in Casamance and Sine Saloum <sup>32</sup> (AFD).<br>"Mangrove Capital Africa" Program – The "Saloum Delta in Senegal" <sup>33</sup> Component (DOB Ecology).<br>Regional Project for Strengthened Mangrove Ecosystems <sup>34</sup> (UE-M – FED 11).<br>Saloum Delta Integrated Biodiversity Management (GIBioD) <sup>35</sup> (MAVA Foundation).<br>Project to assess the projected impacts of climate change on tourism developing areas in Senegal and the adaptation and resilience strategy for the Petite Côte (Little Coast) and Basse Casamance (Lower Casamance).<br>Developing and settling new tourist facilities.                                                                                               |                     |        |
| OUTSTANDING NATURAL AREAS           | <b>Marine Protected Area of Joal Fadiouth</b> <ul style="list-style-type: none"><li>• WDPA ID : 352706</li><li>• Affected sectors:SN3-f / SN3-g / SN4-a / SN4-b</li><li>• Classification :November 4, 2004 (Decree n°2004-1408)</li><li>• A 2009–2013 management plan for the Joal-Fadiouth MPA was completed in September 2008 and a document review for the 2014–2018 period is in effect.</li></ul> <b>Saloum Delta Ramsar Site</b> <ul style="list-style-type: none"><li>• ZHII ID : 1SN003 – 288 / WDPA ID : 68153</li><li>• Affected sectors:SN4-a / SN4-b / SN4-c / SN4-d / SN4-e</li><li>• Designed on April 3, 1984 (73,000 ha).</li><li>• A process to classify the Niumi-Saloum complex as a transboundary Ramsar site was initiated in 2008.</li></ul> <b>Saloum Delta Biosphere Reserve</b> <ul style="list-style-type: none"><li>• WDPA ID : 3044</li><li>• Affected sectors:SN4-a / SN4-b / SN4-c / SN4-d / SN4-e</li><li>• Part of the Saloum Delta joined the international network of biosphere reserves in 1980.</li></ul> |                     |        |

<sup>31</sup> <http://mava-foundation.org/grants/projet-de-reduction-de-limpact-des-infrastructures-sur-les-ecosystemes-cotiers-en-afrique-de-louest-prie-1-outils-et-renforcement-des-capacites>  
<http://prise.prcmarine.org/en>

<sup>32</sup> <https://www.afd.fr/fr/carte-des-projets/appuyer-la-politique-daires-marines-protegees-du-senegal?origin=/fr/carte-des-projets?page=all&view=start>

<sup>33</sup> <https://www.dobecology.nl/ecology/programmes/mangrove-capital-africa/>

<sup>34</sup> <https://www.iucn.org/fr/news/afrique-centrale-et-occidentale/201910/un-projet-regional-pour-le-renforcement-des-ecosystemes-de-mangroves>

<sup>35</sup> <http://mava-foundation.org/grants/gestion-integree-de-la-biodiversite-du-delta-du-saloum-gibiod/>



| SN4-b           | 31 – SOUTH FADIOUTH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
|                 | <p><b>Saloum Delta World Heritage Site</b></p> <ul style="list-style-type: none"> <li>• WH ID : 1359</li> <li>• Affected sectors: SN4-a / SN4-b / SN4-c / SN4-d / SN4-e</li> <li>• The UNESCO World Heritage Committee registered the Saloum Delta as a cultural landscape in the World Heritage List under criteria (iii), (iv), and (v), and referred the registration proposal of the Saloum Delta under criterion (x) to enable Senegal to pursue additional studies on endangered species and biological diversity (Decision 35/COM/8B.14, June 2011).</li> </ul> <p><b>Transboundary Ramsar Site of the Saloum-Niumi Complex</b></p> <ul style="list-style-type: none"> <li>• WDPA ID : nonexistent</li> <li>• Affected sectors: SN4-a / SN4-b / SN4-c / SN4-d / SN4-e</li> </ul> |                            |
| HAZARDS         | Coastal erosion.<br>Salinized soil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |
| RECOMMENDATIONS | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |
| MONITORING      | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>CRITICALITY    High</b> |



| SN4-c                               | 32 - PALMARIN-FACAO-NGALOU PENINSULA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |
| DIAGNOSTIC                          | Connected to the inland by a very fragile trail on segments crossing salty wetlands. Important salt extraction activity (sites sensitive to sea-level rise, but locally more easily movable). Despite a very exposed situation, presence of beachfront habitat, developing tourist hotel facilities and residential huts (Palmarin - Ngalo), located where the terrace is slightly higher and topographically homogeneous.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |
| DYNAMICS                            | Very low terrace, locally interrupted coastal cordon, very complex coastline in evolution. Unstable sector                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |
| STAKES                              | Human settlements at risk (erosion and especially storm surges).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |
| ACTIONS                             | Promoting the coastal vegetation cover (defensive measures...). Considering the potential relocation of certain settlements. Moderating the developed buildings, especially for tourism, throughout the sector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY Medium |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |
| EVOLUTION OF STAKES                 | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |
| HAZARDS                             | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |
| MONITORING                          | RRegular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY Medium |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |
| EVOLUTION OF STAKES                 | Establishing human settlements, degraded ecosystem, more accentuated anthropogenic actions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |
| CURRENT PROJECTS                    | Regional Project for Reduced Coastal Facilities Impacts on West African Ecosystems (PRISE).WA5: Regulating coastal infrastructure development <sup>36</sup> (MAVA Foundation for Nature). Project to support Senegal's Marine Protected Areas policy by sustainably conserving and developing the mangroves in Casamance and Sine Saloum i <sup>37</sup> (AFD). "Mangrove Capital Africa" Program - The "Saloum Delta in Senegal" <sup>38</sup> Component (DOB Ecology). Regional Project for Strengthened Mangrove Ecosystems <sup>39</sup> (UE-M - FED 11). Saloum Delta Integrated Biodiversity Management (GIBioD) <sup>40</sup> (MAVA Nature Foundation). Project to assess the projected impacts of climate change on tourism developing areas in Senegal and the adaptation and resilience strategy for the Petite Côte (Little Coast) and Basse Casamance (Lower Casamance).                                                                                                                                                                                                      |                    |
| OUTSTANDING NATURAL AREAS           | <p><b>Palmarin Facao Community Natural Reserve</b></p> <ul style="list-style-type: none"><li>CNR Palmarin: WDPA ID : nonexistent</li><li>Affected sector: SN4-c / SN4-d</li><li>The deliberation of the Palmarin Facao Rural Council n°20/AF/CRPF of May 14, 2008 on the adoption of concessions of exploitation and the management of the Community Nature Reserve and the</li></ul> <p><b>EIG of the eco-guides and eco-guards.</b></p> <ul style="list-style-type: none"><li>An assessment of the Palmarin Community Nature Reserve Development and Management Plan was conducted and a revision of the plan for the 2014-2018 period was conducted.</li><li>The Palmarin CNR is not registered in the WDPA.</li></ul> <p><b>Saloum Delta Ramsar Site</b></p> <ul style="list-style-type: none"><li>ZHII ID : 1SN003 – 288 / WDPA ID : 68153</li><li>Affected sectors: SN4-a / SN4-b / SN4-c / SN4-d / SN4-e</li><li>Classification : April 3, 1984 (73,000 ha)</li><li>A process to classify the Niumi-Saloum complex as a transboundary Ramsar site was initiated in 2008.</li></ul> |                    |

<sup>36</sup> <http://mava-foundation.org/grants/projet-de-reduction-de-limpact-des-infrastructures-sur-les-ecosystemes-cotiers-en-afrique-de-louest-prise-1-outils-et-renforcement-des-capacites>  
<http://prise.prcmarine.org/en>

<sup>37</sup> <https://www.afd.fr/fr/carte-des-projets/appuyer-la-politique-daiores-marines-proteges-du-senegal?origin=/fr/carte-des-projets?page=all&view=start>

<sup>38</sup> <https://www.dobecology.nl/ecology/programmes/mangrove-capital-africa/>

<sup>39</sup> <https://www.iucn.org/fr/news/afrique-centrale-et-occidentale/201910/un-projet-regional-pour-le-renforcement-des-ecosystemes-de-mangroves>

<sup>40</sup> <http://mava-foundation.org/grants/gestion-integree-de-la-biodiversite-du-delta-du-saloum-gibiod/>



| SN4-c           | 32 – PALMARIN-FACAO-NGALOU PENINSULA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
|                 | <p><b>Saloum Delta Biosphere Reserve</b></p> <ul style="list-style-type: none"> <li>• WDPA ID : 3044</li> <li>• Affected sectors: SN4-a / SN4-b / SN4-c / SN4-d / SN4-e</li> <li>• Part of the Saloum Delta joined the international network of biosphere reserves in 1980.</li> </ul> <p><b>Saloum Delta World Heritage Site</b></p> <ul style="list-style-type: none"> <li>• WH ID : 1359</li> <li>• Affected sectors: SN4-a / SN4-b / SN4-c / SN4-d / SN4-e</li> <li>• The UNESCO World Heritage Committee registered the Saloum Delta as a cultural landscape in the World Heritage List under criteria (iii), (iv), and (v), and referred the registration proposal of the Saloum Delta under criterion (x) to enable Senegal to pursue additional studies on endangered species and biological diversity (Decision 35/COM/8B.14, June 2011).</li> </ul> <p><b>Transboundary Ramsar Site of the Saloum-Niumi Complex</b></p> <ul style="list-style-type: none"> <li>• WDPA ID : nonexistent</li> <li>• Affected sectors: SN4-a / SN4-b / SN4-c / SN4-d / SN4-e</li> </ul> |                  |
| HAZARDS         | Coastal erosion.<br>Salinized soil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |
| RECOMMENDATIONS | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |
| MONITORING      | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY High |





| SN4-d                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 33 - DJIFFER– PALMARIN PENINSULA |           |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                  |           |
| DIAGNOSTIC                          | Extremely unstable area. In particular for Djiffer, a fishing center in the estuary. Particularly exposed and at risk of road enclosure due to the submersion of part of the track connecting Djiffer to Joal Fadiouth.<br>The rupture of the Sangomar spit (Lagoba breach) in 1987 corresponds to a retreat episode in which a rate of 137m/year was recorded. This rupture caused the displacement of the Palmarin village and the Djiffer camp.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                  |           |
| DYNAMICS                            | Extremely unstable area.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |           |
| STAKES                              | Retreat of people out of the at-risk sector of Djiffer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                  |           |
| ACTIONS                             | Protective plant reforestation to timely slow down uncontrollable dynamics.<br>Relocated populations and permanent settlements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                  |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CRITICALITY                      | Very high |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                  |           |
| EVOLUTION OF STAKES                 | Discovery of an oil deposit: Setting up oil extraction facilities.<br>Project to build a protection infrastructure for the Sangomar spit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                  |           |
| HAZARDS                             | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                  |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CRITICALITY                      | Very high |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                  |           |
| EVOLUTION OF STAKES                 | Preserving coastal ecosystems from the considered oil exploitation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                  |           |
| CURRENT PROJECTS                    | Regional Project for Reduced Coastal Facilities Impacts on West African Ecosystems (PRISE) - WA5: Regulating Coastal Infrastructure Development <sup>41</sup> (MAVA Foundation for Nature).<br>Project to Support Senegal's Marine Protected Areas Policy by Sustainably Conserving and Developing the Mangroves in Casamance and Sine Saloum <sup>42</sup> (AFD).<br>"Mangrove Capital Africa" Program - The "Saloum Delta in Senegal" <sup>43</sup> Component (DOB Ecology).<br>Regional Project for Strengthened Mangrove Ecosystems <sup>44</sup> (UE-M - FED 11).<br>Saloum Delta Integrated Biodiversity Management (GIBioD) <sup>45</sup> (MAVA Foundation).<br>"Project for Improved Protected Areas Management in 02 Senegalese Biosphere Reserves (PAGERE)"<br>BIOPAMA/DPN and DAMCP (CNR of Palmarin).<br>Project to assess the projected impacts of climate change on tourism developing areas in Senegal and the adaptation and resilience strategy for the Petite Côte (Little Coast) and Basse Casamance (Lower Casamance). |                                  |           |
| OUTSTANDING NATURAL AREAS           | <b>Saloum Delta Ramsar Site</b> <ul style="list-style-type: none"><li>• ZHII ID : 1SN003 – 288 / WDPA ID : 68153</li><li>• Affected sectors: SN4-a / SN4-b / SN4-c / SN4-d / SN4-e</li><li>• Classification : April 3, 1984 (73,000 ha)</li><li>• A process to classify the Niimi-Saloum complex as a transboundary Ramsar site was initiated in 2008.</li></ul> <b>Saloum Delta Biosphere Reserve</b> <ul style="list-style-type: none"><li>• WDPA ID : 3044</li><li>• Affected sectors: SN4-a / SN4-b / SN4-c / SN4-d / SN4-e</li><li>• Part of the Saloum Delta joined the international network of biosphere reserves in 1980.</li></ul> <b>Saloum Delta World Heritage Site</b> <ul style="list-style-type: none"><li>• WH ID : 1359</li><li>• Affected sectors: SN4-a / SN4-b / SN4-c / SN4-d / SN4-e</li><li>• The UNESCO World Heritage Committee registered the Saloum Delta as a cultural landscape in the World Heritage List under criteria (iii), (iv), and (v), and referred the registration proposal of the</li></ul>      |                                  |           |

<sup>41</sup> <http://mava-foundation.org/grants/projet-de-reduction-de-limpact-des-infrastructures-sur-les-ecosystemes-cotiers-en-afrique-de-louest-prise-1-outils-et-renforcement-des-capacites>  
<http://prise.prcmarine.org/en>

<sup>42</sup> <https://www.afd.fr/fr/carte-des-projets/appuyer-la-politique-daies-marines-protgees-du-senegal?origin=/fr/carte-des-projets?page=all&view=start>

<sup>43</sup> <https://www.dobecology.nl/ecology/programmes/mangrove-capital-africa/>

<sup>44</sup> <https://www.iucn.org/fr/news/afrique-centrale-et-occidentale/201910/un-projet-regional-pour-le-renforcement-des-ecosystemes-de-mangroves>

<sup>45</sup> <http://mava-foundation.org/grants/gestion-integree-de-la-biodiversite-du-delta-du-saloum-gibiod/>



| SN4-d           | 33 - DJIFFER- PALMARIN PENINSULA                                                                                                                                                                                                                                                                                                                                                       |                       |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
|                 | <p>Saloum Delta under criterion (x) to enable Senegal to pursue additional studies on endangered species and biological diversity (Decision 35/COM/8B.14, June 2011).</p> <p><b>Transboundary Ramsar Site of the Saloum-Niumi Complex</b></p> <ul style="list-style-type: none"> <li>• WDPA ID : nonexistent</li> </ul> <p>Affected sectors: SN4-a / SN4-b / SN4-c / SN4-d / SN4-e</p> |                       |
| HAZARDS         | Salinized soils                                                                                                                                                                                                                                                                                                                                                                        |                       |
| RECOMMENDATIONS | -                                                                                                                                                                                                                                                                                                                                                                                      |                       |
| MONITORING      | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY Very high |



| SN4-e                               | 34 – SOUTH SINE–SALOUM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| DIAGNOSTIC                          | A coastline dominated by sandy spits backed by mangroves in active and permanent evolution (Sangomar point).<br>Small island terraces, home to small fishing villages as in all the other inland islands of the Saloum Delta, with the usual constraints in this type of situation: landlockedness, drinking water, precariousness of the habitat in case of storm.<br>Niodior, a larger village with a small fishing port and some (eco) tourist facilities.<br>Case study: Coastline evolution of the Palmarin coast.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| DYNAMICS                            | Extremely unstable sector in permanent evolution. Rapid silting observed on occupied sites.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |
| STAKES                              | The coastline is included in the Saloum Delta Marine National Park with another nearby mangrove area (Bamboung Community Marine Protected Area).<br>Settlements in Niodior and Dionewar in risky sites.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| ACTIONS                             | Complying with the National Park management provisions.<br>Limiting the development of settlements in risky situations.<br>Plant reforestation to slow down the silting process.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY High      |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| EVOLUTION OF STAKES                 | Building a docked port in Foundiougne.<br>Project to build a 700 m bridge connecting Ndangane to Mar Lodge.<br>Tourist developments by SAPCO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |
| HAZARDS                             | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |
| MONITORING                          | RRegular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY Very high |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| EVOLUTION OF STAKES                 | Preserving coastal ecosystems (Mangroves...).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |
| CURRENT PROJECTS                    | Regional Project for Reduced Coastal Facilities Impacts on West African Ecosystems (PRISE) – WAS: Regulating coastal infrastructure development <sup>46</sup> (MAVA Foundation for Nature).<br>Project to support Senegal's Marine Protected Areas policy by sustainably conserving and developing the mangroves in Casamance and Sine Saloum <sup>47</sup> (AFD).<br>"Mangrove Capital Africa" Program – The "Saloum Delta in Senegal" <sup>48</sup> Component (DOB Ecology).<br>Regional Project for Strengthened Mangrove Ecosystems <sup>49</sup> (EU-M – EDF 11).<br>Saloum Delta Integrated Biodiversity Management (GIBioD) <sup>50</sup> (MAVA Foundation).<br>Project to Promote Innovative Funding and Community Adaptation in the Communes Surrounding Community Nature Reserves (PFNAC) (GEF, 2018 – 2022)<br>Project: "Reduced Criticality and Improved Resilience in the Communities of Dionewar", Adaptation Fund, 2017–2020)<br>"Dissemination of Innovative Participatory Management Experiences – Mangroves and Territories (DE-METER)" Project: UE Funding, Ecoio NGO, and 5 Deltas (2017–2020)<br>"Improved Resilience for Ecosystems and Communities in the Groundnut Basin through Restored Saline Lands» Project (2019–2023) Green Climate Fund (CSE) (Foundiougne department: Djilor, Toubacouta, Keur Samba Gueye and Diossong).<br>"Project for Improved Protected Areas Management in 02 Senegalese Biosphere Reserves (PAGERE)" BIOPAMA/DPN and DAMCP (Gandoul MPA and Saloum Delta National Park).<br>Project to assess the projected impacts of climate change on tourism developing areas in Senegal and the adaptation and resilience strategy for the Petite Côte (Little Coast) and Basse Casamance (Lower Casamance). |                       |

<sup>46</sup> <http://mava-foundation.org/grants/projet-de-reduction-de-limpact-des-infrastructures-sur-les-ecosystemes-cotiers-en-afrique-de-louest-priese-1-outils-et-renforcement-des-capacites>  
<http://priese.prcmarine.org/en>

<sup>47</sup> <https://www.afd.fr/fr/carte-des-projets/appuyer-la-politique-daires-marines-protgees-du-senegal?origin=/fr/carte-des-projets?page=all&view=start>

<sup>48</sup> <https://www.dobecology.nl/ecology/programmes/mangrove-capital-africa/>

<sup>49</sup> <https://www.iucn.org/fr/news/afrique-centrale-et-occidentale/201910/un-projet-regional-pour-le-renforcement-des-ecosystemes-de-mangroves>

<sup>50</sup> <http://mava-foundation.org/grants/gestion-integree-de-la-biodiversite-du-delta-du-saloum-gibiod/>



## SUMMARY TABLE

|         |                                                                                                |                                                                                                   |                                                                                                     |                                                                                                                   |                                                                                                          |                                                                                             |                                                                                                  |                                                                                                          |                                                                                                            |                                                                                                     |                                                                                                       |
|---------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| HABITAT |               |                  |                    |                                  |                         |            |                                                                                                  |                                                                                                          |                                                                                                            |                                                                                                     |                                                                                                       |
| STAKES  | Fishing<br>Fishing port<br>Landing areas                                                       | Rice-growing                                                                                      | Palm oil<br>Palm plantation                                                                         | Trade<br>Commercial port                                                                                          | Trade+<br>Commercial port<br>Airport                                                                     | Oil & Gas<br>Exploration<br>Exploitation                                                    | Extractive ind.<br>Salt, metal-bearing sand,<br>gold                                             | Tourism                                                                                                  | (Tourism)<br>Unexploited outstanding<br>areas                                                              | Biodiversity<br>Outstanding areas<br>(biodiversity landscape)                                       |                                                                                                       |
| HAZARDS |  Soil erosion |  Coastal erosion |  Marine submersion |  Pluvial and/or fluvial flooding |  Intrusion of saltwater |  Pollution |  Anthropization |  Sargasso proliferation |  Jellyfish proliferation |  Industrial risk |  Nothing to report |

| N°                                           | REF   | NAME                                  | HABITAT                                                                             | STAKES  |                 | HAZARDS         | CRITICALITY                                                                         |           |           | MONITORING |                       |                       |                       |
|----------------------------------------------|-------|---------------------------------------|-------------------------------------------------------------------------------------|---------|-----------------|-----------------|-------------------------------------------------------------------------------------|-----------|-----------|------------|-----------------------|-----------------------|-----------------------|
|                                              |       |                                       |                                                                                     |         |                 |                 | 2011                                                                                | 2016      | 2020      | 2011       | 2016                  | 2020                  |                       |
| MR1 NOUADHIBOU AND BAIE DU LÉVRIER PENINSULA |       |                                       |                                                                                     |         |                 |                 |                                                                                     |           |           |            |                       |                       |                       |
| 1                                            | MR1-a | Cap Blanc                             |    | Fishing |                 | Biodiversity    |    | Low       | Medium    | High       | No monitoring         | Watch-keeping         | Regular and light     |
| 2                                            | MR1-b | Cansado Spit and Bay                  |    |         | Trade           | Oil & Gas       |    | Low       | Medium    | High       | Watch-keeping         | Regular and light     | Regular and light     |
| 3                                            | MR1-c | Urban coastline and Nouadhibou port   |    | Fishing | Trade           |                 |    | Medium    | Medium    | High       | Regular and light     | Regular and light     | Regular and light     |
| 4                                            | MR1-d | Nouadhibou North and Baie de l'Étoile |    |         |                 | Biodiversity    |    | Medium    | Medium    | High       | Regular and intensive | Regular and intensive | Regular and intensive |
| 5                                            | MR1-e | Baie du Lévrier                       |    |         |                 | Biodiversity    |    | Medium    | Medium    | High       | Regular and intensive | Regular and intensive | Regular and intensive |
| MR2 BANC D'ARGUIN – NORTH NOUAKCHOTT         |       |                                       |                                                                                     |         |                 |                 |                                                                                     |           |           |            |                       |                       |                       |
| 6                                            | MR2-a | Banc d'Arguin (PNBA)                  |    | Fishing |                 | Tourism         |    | Low       | Medium    | Medium     | Regular and light     | Regular and light     | Regular and light     |
| 7                                            | MR2-b | Mamghar – Majhrat                     |    | Fishing |                 | Tourism         |    | Low       | Medium    | Medium     | No monitoring         | Regular and light     | Regular and light     |
| 8                                            | MR2-c | Tanit – Sebkhra N'Dramcha             |    | Fishing | Extractive Ind. | Trade           |    | Low       | Medium    | Medium     | Watch-keeping         | Regular and light     | Regular and intensive |
| 9                                            | MR2-d | Djreidrat                             |    | Fishing |                 | Tourism         |    | Low       | Medium    | Medium     | Watch-keeping         | Regular and light     | Regular and light     |
| MR3 NOUAKCHOTT                               |       |                                       |                                                                                     |         |                 |                 |                                                                                     |           |           |            |                       |                       |                       |
| 10                                           | MR3-a | North Nouakchott                      |  | Fishing |                 | Tourism         |  | High      | High      | High       | Regular and light     | Regular and intensive | Regular and intensive |
| 11                                           | MR3-b | South Nouakchott                      |  | Fishing |                 | Extractive Ind. |  | Very High | Very High | Very High  | Regular and intensive | Regular and intensive | Regular and intensive |
| MR4 SOUTH MAURITANIA & RIVER SENEGAL DELTA   |       |                                       |                                                                                     |         |                 |                 |                                                                                     |           |           |            |                       |                       |                       |
| 12                                           | MR4-a | PK 28 - South Tiguent                 |  | Fishing | Extractive Ind. | Tourism         |  | Medium    | Medium    | High       | Regular and light     | Regular and light     | Regular and light     |
| 13                                           | MR4-b | SouthTiguent - Chott Boul             |  | Fishing | Extractive Ind. | Tourism         |  | Low       | Medium    | High       | Watch-keeping         | Regular and light     | Regular and light     |
| 14                                           | MR4-c | Chott Boul - Ghara (RBTDS)            |  |         | Trade           | Extractive Ind. |  | Low       | Medium    | Medium     | Regular and light     | Regular and light     | Regular and intensive |
| 15                                           | MR4-d | Ndiago                                |  | Fishing |                 | Oil & Gas       |  | Low       | Medium    | High       | Regular and light     | Regular and light     | Regular and intensive |





# SN-SENEGAL (South)

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## SN5

## MARITIME CASAMANCE

| SN5-a                               | 41 - NIAFARANG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |        |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |        |
| DIAGNOSTIC                          | Littoral in high evolution, under the influence of a probably reinforced cape at the sea level by sandstone - cuirasses level with shallow waters.<br>Very complex immediate hinterland: wrinkled terraces and channels in formation, long narrow estuary bordered by unstable sandy cordons, partially vegetated, traces of storm deposits and/or crescent floods, mangroves.<br>Conserving the whole is probably interesting in terms of biodiversity, given the very great heterogeneity of a mosaic of evolving natural environments. Different communities and ecosystems are actually represented over a small area.                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |        |
| DYNAMICS                            | Dynamic littoral including very unstable spire formations, southern part of the sector eroding.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |        |
| STAKES                              | Pursuing a future residential development from Kafountine, but non-constructible zone on a wide coastal fringe. Further inland, small sites to be studied in order to equip them with light facilities, possibly for ecotourism.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |        |
| ACTIONS                             | Limiting settlements other than light and temporary at seafront.<br>Preserving the natural vegetation of the cordon, maintaining a vegetated seafront along the beach and absence of sustainable equipment in this green belt.<br>Densifying residential and tourist habitat to be limited and reserved, if necessary, to areas back from the shore in the extreme south of the sector, with an overall logic (sector plan) to be connected to the Kafountine sector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |        |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY | Medium |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |        |
| EVOLUTION OF STAKES                 | Building a hotel near Abene.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |        |
| HAZARDS                             | Erosion-accretion cycles                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |        |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY | Medium |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |        |
| EVOLUTION OF STAKES                 | Erosion is worsening and, as in the Saloum insular domain, sandy spires are being formed in the prograding sectors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |        |
| CURRENT PROJECTS                    | Support project to the Senegal's Marine Protected Areas policy, by conserving and sustainably developing the mangroves of Casamance and Sine Saloum <sup>1</sup> (AFD).<br>«Support program to preserve biodiversity and fragile ecosystems, regional governance and climate change in West Africa - PAPBio» (ROC/FED/039-269) officially launched on July 25, 2019. Under this program, many projects are achieved, of which the "Regional Project to Reinforce Mangrove Ecosystems" (EU, ECOWAS, WAEMU, 11th EDF) <sup>2</sup> that aims at strengthening the status of protecting mangrove areas and creating income generating activities in 9 coastal countries in the west African sub region. This project is currently in the diagnostic phase.<br>Project on climate change and Integrated Coastal Areas Management (ICAM) funded by the EU which started since January 2020 and implemented by the DEEC.<br>Environmental Risk Study and Feasibility Study of the National Coastal Observatory (AFD under the Expertise and Capacity Building Fund - FERC). |             |        |
| OUTSTANDING NATURAL AREAS           | <b>Abene's Marine Protected Area</b> <ul style="list-style-type: none"><li>WDPA ID : 352707</li><li>Relevant Sectors: SN5-a / SN5-b</li><li>Classification: November 04, 2004 (Decree n°2004-1408)</li><li>Reviewing its development and management plan for the 2014-2018 period.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |        |

<sup>1</sup> <https://www.afd.fr/fr/carte-des-projets/appuyer-la-politique-daires-marines-proteges-du-senegal?origin=/fr/carte-des-projets?page=all&view=start>

<sup>2</sup> <https://www.iucn.org/fr/news/afrique-centrale-et-occidentale/201910/un-projet-regional-pour-le-renforcement-des-ecosystemes-de-mangroves>





| SN5-a           | 41 – NIAFARANG                                                                                                                                           |                  |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| HAZARDS         | Erosion-accretion cycles<br>Accretion until 22m/year of the coastline these recent years. (Source: Coastal Erosion Mapping, Final Report December 2018). |                  |
| RECOMMENDATIONS | -                                                                                                                                                        |                  |
| MONITORING      | Regular and light                                                                                                                                        | CRITICALITY High |



| SN5-b                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 42 - KAFOUNTINE |        |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |        |
| DIAGNOSTIC                          | 30 years ago, a small village of agro-fishermen with a tourist camp. Kafountine has experienced a fast growth, with particularly an equipped and important fishing center, in a very exposed situation. A basic track serves several small tourist facilities, with traces of concessions further in the South. The southern extension zone is a narrow cordon leaning against a wetland/lagoon area passing a lagoon and mangrove channel toward the South. Large unstable beach subject to wind and light wind erosion, but accelerating in the south of the bird peninsula. The northern part is undergoing residential tourism development and land appropriation. Cordons separated by a narrow lagoon channel, the concessions and traces of plots are located on either side of the channel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |        |
| DYNAMICS                            | Littoral naturally very unstable, many eroding beach segments, especially where buildings have been developed near the beach.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |        |
| STAKES                              | The southern extension is typically a very fragile and exposed area with an unstable coastline and sensitive to storm swells. In this context, urbanization is undesirable; however, the images show some parceling marks. The central zone is in high terrace approaching the beach, with large concessions of residential huts in palm grove, this up to the beach limit. Precious land visibly appropriated. In the northern part, the challenges are the same as in the central part, a plan is essential to anticipate future constructions in this area.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 |        |
| ACTIONS                             | Limiting settlements other than light and temporary at seafront. Preserving the natural vegetation of the cordon, maintaining a vegetated seafront along the beach and absence of sustainable equipment in this green belt. Densifying residential and tourist habitat to be limited and reserved, if necessary, to areas back from the shore in the central and northern parts of the sector, with an overall logic (sector plan) preserving from the urban sprawl of the back littoral.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |        |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY     | Medium |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |        |
| EVOLUTION OF STAKES                 | Substantial growth of the City of Kafountine. Habitat building at seafront. Strong occupation of the littoral domain. Landing areas, drying and fish processing areas. Major land clearing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 |        |
| HAZARDS                             | Erosion-accretion cycles                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY     | Medium |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |        |
| EVOLUTION OF STAKES                 | Extending the city of Kafountine, strong urbanization of the coastline.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |        |
| CURRENT PROJECTS                    | Support project to the Senegal's Marine Protected Areas policy, by conserving and sustainably developing the mangroves of Casamance and Sine Saloum <sup>3</sup> (AFD). «Support program to preserve biodiversity and fragile ecosystems, regional governance and climate change in West Africa - PAPBio» (ROC/FED/039-269) officially launched on July 25, 2019. Under this program, many projects are achieved, of which the "Regional Project to Reinforce Mangrove Ecosystems" (EU, ECOWAS, WAEMU, 11th EDF) <sup>4</sup> that aims at strengthening the status of protecting mangrove areas and creating income generating activities in 9 coastal countries in the west African sub region. This project is currently in the diagnostic phase. Project on climate change and Integrated Coastal Areas Management (ICAM) funded by the EU which started since January 2020 and implemented by the DEEC. Studies on environmental risks: mapping of coastal and river erosion in Senegal, mapping of pollution along the coastline and in the interior of the country. Studies on environmental risks: mapping of coastal and river erosion in Senegal, mapping of pollution along the littoral and in the interior of the country. Feasibility Study of the National Coastal Observatory (AFD under the Expertise and Capacity Building Fund - FERC). |                 |        |

<sup>3</sup> <https://www.afd.fr/fr/carte-des-projets/appuyer-la-politique-daires-marines-protegees-du-senegal?origin=/fr/carte-des-projets?page=all&view=start>

<sup>4</sup> <https://www.iucn.org/fr/news/afrique-centrale-et-occidentale/201910/un-projet-regional-pour-le-renforcement-des-ecosystemes-de-mangroves>



| SN5-b                     | 42 - KAFOUNTINE                                                                                                                                                                                                                                                                                                                          |                         |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| OUTSTANDING NATURAL AREAS | <b>Abene's Marine Protected Area</b> <ul style="list-style-type: none"> <li>WDPA ID : 352707</li> </ul> <b>Relevant Sectors: SN5-a / SN5-b</b> <ul style="list-style-type: none"> <li>Classification: November 04, 2004 (Decree n°2004-1408)</li> <li>Reviewing its development and management plan for the 2014-2018 period.</li> </ul> |                         |
| HAZARDS                   | Increasing socioeconomic challenges.<br>Coastal erosion                                                                                                                                                                                                                                                                                  |                         |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                        |                         |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                        | <b>CRITICALITY</b> High |



DEVELOPMENT OF THE CITY OF KAFOUNTINE,  
HIGH URBANIZATION OF THE COASTLINE

February 2016



July 2019





| SN5-c                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 43 – INSULAR OR PENINSULAR COASTLINES<br>ON THE RIGHT BANK OF CASAMANCE |      |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                         |      |
| DIAGNOSTIC                          | Facing the ocean and the banks of Casamance, narrow sandy cordons and also narrow low terraces form very unstable sandy coastlines. These small emerging Insular areas are locally occupied by small fishing villages on the larger islands: Diogo, Karabane (small tourist site with wharf for cruise ships).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                         |      |
| DYNAMICS                            | Naturally very unstable coastline, whether it is mangrove shores or sandy cordons partially vegetated and locally subject to wind erosion (Bird Peninsula in South Kafountine). This bird peninsula seems to be threatened by breakage (about 200 m at the narrowest point), with the enclosure of the southern point as in the south of Djiffer in Saloum.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                         |      |
| STAKES                              | Particularly fragile sector.<br>Ecotourism-oriented littoral with light installations very far from the coast.<br>Fixing sands by forest plantations on the lively sands could be envisaged (as on the Great Coast) in more favorable soil and rainfall conditions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                         |      |
| ACTIONS                             | Limiting settlements other than light and temporary.<br>The entire natural environment is to be preserved and would be in charge of a conservation unit as in the neighboring Saloum Delta.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                         |      |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY                                                             | High |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                         |      |
| EVOLUTION OF STAKES                 | Building the Karabane wharf.<br>Developing the first port of Ziguinchor.<br>Building the second port of Ziguinchor.<br>Frequent dredging of the river channel.<br>Strong pressure due to shark fishing.<br>Reforestation beefwood in Diogue.<br>Island Networking Project (PGIZC).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                         |      |
| HAZARDS                             | High erosion in Diogue.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                         |      |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY                                                             | High |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                         |      |
| EVOLUTION OF STAKES                 | Dredging activities and support for the navigability study on the Casamance River to improve the accessibility of the port of Ziguinchor.<br>Building and renovating the port of Ziguinchor to upgrade the facilities, including fuel import facilities.<br>Erecting a new pier at the fishing port of Boudody.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                         |      |
| CURRENT PROJECTS                    | Support project to Senegal's Marine Protected Areas policy, by conserving and sustainably developing the mangroves of Casamance and Sine Saloum <sup>5</sup> (AFD).<br>«Support program to preserve biodiversity and fragile ecosystems, regional governance and climate change in West Africa – PAPBio» (ROC/FED/039-269) officially launched on July 25, 2019. Under this program, many projects are implemented, of which the "Regional Project to Reinforce Mangrove Ecosystems" (EU, ECOWAS, WAEMU, 11th EDF) <sup>6</sup> that aims at strengthening the status of protecting mangrove areas and creating income generating activities in 9 coastal countries in the west African sub region. This project is currently in the diagnostic phase.<br>Feasibility study on coping options in the estuary of Casamance (WACA – development) conducted by EGIS in 2020.<br>Project on climate change and Integrated Coastal Areas Management (ICAM) funded by the EU which started since January 2020 and implemented by the DEEC.<br>Studies on environmental risks: mapping of coastal and river erosion in Senegal, mapping of pollution along the littoral and in the interior of the country.<br>Feasibility Study of the National Coastal Observatory (AFD under the Expertise and Capacity Building Fund – FERC). |                                                                         |      |

<sup>5</sup> <https://www.afd.fr/fr/carte-des-projets/appuyer-la-politique-daires-marines-protegees-du-senegal?origin=/fr/carte-des-projets?page=all&view=start>

<sup>6</sup> <https://www.iucn.org/fr/news/afrique-centrale-et-occidentale/201910/un-projet-regional-pour-le-renforcement-des-ecosystemes-de-mangroves>



| SN5-c                     | 43 – INSULAR OR PENINSULAR COASTLINES<br>ON THE RIGHT BANK OF CASAMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| OUTSTANDING NATURAL AREAS | <p><b>Ornithological reserve of Kalissaye</b></p> <ul style="list-style-type: none"> <li>• WDPA ID : 3217</li> <li>• Relevant sector: SN5-c</li> <li>• Classification: July 28, 1978 (Decree n°78/809)</li> <li>• The Internal regulation of the Kalissaye Special Bird Sanctuary were determined by Order No. 13.327/PM/SGG/DPN of September 26, 1978.</li> <li>• The delimitation of the Kalissaye ornithological reserve is not presented in the WDPA.</li> </ul> <p><b>Community Heritage Area of the Rural Commune of Mangagoulack (Kawawana) Kalissaye</b></p> <ul style="list-style-type: none"> <li>• WDPA ID: nonexistent</li> <li>• Relevant sector: SN5-c</li> <li>• The deliberation of the Regional Council of Ziguinchor n°003/CRZ of March 20, 2010 authorizing the creation of a Community Heritage Area on the public river domain of the Mangagoulack rural community was approved by Prefectorial Order n°106/GRZ/AD of June 1, 2010.</li> <li>• The Order n°0098/GRZ/AD of April 17, 2012 validates the deliberation n°005/CRZ of December 13, 2011 adopting the internal regulation of the APC of Mangagoulack.</li> <li>• The APAC of Mangagoulack is not registered in the WDPA.</li> </ul> <p><b>Niamone-Kalounayes' Protected Marine Area</b></p> <ul style="list-style-type: none"> <li>• WDPA ID: nonexistent</li> <li>• Relevant sector: SN5-c</li> <li>• Classification: November 4, 2015 (Decree n°2015-1724)</li> <li>• Drafting the development and management plan in February 2015.</li> <li>• The MPA of Niamone-Kalounayes is not registered in the WDPA.</li> </ul> |                  |
| HAZARDS                   | Severe erosion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY High |





ZIGUINCHOR'S PORT RENOVATION

February 2016



July 2019





| SN5-d                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 44 - DJEMBERING – NIKINE POINT |        |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |        |
| DIAGNOSTIC                          | A wrinkled and channeled sandy terrace relays the formation of the terminal continental with rice farming in the channels.<br>Sandy littoral with an undulating longitudinal profile, with a thin rocky cape progressing into the sea. The scarcity and precariousness of drinking water resources have limited the potential extension of the tourist area of Cap-Skiring to the north. In addition, the sandy beachfront cordon is unstable, with complex channel topography.<br>In the North of Djembering, with a northwest orientation, a wide belt of unconsolidated sand is subject to a generalized wind transit in a South-Southeast direction.<br>Constructible sites, even for ecotourism with light facilities, are scarce near a coastline and an immediate hinterland of an enclosed terrace (only one internal track).                                                                                                                                                                                                                                                                                                                                                                     |                                |        |
| DYNAMICS                            | Very unstable littoral with alternating levels of accretion and marine erosion. To this instability is added the subtraction of sand towards the interior due to wind erosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                |        |
| STAKES                              | Particularly fragile sector.<br>Littoral with ecotourism vocation with light installations very far from the coast.<br>Fixing sands by forest plantations on the lively sands could be envisaged (as on the Great Coast) in more favorable soil and rainfall conditions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                |        |
| ACTIONS                             | Preserving the vegetation cover at the top of the beach and cordon<br>Limiting new facilities on the beach.<br>Supervising and following up possible individual protection initiatives to be set, if necessary, in an overall development.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                |        |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY                    | Medium |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |        |
| EVOLUTION OF STAKES                 | Infrastructure projects to land fishery products.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                |        |
| HAZARDS                             | High erosion in Djembering.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY                    | Medium |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |        |
| EVOLUTION OF STAKES                 | Infrastructure projects to land fishery products.<br>Increasing urbanization of the coastline<br>More accentuated erosion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                |        |
| CURRENT PROJECTS                    | Support project to the Senegal's Marine Protected Areas policy, by conserving and sustainably developing the mangroves of Casamance and Sine Saloum <sup>7</sup> (AFD).<br>«Support program to preserve biodiversity and fragile ecosystems, regional governance and climate change in West Africa – PAPBio» (ROC/FED/039-269) officially launched on July 25, 2019. Under this program, many projects are achieved, of which the "Regional Project to Reinforce Mangrove Ecosystems" (EU, ECOWAS, WAEMU, 11th EDF) <sup>8</sup> that aims at strengthening the status of protecting mangrove areas and creating income generating activities in 9 coastal countries in the west African sub region. This project is currently in the diagnostic phase.<br>Project on climate change and Integrated Coastal Areas Management (ICAM) funded by the EU which started since January 2020 and implemented by the DEEC.<br>Studies on environmental risks: mapping of coastal and river erosion in Senegal, mapping of pollution along the coastline and in the interior of the country.<br>Feasibility Study of the National Coastal Observatory (AFD under the Expertise and Capacity Building Fund – FERC). |                                |        |
| OUTSTANDING NATURAL AREAS           | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |        |
| HAZARDS                             | Severe erosion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                |        |
| RECOMMENDATIONS                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                |        |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY                    | High   |

<sup>7</sup> <https://www.afd.fr/fr/carte-des-projets/appuyer-la-politique-daires-marines-proteges-du-senegal?origin=/fr/carte-des-projets?page=all&view=start>

<sup>8</sup> <https://www.iucn.org/fr/news/afrique-centrale-et-occidentale/201910/un-projet-regional-pour-le-renforcement-des-ecosystemes-de-mangroves>





| SN5-e                               | 45 – CAP SKIRING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |        |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |        |
| DIAGNOSTIC                          | <p>Peninsula extending from Cap-Roxo on the border with Bissau to the Nikine Point, opening to the ocean of the Casamance estuary.</p> <p>Flattened hilly landscape forming the sandstone-based terminal continental and inclusions of cuirasses appearing at the level of small capes separating beautiful beaches in sandy coves (segments of type 4b then 4a).</p> <p>Over a dozen kilometers, the area near the coast is almost saturated with hotels and residences, and a golf course.</p> <p>With an airport nearby, this tourist area welcomes international visitors, connected to Ziguinchor and Dakar by an asphalt road. It experienced an important start of activity, which has been slowed down by social unrest in Casamance.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |        |
| DYNAMICS                            | <p>The small, barely consolidated capes are very fragile and sensitive to erosion. The slightest change is likely to disturb the precarious balance of the beaches that are highly exposed to storm swells during the rainy season.</p> <p>The extreme South is in sandy terraces, discontinuous vegetation and sensitive to active wind erosion. This sector has probably also undergone the impacts of the sedimentary flows reduction from Casamance (generalized developments of lowlands and the 70-80 drought period).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |        |
| STAKES                              | <p>Maintaining the capes and the balance of the beaches, bearing in mind that reinforcement works can be dangerous.</p> <p>The need to maintain a striped vegetative cover along the capes and beaches, playing a mitigating role during storm events.</p> <p>Any permanent development along the beach should be excluded. Drinking water resources are limited, with a high risk of saltwater wedge upwelling in the event of increased groundwater exploitation.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |        |
| ACTIONS                             | <p>Preserving the vegetation cover at the top of the beach and cordon Limiting new facilities on the beach.</p> <p>Supervising and following up the individual protection initiatives to be set, if necessary, in an overall development.</p> <p>Reviewing and updating of the existing master plans.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY | Medium |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |        |
| EVOLUTION OF STAKES                 | Offshore oil exploration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |        |
| HAZARDS                             | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY | Medium |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |        |
| EVOLUTION OF STAKES                 | Offshore oil exploration.<br>Cutting the littoral in capes and bays.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |        |
| CURRENT PROJECTS                    | <p>Support project to the Senegal's Marine Protected Areas policy, by conserving and sustainably developing the mangroves of Casamance and Sine Saloum<sup>9</sup> (AFD).</p> <p>«Support program to preserve biodiversity and fragile ecosystems, regional governance and climate change in West Africa – PAPBio» (ROC/FED/039-269) officially launched on July 25, 2019. Under this program, many projects are achieved, of which the "Regional Project to Reinforce Mangrove Ecosystems" (EU, ECOWAS, WAEMU, 11th EDF)<sup>10</sup> that aims at strengthening the status of protecting mangrove areas and creating income generating activities in 9 coastal countries in the west African sub region. This project is currently in the diagnostic phase.</p> <p>Project on climate change and Integrated Management of Coastal Areas (GIZC) funded by the EU which started since January 2020 and implemented by the DEEC.</p> <p>Studies on environmental risks: mapping of coastal and river erosion in Senegal, mapping of pollution along the littoral and in the interior of the country.</p> <p>Feasibility Study of the National Coastal Observatory (AFD under the Expertise and Capacity Building Fund – FERC).</p> |             |        |

<sup>9</sup> <https://www.afd.fr/fr/carte-des-projets/appuyer-la-politique-daires-marines-protegees-du-senegal?origin=/fr/carte-des-projets?page=all&view=start>

<sup>10</sup> <https://www.iucn.org/fr/news/afrique-centrale-et-occidentale/201910/un-projet-regional-pour-le-renforcement-des-ecosystemes-de-mangroves>



## SN-Senegal (South)

| SN5-e                     | 45 - CAP SKIRING                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                              |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| OUTSTANDING NATURAL AREAS | <b>National Park of Lower Casamance</b> <ul style="list-style-type: none"><li>• WDPA ID : 868</li><li>• Relevant sectors: SN5-e</li><li>• Classification: April 10, 1970 (Decree n°70-399 on classification in the forest domain and creation of the National Park of Lower Casamance).</li><li>• An internal regulation has been adopted by the Ministerial Order n°5170 PM of May 12, 1970 on the internal regulation of the National Park of Lower Casamance.</li></ul> |                              |
| HAZARDS                   | Severe erosion                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                              |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                              |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>CRITICALITY</b> Very high |



## SUMMARY TABLE

|         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|---------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| HABITAT |  |  |  |  |  |  |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|         | Desert area                                                                       | Mangrove Wetland                                                                  | Camp Small village                                                                | Rural                                                                             | Rurban                                                                            | Urban                                                                             |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| STAKES  | Fishing                                                                           | Rice-growing                                                                      | Palm oil                                                                          | Trade                                                                             | Trade+                                                                            | Oil & Gas                                                                         | Extrative ind.                                                                    | Tourism                                                                             | (Tourism)                                                                           | Biodiversity                                                                        |                                                                                     |
|         | Fishing port<br>Landing areas                                                     |                                                                                   | Palm plantation                                                                   | Commercial port                                                                   | Commercial port<br>Airport                                                        | Exploration<br>Exploitation                                                       | Salt, metal-bearing sand,<br>gold...                                              |                                                                                     | Unexploited outstanding<br>areas                                                    | Outstanding areas<br>(biodiversity, lands capre)                                    |                                                                                     |
| HAZARDS |  |  |  |  |  |  |  |  |  |  |  |
|         | Soil erosion<br>Landslide                                                         | Coastal erosion                                                                   | Marine submersion                                                                 | Pluvial and or fluvial<br>flooding                                                | Intrusion of saltwater                                                            | Pollution                                                                         | Anthropization                                                                    | Sargasso proliferation                                                              | Jellyfish proliferation                                                             | Industrial risk                                                                     | Nothing to report                                                                   |

| N°                     | REF   | NAME                                                                | HABITAT                                                                           | STAKES  |             |           |              | HAZARDS      | CRITICALITY                   |                                                          |                                                                      | MONITORING |      |      |
|------------------------|-------|---------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------|-------------|-----------|--------------|--------------|-------------------------------|----------------------------------------------------------|----------------------------------------------------------------------|------------|------|------|
|                        |       |                                                                     |                                                                                   |         |             |           |              |              | 2011                          | 2016                                                     | 2020                                                                 | 2011       | 2016 | 2020 |
| SN5 CASAMANCE MARITIME |       |                                                                     |                                                                                   |         |             |           |              |              |                               |                                                          |                                                                      |            |      |      |
| 41                     | SN5-a | Niafarang                                                           |  |         |             | Tourism   | Biodiversity | <b>h</b>     | Medium → Medium ↗ <b>High</b> | Watch-keeping → Watch-keeping ↗ <b>Regular and light</b> |                                                                      |            |      |      |
| 42                     | SN5-b | Kafountine                                                          |  | Fishing | Agriculture |           | Tourism      | Biodiversity | <b>h</b>                      | Medium → Medium ↗ <b>High</b>                            | Watch-keeping ↗ Regular and light → <b>Regular and light</b>         |            |      |      |
| 43                     | SN5-c | Insular or quasi insular coastlines in the right shore of Casamance |  | Fishing | Trade       |           | Tourism      | Biodiversity | <b>h</b>                      | High → High → <b>High</b>                                | Watch-keeping ↗ Regular and light ↗ <b>Regular and intensive</b>     |            |      |      |
| 44                     | SN5-d | Djembering - Pointe Nikine                                          |  | Fishing | Trade       |           | Tourism      |              | <b>h</b>                      | Medium → Medium ↗ <b>High</b>                            | Watch-keeping ↗ Regular and light ↗ <b>Regular and intensive</b>     |            |      |      |
| 45                     | SN5-e | Cap Skiring                                                         |  | Fishing |             | Oil & Gas | Tourism      | Biodiversity | <b>h</b>                      | Medium → Medium ↗ <b>Very High</b>                       | Regular and light → Regular and light ↗ <b>Regular and intensive</b> |            |      |      |





## GM – Gambia

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## GM - Gambia

For more than 50 years The Gambia has experienced considerable problems related to coastal erosion. These are a result of its situation, the lithology of the shoreline, and the installation of tourism infrastructure and other sources of anthropic pressure, such as the extraction of beach sand, today banned.

The tourism development plan for the 1970s and 1980s instigated ostensibly quite vigorous control of the distribution of hotel facilities, for which almost the entire area close to the coast was reserved. Holiday homes are still very rare today on the whole coastline, even in situations highly suitable for building. This textbook case of planning is not to be found in any other country in the sub-region. The tourism development plan for the Gambia was updated in 2007.

On the other hand, the issues related to the risks associated with coastal erosion, to the risks of storms, have been underestimated and approached on a case-by-case basis.

The coastline of Banjul has been subject to important improvements since 2000, including the refilling of certain beaches (2,400,000 m<sup>3</sup>). The results seem to be encouraging but should be confirmed over the next decade.



## GM1

## GAMBIA

| GM1-a                               | 35 - ESSAU - BARRA AND RIGHT BANK OF THE GAMBIA ESTUARY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                           |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                           |
| DIAGNOSTIC                          | Small historical town with a fort dominating the entrance to the sheltered estuary.<br>Small of port infrastructure for the ferry and fish landing point.<br>Urban growth inland along the road in particular towards Senegal and at a distance from the coastline.<br>Barra point extends north in a sandy terrace in a peninsular situation, bordered on the inside by channels and mangrove lagoons as far as the border with Senegal.<br>Fragile coastline, crescent-shaped beaches. There is little human land use in the area close to the shore, on the first terrace rim. Further in, vegetable growing ("niaye type") using the freshwater lens exploited by individual wells. |                           |
| DYNAMICS                            | Unstable coastline.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                           |
| STAKES                              | Relatively isolated (in spite of the ferry) by the estuary, with a much less attractive coastline, this sector has been totally excluded from the tourism development plan for the Gambia. On condition that there are facilities inland of the coastline, it represents a possible long-term potential, if the coastline becomes saturated one day like nearby Senegal.<br>Conservation of the trees growing on the uncultivated terrace, current extraction of wood for fuel.<br>Protected forestry area?                                                                                                                                                                             |                           |
| RECOMMANDATION                      | Vigilance regarding the dynamics of land use and the extension of built-up areas.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                           |
| MONITORING                          | Low                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY Watch-keeping |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                           |
| EVOLUTION OF STAKES                 | Niumi National Park rehabilitation Project.<br>Construction of stormwater management facilities in progress.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           |
| HAZARDS                             | Erosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                           |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY Medium        |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                           |
| EVOLUTION OF STAKES                 | Bara hotel construction project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                           |
| CURRENT PROJECTS                    | Nothing to report.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                           |
| OUTSTANDING NATURAL AREAS           | <b>Niumi National Park (IUCN Category IV)</b> <ul style="list-style-type: none"><li>• WDPA ID: 2290</li><li>• Affected sector: GM1-a</li><li>• Classification: 1986</li><li>• The national park management plan was finalized in May 2011.</li></ul> <b>Niumi Ramsar Site</b> <ul style="list-style-type: none"><li>• WII ID: 1GM003 - 1840 / WDPA ID: 109037</li><li>• Affected sector: GM1-a</li><li>• Designation on October 13, 2008.</li></ul>                                                                                                                                                                                                                                     |                           |
| HAZARDS                             | Erosion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                           |
| RECOMMENDATIONS                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                           |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY Medium        |





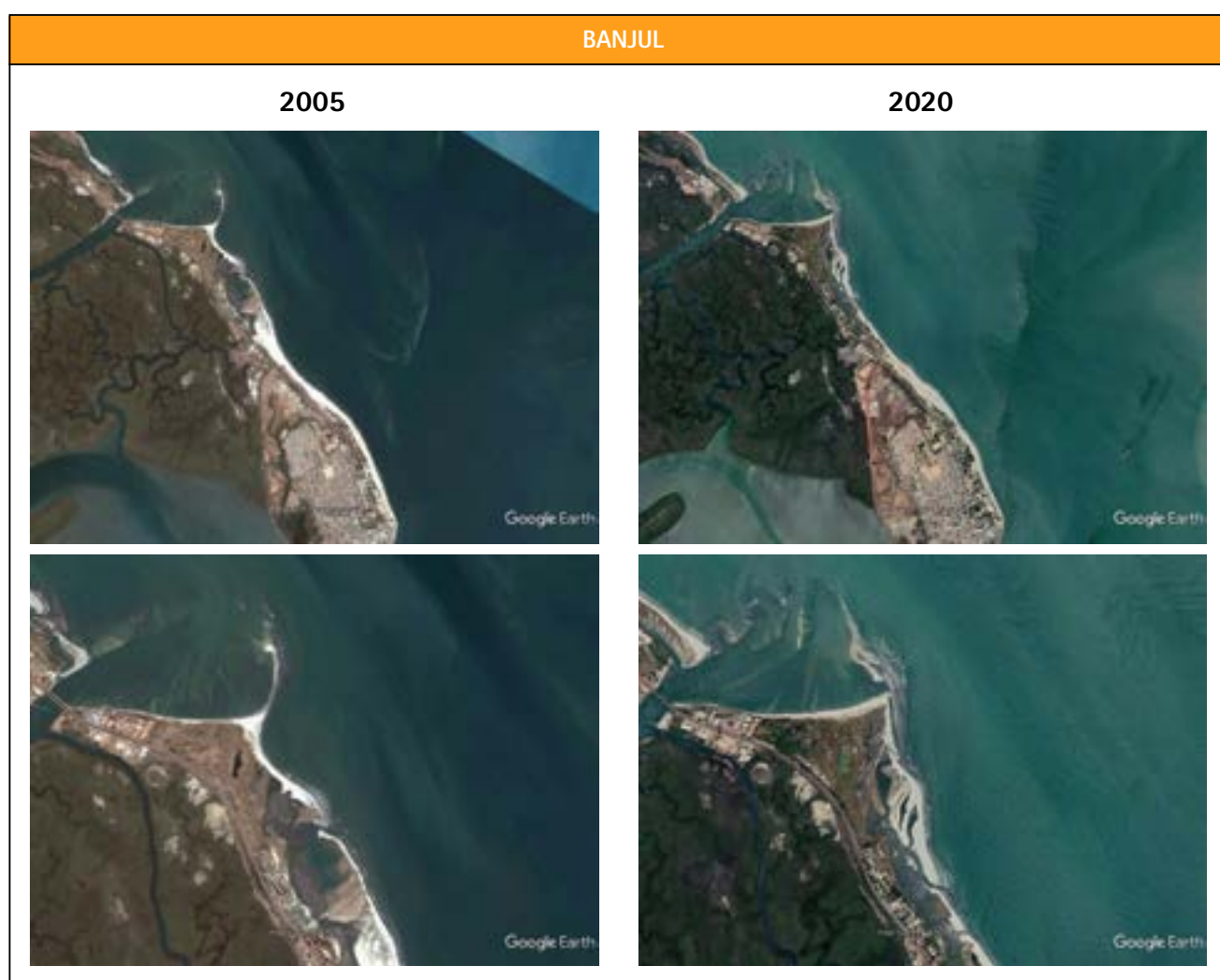
| GM1-b                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 36 - BANJUL CENTRE |           |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |           |
| DIAGNOSTIC                          | In a practically insular situation, served by a road network on unstable terrain and surrounded in the South by a dyke road that acts as a dyke for the low-lying urban extension built on the mangrove embankment, lagoons and wetlands that are not yet urbanized.<br>The urban beach is bordered by large hotels.<br>Beaches of very fine sand or more or less silt estuary sand but relatively sheltered from ocean swell.<br>The cemetery has been under threat for a long time and has been affected on several occasions by surges. |                    |           |
| DYNAMICS                            | The coastline of sandy banks of estuary deposits is very fragile and changing, with sections undergoing erosion and accretion, momentarily balanced. The risks of marine submersion concerning the low-lying part of the town that is protected by a dyke have been on the agenda for a long time <sup>1</sup> .                                                                                                                                                                                                                           |                    |           |
| STAKES                              | Dense urban site with highly unstable surroundings and coastlines, and a significant part of the town in a dyke situation and built on terrain that is not consolidated in depth. A part of the current urban extension is not protected by the dyke with small platforms scattered along the edge of the main roads.                                                                                                                                                                                                                      |                    |           |
| RECOMMENDATION                      | Continuation and completion of developments/improvements undertaken.<br>Study of flood-submersion contingency at the level of the town of Banjul, risk prevention plan. Close monitoring of the developments carried out.<br>The National Park Management Plan was finalized in May 2011.                                                                                                                                                                                                                                                  |                    |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CRITICALITY        | Very high |
| REMARKS                             | The monitoring system implemented within the framework of recent developments on the Banjul Coast can make a useful contribution to the monitoring-observation of the sector.                                                                                                                                                                                                                                                                                                                                                              |                    |           |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |           |
| EVOLUTION OF STAKES                 | Extension of the port of Banjul.<br>Rehabilitation of the <i>Bun Road</i> pumping station.<br>Construction of new buildings including the National Assembly and the Ministry of Foreign Affairs.<br>New road to Gondour. Residential development projects.                                                                                                                                                                                                                                                                                 |                    |           |
| PORT INSTALLATIONS                  | The Port of Banjul, built in 1972, is located south of the city of Banjul in the Gambia River and is managed by the Gambia Port Authority.<br>The fishing pier located west of the Port of Banjul was enlarged between 2010 and 2012 and embankments have been carried out at the base of this jetty <sup>2</sup> .                                                                                                                                                                                                                        |                    |           |
| HAZARDS                             | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CRITICALITY        | Very high |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |           |
| EVOLUTION OF STAKES                 | Construction of Ministry of Foreign Affairs building (still in progress).<br>Rehabilitation of Banjul Road network.<br>Construction of bund road (still in progress).<br>Banjul ports extension project.<br>Displacement of populations linked to port extension.                                                                                                                                                                                                                                                                          |                    |           |
| CURRENT PROJECTS                    | Expansion of the Ports facility (Gambia Government).<br>Banjul Road Network (Gambia Government).                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |           |
| OUTSTANDING NATURAL AREAS           | <b>Tanbi Wetland National Park (IUCN Category VI)</b> <ul style="list-style-type: none"><li>• WDPA ID: 555547524</li><li>• Affected sector: GM1-b</li><li>• Classification: 2003.</li></ul> <b>Tanbi Wetland complex Ramsar Site</b> <ul style="list-style-type: none"><li>• WII ID: 1GM002 - 1657 / WDPA ID: 903024</li><li>• Affected sector: GM1-b</li><li>• Designation on April 02, 2007</li></ul>                                                                                                                                    |                    |           |

<sup>1</sup> Jallow. B. P. 1996.- CRITICALITY of the coastal zone of The Gambia to sea level rise and development of response strategies and adaptation options. Climate Research. 6:165-177p.

<sup>2</sup> <http://www.gamports.com/>



| GM1-b           | 36 – BANJUL CENTRE                                                                                          |                       |
|-----------------|-------------------------------------------------------------------------------------------------------------|-----------------------|
| HAZARDS         | Flooding mostly due to rainfall.<br>Erosion.<br>Land-based pollution.                                       |                       |
| RECOMMENDATIONS | Relevant institutions to be regular in their monitoring to make sure environmental issues are not left out. |                       |
| MONITORING      | Regular and intensive                                                                                       | CRITICALITY Very High |





| GM1-c                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 37 - BANJUL – KOLOLI POINT |  |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                            |  |
| DIAGNOSTIC                          | The coast facing the sea is predominantly rocky, especially in the North part. A few beaches in creeks where erosion is in progress (crescent-shapes facies), but most often a thin layer of sand on rock. The hotel area with a few homes and a fishing point at Bakau, with quay-pontoon jutting out well into the sea. For more than half of the hotels, there are limited or no beach resources. Several hotels advance towards the sea protected by walls-armouring. However, of note are wide areas with no buildings immediately bordering the coastal escarpments. In addition to the rock belt of the cape, there are several protective developments on the North-East part. |                            |  |
| DYNAMICS                            | Active erosion on a mainly rocky coastline with headlands and creeks with low sediment reserves.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |  |
| STAKES                              | Active erosion also related to the reflection on the rocky micro-cliffs and protective walls, leading to the deterioration of the potential for beach resort and tourism. Impacts of the development of the beach at Cape Point.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |  |
| RECOMMANDATION                      | Preserve unbuilt areas with location of future development of built-up area back from the shore.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |  |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CRITICALITY High           |  |
| REMARKS                             | Te monitoring system implemented within the framework of recent developments on the Banjul Coast can make a useful contribution to the monitoring-observation of the sector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                            |  |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                            |  |
| EVOLUTION OF STAKES                 | Individual protection operations currently supported by the construction of structures reflect the threat to hotels' seaside properties.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |  |
| COASTAL PROTECTIONS                 | Construction of protection structures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                            |  |
| HAZARDS                             | Important erosion directly threatening the seaside properties of most major hotels concentrated in this sector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                            |  |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY Very high      |  |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                            |  |
| EVOLUTION OF STAKES                 | Construction of Cement packaging factory.<br>Construction of Fish Processing factory (Hansen Seafood).<br>Construction of individual revetments to protect properties.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                            |  |
| CURRENT PROJECTS                    | Nothing to report.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            |  |
| INVESTMENTS                         | Nothing to report.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            |  |
| OUTSTANDING NATURAL AREAS           | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            |  |
| HAZARDS                             | Erosion.<br>Illegal dumping of waste.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |  |
| RECOMMENDATIONS                     | Support needed to protect the cliff which is under threat to erosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |  |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY Very High      |  |



| GM1-d                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 38 - KOLOLI POINT – BALD CAPE |           |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                               |           |
| DIAGNOSTIC                          | A discontinuous strip of large capacity hotels saturates the coastline with golf course. The whole is clearly delimited by the coastal road, which separates this strip from the urban habitat.<br><br>Certain establishments are visibly very deteriorated. Globally, the buildings are as close as possible to the foreshore, but certain hotels have their buildings and swimming pool some way back. In other cases, these leisure facilities are directly on the sea front.<br><br>Overall, there is a certain amount of diversity and the zone would have deserved a case study, as its development probably dates (70s-80s). Protected forest area (Bilijo forest) constituting a first break in urbanization, followed by area still with little building in the South.<br><br>Materials extraction site. |                               |           |
| DYNAMICS                            | Sector globally undergoing active erosion, improvements, in particular at the level of the Hotel Senegambia.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                               |           |
| STAKES                              | Viability of developments.<br><br>Planning of new installations that will not fail to appear in the residual space South of the sector.<br><br>Maintaining and protection of breaks in urbanization.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |           |
| RECOMMANDATION                      | Protect natural vegetation in breaks in urbanization that are still to be secured<br><br>Plan the implementation of any new hotel complexes with impact study.<br><br>Closely monitor the developments carried out by Haskoning.<br><br>The monitoring system implemented within the framework of recent developments on the Banjul Coast can make a useful contribution to the monitoring-observation of the sector.                                                                                                                                                                                                                                                                                                                                                                                             |                               |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY                   | High      |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                               |           |
| EVOLUTION OF STAKES                 | Individual protection operations currently supported by the construction of structures reflect the threat to hotels' seaside properties.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                               |           |
| COASTAL PROTECTIONS                 | Construction of protection structures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                               |           |
| HAZARDS                             | Severe erosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                               |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY                   | Very high |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                               |           |
| EVOLUTION OF STAKES                 | Coastal protection measures along the Kololi/Senegambia stretch.<br><br>Construction of an International Conference Center within a reserved area (Monkey Park).<br><br>Ongoing construction of new hotels.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                               |           |
| CURRENT PROJECTS                    | Coastal Resilience project (Gambia government, UNDP, GEF) which was completed in year 2018 protected the beaches of Kololi/Senegambia stretch where most of the hotels' in The Gambia are built.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                               |           |
| INVESTMENTS                         | 1 km of revetment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                               |           |
| OUTSTANDING NATURAL AREAS           | Tanji Bird Reserve (IUCN Category II)<br><br>WDPA ID: 62085 <ul style="list-style-type: none"><li>Affected sector: GM1-d / GM1-e</li><li>Classification: 1993</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                               |           |
| HAZARDS                             | Severe erosion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |           |
| RECOMMENDATIONS                     | SThis is one of the most important areas along the coast due to concentration of major hotels. Therefore, there is need to support in protecting the structures along this area from further erosion..                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                               |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY                   | Very High |



| GM1-e                               | 39 - BALD CAPE - SANYANG                                                                                                                                                                                                                                                                                                                                                                          |             |        |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                   |             |        |
| DIAGNOSTIC                          | Nearshore littoral with very little human land use (two tourist establishments in Sanjang bay). Beach serves as a road at low tide.<br><br>The existing hard-surfaced road constitutes a barrier to urbanization as far as the cape (Baldcap), leaving a strip devoid for human use.<br><br>A small protected forest surrounds the cape.<br><br>A large protected wetland and Tanji fishing port. |             |        |
| DYNAMICS                            | No remarks.                                                                                                                                                                                                                                                                                                                                                                                       |             |        |
| STAKES                              | Maintain the current situation, trend towards residential appropriation in the future to be anticipated.                                                                                                                                                                                                                                                                                          |             |        |
| RECOMMANDATION                      | Anticipation of tourist and residential facilities and development.<br><br>Protection and preservation of the vegetation on the dune rim required, in particular by maintaining the natural vegetation and possible replanting.<br><br>Preservation of the urban sprawl and urbanization of all surroundings of the complex of wetlands at Tanji.                                                 |             |        |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY | Low    |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                   |             |        |
| EVOLUTION OF STAKES                 | Wind farm project.<br><br>Development of tourist developments and facilities.<br><br>Establishment of temporary anti-erosion structure around the bridge of Tanji and project being identified for the construction of permanent protection structures.                                                                                                                                           |             |        |
| HAZARDS                             | Intense erosion.                                                                                                                                                                                                                                                                                                                                                                                  |             |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY | Medium |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                   |             |        |
| EVOLUTION OF STAKES                 | Permanent intervention for the protection of Tanji bridge area.<br><br>Construction of fish meal factory (private, chinois).                                                                                                                                                                                                                                                                      |             |        |
| CURRENT PROJECTS                    | Coastal Resilience project (Gambia government, UNDP, GEF).<br><br>Revetment was constructed at Tanji Bridge area to limit the trend of erosion that was threatening to take the road (highway). This was done during the Coastal Resillience Project that ended in 2018.                                                                                                                          |             |        |
| OUTSTANDING NATURAL AREAS           | Tanji Bird Reserve (IUCN Category II) <ul style="list-style-type: none"><li>• WDPA ID: 62085</li><li>• Affected sector: GM1-d / GM1-e</li><li>• Classification: 1993</li></ul>                                                                                                                                                                                                                    |             |        |
| HAZARDS                             | Erosion.<br><br>Pollution mostly from fisheries activities in Tanji.                                                                                                                                                                                                                                                                                                                              |             |        |
| RECOMMENDATIONS                     | Frequent monitoring needed to detect any changes at an early stage                                                                                                                                                                                                                                                                                                                                |             |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY | Medium |



| GM1-f                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 40 – GUNJUR TO KARTONG |        |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |        |
| DIAGNOSTIC                          | Coastline with a generally longitudinal profile, undulating from headlands – shallows. Beach-top rim subject to wind erosion in places.<br><br>Important fishing port at Gunjur to the South of the town.<br><br>Access to the coastline by branches of the hard-surfaced road which approaches the coast, a few dwellings.<br><br>Globally, little human land use on the sandy terraces close to the coastline, locally in ridges and channels. Average density tourist zone in the northern part of the sector. |                        |        |
| DYNAMICS                            | Berms and beach top cliffs observed in places. Wind erosion of the rim sands.                                                                                                                                                                                                                                                                                                                                                                                                                                     |                        |        |
| STAKES                              | The southern part of the Gunjur sector has potential for tourism and dwellings and will probably eventually be used in the same way as in Casamance                                                                                                                                                                                                                                                                                                                                                               |                        |        |
| RECOMMANDATION                      | Anticipation of tourist facilities and development.<br><br>Protection and preservation required for the dune rim vegetation.                                                                                                                                                                                                                                                                                                                                                                                      |                        |        |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY            | Low    |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |        |
| EVOLUTION OF STAKES                 | Limited but gradual densification of developments and construction on the seashore.                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |        |
| HAZARDS                             | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                        |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY            | Medium |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |        |
| EVOLUTION OF STAKES                 | Construction of fish meal factories in Gunjur and Kartong (Chinese companies).<br><br>Sand mining in Gunjur. Currently sand mining is taking place in Sanyang by a local company. Sand is purposely use for construction activities.<br><br>Sand mining in Sambouya, Batokunku, Kartong, Locals are sometimes engaged in illegal sand mining for construction within the communities                                                                                                                              |                        |        |
| CURRENT PROJECTS                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                        |        |
| OUTSTANDING NATURAL AREAS           | Gunjur Community Wildlife Reserve <ul style="list-style-type: none"><li>• WDPA ID: 555547522</li><li>• Affected sector: GM1-f</li><li>• Classification: 2007</li></ul>                                                                                                                                                                                                                                                                                                                                            |                        |        |
| HAZARDS                             | Erosion.<br><br>Pollution of air quality, and wastewater is notice in these areas due to fishmeals and other fisheries activities.                                                                                                                                                                                                                                                                                                                                                                                |                        |        |
| RECOMMENDATIONS                     | Coastal sand mining to be shifted to offshore or inland sand mining.                                                                                                                                                                                                                                                                                                                                                                                                                                              |                        |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY            | High   |



## SUMMARY TABLE

| HABITAT | <br>Desert area                              | <br>Mangrove<br>Wetland | <br>Camp<br>Small village       | <br>Rural                           | <br>Rurban                               | <br>Urban                                    |                                                                                                                                             |                                                                                                               |                                                                                                                                      |                                                                                                                                                      |                                                                                                          |
|---------|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| STAKES  | <br>Fishing<br>Fishing port<br>Landing areas | <br>Rice-growing        | <br>Palm oil<br>Palm plantation | <br>Trade<br>Commercial port        | <br>Trade+<br>Commercial port<br>Airport | <br>Oil & Gas<br>Exploration<br>Exploitation | <br>Extractive ind.<br>Salt, metal-bearing sand,<br>gold | <br>Tourism                | <br>(Tourism)<br>Unexploited outstanding<br>areas | <br>Biodiversity<br>Outstanding areas<br>(biodiversity landscape) |                                                                                                          |
| HAZARDS | <br>Soil erosion                             | <br>Coastal erosion     | <br>Marine submersion           | <br>Pluvial and/or fluvial flooding | <br>Intusion of saltwater                | <br>Pollution                                | <br>Anthropization                                       | <br>Sargasso proliferation | <br>Jellyfish proliferation                       | <br>Industrial risk                                               | <br>Nothing to report |

| N°             | REF   | NAME                                                | HABITAT | STAKES        |                               |  | HAZARDS   | CRITICALITY |           |      | MONITORING |                       |      |                       |   |                       |
|----------------|-------|-----------------------------------------------------|---------|---------------|-------------------------------|--|-----------|-------------|-----------|------|------------|-----------------------|------|-----------------------|---|-----------------------|
|                |       |                                                     |         |               |                               |  |           | 2011        | 2016      | 2020 | 2011       | 2016                  | 2020 |                       |   |                       |
| GM1 THE GAMBIA |       |                                                     |         |               |                               |  |           |             |           |      |            |                       |      |                       |   |                       |
| 35             | GM1-a | Essau - Barra and right shore of the Gambia estuary |         | Fishing       | (Tourism) Biodiversity        |  | Low       | ↗           | Medium    | →    | Medium     | Watch-keeping         | ↗    | Regular and light     | → | Regular and light     |
| 36             | GM1-b | Banjul center                                       |         | Fishing Trade | Tourism Biodiversity          |  | Very High | →           | Very High | →    | Very High  | Regular and intensive | →    | Regular and intensive | → | Regular and intensive |
| 37             | GM1-c | Banjul - Kololi Point                               |         | Fishing       | Tourism                       |  | High      | ↗           | Very High | →    | Very High  | Regular and light     | ↗    | Regular and intensive | → | Regular and intensive |
| 38             | GM1-d | Kololi Point - Bald Cape                            |         |               | Tourism Biodiversity          |  | High      | →           | High      | ↗    | Very High  | Regular and intensive | →    | Regular and intensive | → | Regular and intensive |
| 39             | GM1-e | Bald Cape - Sanyang                                 |         | Fishing       | Tourism Biodiversity          |  | Low       | ↗           | Medium    | →    | Medium     | Watch-keeping         | ↗    | Regular and light     | → | Regular and light     |
| 40             | GM1-f | Gunjur to Kartong                                   |         | Fishing       | Extractive Ind.s Biodiversity |  | Low       | ↗           | Medium    | ↗    | High       | Watch-keeping         | ↗    | Regular and light     | → | Regular and light     |



# Guinea-Bissau

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## GW-Guinea-Bissau

Guinea-Bissau is a small Portuguese-speaking country in West Africa that is distinguished by the presence of large inlets bordered by mangroves and an archipelago, the Bijagós Archipelago. It is located in a climate transition zone which explains the diversity of its ecosystems.

Guinea-Bissau is home to exceptional biodiversity, with the second largest expanse of mangroves in Africa, the best preserved forest cover in West Africa, as well as globally important wetlands, which are major wintering sites for migratory birds. The Bijagós Archipelago (UNESCO Biosphere Reserve) is a natural and cultural jewel that includes the most important sea turtle nesting site in West and Central Africa and a unique population of marine hippos in the world.

Guinea-Bissau's economy is highly dependent on its natural resources, and the food security of the population relies mainly on agriculture, fishing and biodiversity. The physiography of the country is characterized by the following elements:

- Homogeneity of the living systems of the «Balante» and «Feloups» population facing the sea (fishing and rice-growing on land under marine influence).
- Location of the habitat on high terraces and hills out of reach of storm surges, even in the event of a rise in sea level (except very locally such as in the urban area of Bissau where the majority of villages north of Rio Cacheu are flood-prone at high tides, and the same applies to the margins of Rio Geba and Cumbidjà). Large huts surrounded by orchards and food crops.
- Practice of mangrove harvesting fishing as a complementary activity, except in the Bijagós archipelago where the main source of animal protein is shellfish. Few people live on the beach.
- Importance of rice growing on dyked mangrove lands, brackish and freshwater shallows. This rice-growing is demanding in terms of rainfall and Guinea-Bissau in view of the large areas in the North abandoned during droughts. An ancient rice civilization attested by the Portuguese as early as the 16th century. The lowest and most threatened lands are often also the most fertile. In terms of diking work, 20 centimeters is already a significant height...<sup>1</sup>

The improvement of the road service network followed a situation of landlockedness of a large part of Maritime Guinea at the time of independence, the communications of the colonial period being ensured by cabotage linking the main small coastal towns and Bissau.

The tourist potential of Guinea-Bissau is mainly located in the Bijagós archipelago, part of which is classified as a National Park and at the level of the small site of Varela.

Guinea-Bissau has set up a National System of Protected Areas (SNAP) which today represents 26% of the national territory and is managed by the Institute for Biodiversity and Protected Areas (IBAP), a financially and administratively autonomous body. The BioGuiné Foundation exists since 2011. It is a sustainable financing instrument for biodiversity conservation in Guinea-Bissau. Its role, in line with the Convention on Biological Diversity and the National Strategy for the Conservation of Biodiversity, is to catalyze strategic actions for the conservation and sustainable use of biodiversity for sustainable development. Its beneficiaries are first and foremost IBAP, with which it has renewed an agreement, and its partners, notably NGOs and local communities. «In order to enable the BioGuiné Foundation to strengthen the foundations of its operational credibility, but also to quickly establish its legitimacy by enabling it to finance conservation projects in the field, in accordance with the objectives of its creation, MAVA Foundation for Nature is financing the project «Support for the operation and operationalization of the BioGuiné Foundation»<sup>2</sup>.

<sup>1</sup> Given the scale, not all of the rice crop concerned has been fully mapped.

<sup>2</sup> <http://mava-foundation.org/grants/appui-au-fonctionnement-et-a-l-operationnalisation-de-la-fondation-bioguine/>



The project aims to help support the functioning of the executive secretariat of the BioGuiné FBG Foundation. It will allow the foundation to ensure the efficient functioning of its team and its organs, without touching the still limited income currently generated by the funds invested.

Within the framework of the coastal planning of Guinea-Bissau other projects are also carried out, among which:

- The project «Consolidating the management of the Guinea-Bissau's national protected areas system»<sup>3</sup> (MAVA Foundation). *This project aims to support the organization and ensure the continuation of its conservation activities in some of MAVA's priority sites.*
- PAPbio, «Support Program for the Preservation of Biodiversity and Fragile Ecosystems, Environmental Governance and Climate Change in West Africa - PAPBio» (ROC/FED/039-269) officially launched on July 25, 2019. *Within the framework of this program, several projects are being implemented including the «Regional Project for the Strengthening of Mangrove Ecosystems» (EU, ECOWAS and WAEMU, 11th EDF)<sup>4</sup> which aims at enhancing the protection status of mangrove areas and creating income-generating activities in 9 coastal countries of the West African sub-region. This project is in the diagnostic phase.*
- The West Africa Coastal Areas Management (WACA) program<sup>5</sup>. *The WACA program was developed in partnership with the West African people who live on the coast and depend on it for their livelihoods, nutrition, food security and prosperity. The program supports countries' efforts to improve the management of their shared coastal resources and reduce natural and man-made hazards affecting coastal communities.*
- The project « Strengthening of the Enabling Environment, Ecosystem-based Management and Governance to support Implementation of the Strategic Action Program of the Guinea Current Large Marine Ecosystem »<sup>6</sup> : EF-6 (9911). *This project aims to strengthen the regional governance and ecosystem-based management of GCLME by assisting counties to build their capacity for measures to implement the Strategic Action Program related to transboundary fisheries, biodiversity conservation and pollution reduction.*
- The project «Managing Mangroves and Production Landscapes for Climate Change Mitigation»<sup>7</sup> (Rice and Mangrove Guinea-Bissau): GEF-6 (9521). *This project aims to protect and restore 1500 ha of mangroves and 1200 ha of degraded rice fields in Guinea-Bissau to improve food security and mitigate the impacts of climate change.*
- The project «Strengthening the Resilience of Vulnerable Coastal Areas and Communities to Climate Change in Guinea Bissau»<sup>8</sup> : UNDP-GEF (4978) & GEF-6 (6988). *This project aims to build Guinea Bissau's institutional capacity to manage climate risks in coastal areas, as well as to improve coastal protection infrastructure and increase the resilience of coastal communities to climate impacts.*
- v • The project «Ecotourism activities in Orango National Park»<sup>9</sup> (MAVA Foundation). *This project aims to provide organizational support.*

Due to the difficulties related to the poor quality of the high resolution images, only one zone was considered for Guinea-Bissau with a division into 6 sectors.

<sup>3</sup> <http://mava-foundation.org/grants/consolidating-the-management-of-the-guinea-bissaus-national-protected-areas-system/>

<sup>4</sup> <https://www.iucn.org/fr/news/afrique-centrale-et-occidentale/201910/un-projet-regional-pour-le-renforcement-des-ecosystemes-de-mangroves>

<sup>5</sup> <https://www.wacaprogram.org/>

<sup>6</sup> <https://www.thegef.org/project/strengthening-enabling-environment-ecosystem-based-management-and-governance-support>

<sup>7</sup> <https://www.thegef.org/project/managing-mangroves-and-production-landscapes-climate-change-mitigation>

<sup>8</sup> <https://www.thegef.org/project/strengthening-resilience-vulnerable-coastal-areas-and-communities-climate-change-guinea>

<sup>9</sup> <http://mava-foundation.org/grants/ecotourism-activities-in-orango-national-park-guinea-bissau/>



## GW1

## GUINEA-BISSAU

| GW1-a                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 46 – NORTHERN MARITIME SECTOR – CAPE VARELA |      |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                             |      |
| DIAGNOSTIC                          | <p>Important rice-growing area, but which seems to have diminished considerably after 1980, when the initial map data were available.</p> <p>All the systems of mobilization of the environment, land and water are represented: mangrove lands, hydromorphic sands, terrace channels, wetlands, lowlands in fresh and/or brackish water. The overall rainfall conditions are less favorable compared to the rest of Guinea (volume and predictability).</p> <p>The seaside tourism site of Varela still little exploited, but which, apart from Bijagós, remains the only site with international potential in Guinea Bissau. Extension however restricted to more or less 3 km of beach backed by a building plot and very little set back from the coast.</p> <p>Whether in terms of geography, physical and economic, coastal current patterns, this sector is a continuity of the Senegalese Maritime Casamance.</p> |                                             |      |
| DYNAMICS                            | <p>Strong evolution of the coastline both subject to the influence of the coastal currents of the capes (Varela and Roxo) and drift currents and sediment transfer from opposite directions according to the seasons, as well as a strong exposure to storm swells during the rainy season.</p> <p>Cap Varela, which is poorly consolidated geologically, is very sensitive to erosion. This sector has probably also suffered the impacts of the reduction of sedimentary flows from Casamance (generalized development of the lowlands and the 70-80 drought period).</p>                                                                                                                                                                                                                                                                                                                                               |                                             |      |
| STAKES                              | <p>The coastline south of Cap Varela has 15 kilometers of beautiful sandy beaches, but backed by a very narrow sandy belt unsuitable for tourist facilities.</p> <p>In addition to the stakes relating to the various rice crops, one should mention the very great fragility to marine erosion with the discontinuous armoured rocky outcrops of Cape Verga facing the swell.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                             |      |
| RECOMMANDATION                      | <p>The answers relate to the precautions to be taken in the establishment in the future of hotel infrastructures that best preserve the function of the cape (imperative respect for the extraction of boulders that are rare in the region).</p> <p>Maintenance of coastal vegetation.</p> <p>Coastal defense arrangements justified within the overall framework of a sector plan structuring a global tourist equipment effort.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                             |      |
| MONITORING                          | Regular and low                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | CRITICALITY                                 | High |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                             |      |
| EVOLUTION OF STAKES                 | <p>Varela National Park in the process of being classified.</p> <p>A deposit of metalliferous sands (ilmenite, rutile and zirconium) has been located on the coastal zone at Nhiquim/Varela. Potential industrial reserves would be 780,000 tonnes of heavy sands concentrate. The Russian company POTO SARL obtained the operating and environmental compliance license in 2012, but the operation was suspended by the authorities due to certain irregularities.</p> <p>Area highly affected by erosion, vulnerability of the dune barrier accentuated by a (abandoned) tourist settlement project and, more recently, by a heavy sand extraction project.</p>                                                                                                                                                                                                                                                         |                                             |      |
| HAZARDS                             | Strong erosion leading to the disappearance of coastal constructions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                             |      |
| MONITORING                          | Regular and low                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | CRITICALITY                                 | High |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                             |      |
| EVOLUTION OF STAKES                 | <p>Varela National Park in the process of being classified.</p> <p>We note the presence of black sands in this sector, subject to non-regular exploitation by mining companies (information to be verified).</p> <p>Area highly affected by erosion, CRITICALITY of the dune barrier accentuated by a (abandoned) tourist settlement project and, more recently, by a heavy sand extraction project.</p> <p>Ecological Interpretation Center on Jeta Island.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                             |      |



| GW1-a                     | 46 – NORTHERN MARITIME SECTOR – CAPE VARELA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| CURRENT PROJECTS          | <p>The Project «Managing Mangroves and Production Landscapes for Climate Change Mitigation»<sup>10</sup> (Rice and Mangrove Guinea-Bissau): GEF-6 (9521).</p> <p>The Project « Strengthening the Resilience of Vulnerable Coastal Areas and Communities to Climate Change in Guinea Bissau »<sup>11</sup> : UNDP-GEF (4978) &amp; GEF-6 (6988).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |
| OUTSTANDING NATURAL AREAS | <p><b>Varela National Park (proposed)</b></p> <ul style="list-style-type: none"> <li>• WDPA ID : 342656</li> <li>• Affected sector: GW1-a</li> <li>• Classification: Varela National Park is recorded in WDPA as being in the process of being classified, other information indicates that there are no parks being classified in the area.</li> </ul> <p><b>Parque Natural dos Tarrafes do Rio de Cacheu</b></p> <ul style="list-style-type: none"> <li>• WDPA ID : 33046</li> <li>• Classification: 30 November 2000 (Decree n°12/2000)</li> <li>• Designation as a Ramsar site in 2014</li> </ul> <p><b>Pelundo Wildlife Reserve</b></p> <ul style="list-style-type: none"> <li>• RF Pelundo : WDPA ID : 342657</li> <li>• Affected sector: GW1-a</li> <li>• Pelundo Faunal Reserve is not working as planned, but Guinea-Bissau has started to prepare a nomination file for the Jeta-Pecixe-Cacheu Biosphere Reserve, which the Pelundo forest will encompass.</li> <li>• Classified as a Protected Area Community Forest of Mata Uco</li> </ul> |                  |
| HAZARDS                   | Strong erosion leading to the disappearance of coastal constructions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |
| MONITORING                | RRRegular and low                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CRITICALITY High |

<sup>10</sup> <https://www.thegef.org/project/managing-mangroves-and-production-landscapes-climate-change-mitigation>

<sup>11</sup> <https://www.thegef.org/project/strengthening-resilience-vulnerable-coastal-areas-and-communities-climate-change-guinea>



NORTHERN MARITIME SECTOR-CAP VARELA

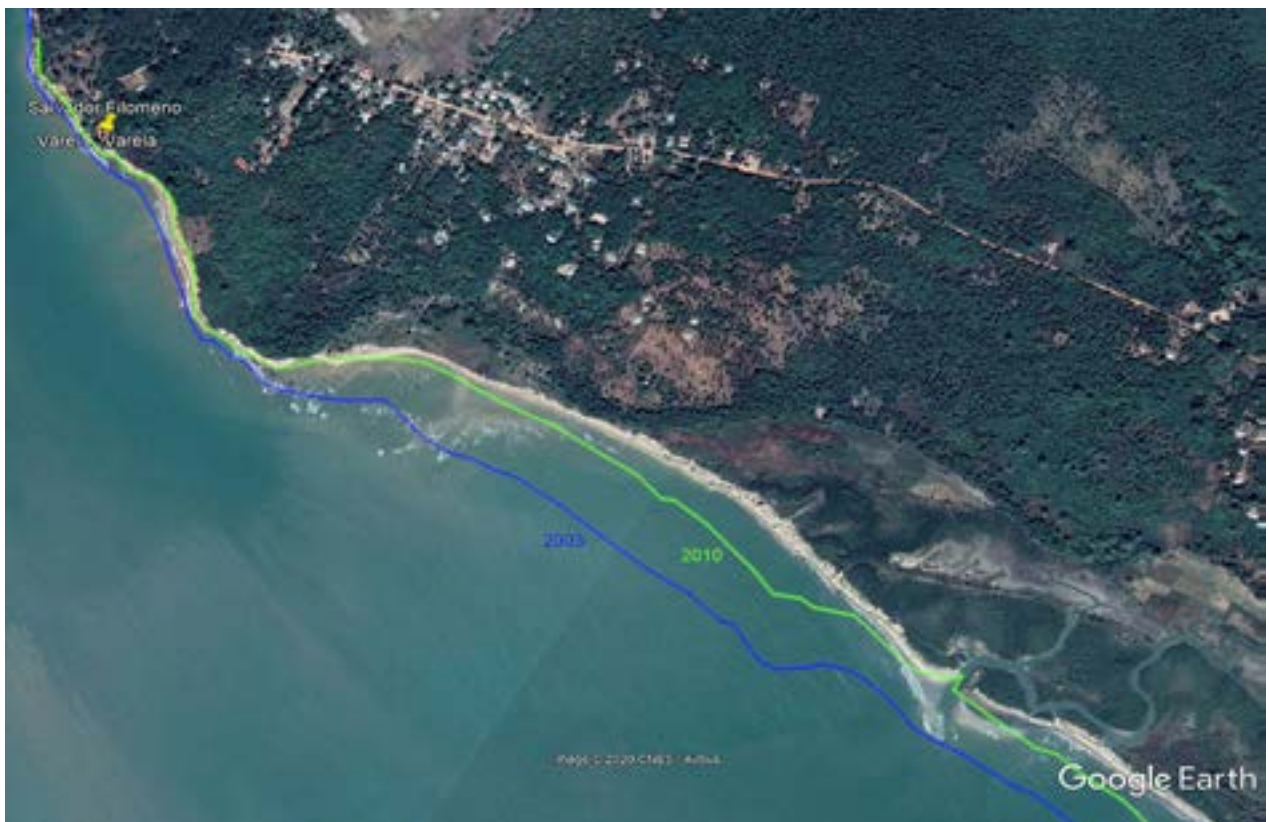
2003



2010



Evolution of the shoreline between 2003 and 2018







NORTHERN MARITIME SECTOR-PONTA DE JUFUNCO

2003



2013



2018





| GW1-b                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 47 – CENTRAL MARINE SECTOR |      |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |      |
| DIAGNOSTIC                          | Importance of the extension of the rias and weakness of the areas of mangrove swamps that can be developed, with little extension of the lowlands that can be cultivated for rice. Small area of rice fields under direct marine influence.                                                                                                                                                                                                                       |                            |      |
| DYNAMICS                            | Very dynamic mangrove systems.                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |      |
| STAKES                              | Risks related to sea level rise on rice farming in the sector, but threatened rice areas are small compared to those threatened in GW1-d and especially in GW1-f.<br>If the hypothesis of a rise in sea level is confirmed, a necessary reconfiguration of rice cultivation on the lowest lands will have to be envisaged: costly labor-intensive reinforcement of the dyking system, abandonment of certain lands that have become too difficult to manage, etc. |                            |      |
| RECOMMENDATION                      | Global reflection to be undertaken on the sustainability of mangrove rice-growing systems and relevant developments in the context of rising sea levels.                                                                                                                                                                                                                                                                                                          |                            |      |
| MONITORING                          | No recommendations                                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY                | Low  |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |      |
| EVOLUTION OF STAKES                 | Extension of the city of Canchungo.<br>Rapid abandonment of mangrove rice fields due to rising sea levels and weakening of labor forces due to the exodus of youth.<br>Strong itinerant agriculture. Cashew tree monoculture.                                                                                                                                                                                                                                     |                            |      |
| HAZARDS                             | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                            |      |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY                | High |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |      |
| EVOLUTION OF STAKES                 | Extension of the city of Canchungo.<br>Rapid abandonment of mangrove rice fields due to rising sea levels and weakening of labor forces due to the exodus of youth.<br>Strong itinerant agriculture. Cashew tree monoculture.<br>Food safety issues.                                                                                                                                                                                                              |                            |      |
| CURRENT PROJECTS                    | Project «Strengthening the Resilience of Vulnerable Coastal Areas and Communities to Climate Change in Guinea Bissau» <sup>12</sup> : UNDP-GEF (4978) & GEF-6 (6988)                                                                                                                                                                                                                                                                                              |                            |      |
| OUTSTANDING NATURAL AREAS           | Future Biosphere Reserve                                                                                                                                                                                                                                                                                                                                                                                                                                          |                            |      |
| HAZARDS                             | No major hazards are identified in this area, including erosion hazard. The area is protected by a very dense mangrove area.                                                                                                                                                                                                                                                                                                                                      |                            |      |
| RECOMMENDATIONS                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                            |      |
| MONITORING                          | Regular and low                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY                | High |

<sup>12</sup> <https://www.thegef.org/project/strengthening-resilience-vulnerable-coastal-areas-and-communities-climate-change-guinea>



| GW1-c                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 48 - BISSAU-URBAN AREA |      |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                        |      |
| DIAGNOSTIC                          | <p>Strong growth of the city since independence.</p> <p>Port issues: the historic city has settled on the Geba estuary, which in the rainy season collects the waters of the vast Corrubal watershed, ensuring seasonal cleaning of the mud of the estuary, to which is added the chasing effect of tides. Tendency nevertheless to silting, with significant mangrove colonization due in part to the dams in Senegal. Navigation draught standards have led to a readjustment of port infrastructures and the development of quays and wharves into two main poles. In spite of the impact of the drowned spur favoring the deepening or simply the maintenance of the main channel of the estuary, one can wonder about the tendency of silting between these two main hubs according to the joint influence of marine current and river floods</p> <p>Urban growth: the topography of flattened hills (digité network) separated by lowlands and mangroves has guided the city's growth in all directions, centered on the main network and at a distance of 5 to 10 km from the city center. An area equivalent to the current urban area remains technically suitable for construction. However, the attraction of the saturated center and the proximity of the latter encourages the construction in wetlands former rice fields, through a conquest on embankments, hut by hut, or even in small housing estates. In addition to unfavorable conditions (sanitation, risk of flooding due to the disappearance of intra-urban wetlands in rice fields or natural vegetation), this situation is detrimental to the urban environment (ecological services: hydrological role, role of rainwater collection and uncontrolled wastewater, future rise of water tables, role of landscape green cuts, etc.). Near the historic and commercial center, most of the wetlands are thus rapidly disappearing.</p> |                        |      |
| DYNAMICS                            | Risks of submersion linked to the draining of wetlands in low and floodable situations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                        |      |
| STAKES                              | <p>Sustainability of the operation of port facilities, dependence on other breakout ports such as Dakar, given the size of modern cargo ships.</p> <p>Controlling urban growth, and respecting wetland cuts in order to preserve the associated ecological services.</p> <p>Risk of water contamination and accumulation of urban and domestic effluents.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                        |      |
| RECOMMENDATIONS                     | <p>Improvement of the transport system to the center and support for land and financial access to building plots in the periphery on suitable soils.</p> <p>Overall scheme unavoidable at the present stage.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                        |      |
| MONITORING                          | Regular and low                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY            | High |
| EVOLUTION OVER THE PERIOD 2010-2016 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                        |      |
| EVOLUTION OF STAKES                 | <p>Construction of a new fishing port in Bissau inaugurated in 2014.</p> <p>Strong silting of port infrastructures due to the slowdown of currents.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                        |      |
| PORT INFRASTRUCTURE                 | The port of Bissau (also known as Port Pidjiguiti) is located on the Geba River, it consists of two quays and a pier.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |      |
| HAZARDS                             | Localized erosion as a consequence of coastal infrastructure.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                        |      |
| MONITORING                          | Regular and low                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY            | High |
| EVOLUTION OVER THE PERIOD 2016-2020 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                        |      |
| EVOLUTION OF STAKES                 | <p>Construction of a very advanced fishing port in Bandim.</p> <p>Construction in the wetland of Bissau.</p> <p>Construction of a new large public waste treatment center in Bissau (Grande Poubelle).</p> <p>Industrial construction (cement plant, fuel station and fish preservation).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                        |      |
| CURRENT PROJECTS                    | The Project « Strengthening the Resilience of Vulnerable Coastal Areas and Communities to Climate Change in Guinea Bissau » <sup>13</sup> : UNDP-GEF (4978) & GEF-6 (6988).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                        |      |
| OUTSTANDING NATURAL AREAS           | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                        |      |
| HAZARDS                             | <p>Localized erosion as a consequence of coastal infrastructure.</p> <p>Flooding due to heavy rains.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                        |      |
| RECOMMENDATIONS                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |      |
| MONITORING                          | Regular and low                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY            | High |

<sup>13</sup> <https://www.thegef.org/project/strengthening-resilience-vulnerable-coastal-areas-and-communities-climate-change-guinea>





BISSAU & BANDIM

2009



2020





| GW1-d                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 49 – SOUTH GUINEA-BISSAU-TITE-TOMBALI |      |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                       |      |
| DIAGNOSTIC                          | Importance of the extension of the rias and weakness of the areas of mangrove swamps that can be developed, with little extension of the lowlands that can be cultivated for rice.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                       |      |
| DYNAMICS                            | Very dynamic mangrove systems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |      |
| STAKES                              | Risks related to sea-level rise on rice cultivation in the sector, but rice areas at risk are much more limited than those affected at the GW1-f sector level.<br>If the hypothesis of a rise in sea level is confirmed, a necessary reconfiguration of rice cultivation on the lowest lands will have to be envisaged: costly labor-intensive reinforcement of the dyking system, abandonment of certain lands that have become too difficult to manage, etc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |      |
| RECOMMENDATIONS                     | Global reflection to be undertaken on the sustainability of mangrove rice-growing systems and relevant developments in the context of rising sea levels.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                       |      |
| MONITORING                          | No recommendations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY                           | Low  |
| EVOLUTION OVER THE PERIOD 2010–2016 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                       |      |
| EVOLUTION OF STAKES                 | General problem of degradation of agricultural systems in mangroves.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                       |      |
| HAZARDS                             | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                       |      |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY                           | Low  |
| EVOLUTION OVER THE PERIOD 2016–2020 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                       |      |
| EVOLUTION OF STAKES                 | Buba city growth.<br>General problem of degradation of agricultural systems in mangroves.<br>Mangrove cutting by foreign artisanal fishermen. Despite the lack of rainfall, there is a strong natural system of mangrove recovery.<br>Power station built in the Natural Park of the Lakes of Cufada. This power plant is not working yet due to a lack of energy (fuel).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                       |      |
| CURRENT PROJECTS                    | The Project «Managing Mangroves and Production Landscapes for Climate Change Mitigation» <sup>14</sup> (Rice and Mangrove Guinea-Bissau): GEF-6 (9521).<br>The Project « Strengthening the Resilience of Vulnerable Coastal Areas and Communities to Climate Change in Guinea Bissau » <sup>15</sup> : UNDP-GEF (4978) & GEF-6 (6988).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                       |      |
| OUTSTANDING NATURAL AREAS           | <b>Cantanhez National Park</b> <ul style="list-style-type: none"><li>PA ID : 351088</li><li>PN Cantanhez : WDPA ID : 351088</li><li>Affected sector: GW1-d</li><li>Classification: 22 February 2011 (decree n°14/2011)</li></ul> <b>Parque Natural das Lagoas de Cufada</b> <ul style="list-style-type: none"><li>PN Cufada : WDPA ID : 342673</li><li>Affected sector: GW1-d</li><li>Classification: 30 November 2000 (Decree n°13/2000).</li></ul> <b>Ramsar Site Lagoa De Cufada</b> <ul style="list-style-type: none"><li>ZHII / Ramsar site : ZHII ID : 1GW001 – 469 / WDPA ID : 29806</li><li>Affected sector: GW1-d</li><li>Designation on 14 May 1990 (39 098 ha).</li></ul> <b>Rio Grande de Buba (proposed)</b> <ul style="list-style-type: none"><li>WDPA ID : 317051</li><li>Affected sector: GW1-d</li><li>Classification: The classification of the Rio Grande de Buba area is under discussion between the Institute of Biodiversity and OUTSTANDING NATURAL AREAS and the Coastal Planning Office of Guinea-Bissau.</li></ul> |                                       |      |
| HAZARDS                             | Localized erosion as a result of mangrove cutting.<br>Flooding due to heavy rains.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                       |      |
| RECOMMENDATIONS                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                       |      |
| MONITORING                          | Regular and low                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY                           | High |

<sup>14</sup> <https://www.thegef.org/project/managing-mangroves-and-production-landscapes-climate-change-mitigation>

<sup>15</sup> <https://www.thegef.org/project/strengthening-resilience-vulnerable-coastal-areas-and-communities-climate-change-guinea>



| GW1-e                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 50 - BIJAGÓS ISLANDS |      |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      |      |
| DIAGNOSTIC                          | ISeveral islands have been the subject of protection measures and special statuses justified by the extraordinary diversity of natural maritime, coastal and terrestrial environments. The latter remain moderately artificialized by a sparsely settled, landlocked and self-sufficient population.<br>Rice fields occupy a limited area but are essential for the self-sufficiency of the population.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                      |      |
| DYNAMICS                            | Multiple situations to be appreciated in each case at a finer level of granularity (nature of the coastline, exposure to swell, tidal currents, etc.).<br>Often high tidal ranges and the essential morphogenic role of tidal hunting currents.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      |      |
| STAKES                              | In the short term, there is a risk of externally induced looting of fishery resources, but providing monetary income, even modest, to the populations.<br>In the future, ecotourism development of the Community Marine Protected Area of Ilas Formosa, Nago & Tchedia, of which some islands (Caravela in particular) have beach sites and a particularly attractive landscaped environment as a welcome point for discovering the natural and cultural diversity of the archipelago.<br>In the current situation, the island of Bubaque, with its airstrip and a small hotel infrastructure, can act as a platform for possible ecotourism activities.                                                                                                                                                                                                                                                                                                                                                                                                      |                      |      |
| RECOMMENDATIONS                     | Rigorous and concerted application of the provisions contained in the management plans of the conservation units.<br>Vigilance with regard to possible tourist establishments in the other islands.<br>Management of access to fishery resources, especially demersal resources.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                      |      |
| MONITORING                          | Regular                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY          | High |
| EVOLUTION OVER THE PERIOD 2010-2016 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      |      |
| EVOLUTION OF STAKES                 | Coastal dynamics on some islands and islets are high.<br>Continued aggressive tourism is a source of concern despite the efforts of site managers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |      |
| HAZARDS                             | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                      |      |
| MONITORING                          | Regular                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY          | High |
| EVOLUTION OVER THE PERIOD 2016-2020 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      |      |
| EVOLUTION OF STAKES                 | Coastal dynamics on some islands and islets are high.<br>Continued aggressive tourism is a cause for concern despite the efforts of site managers.<br>In the future very brief start of oil exploitation in the Bijagós archipelago.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                      |      |
| CURRENT PROJECTS                    | Project «Ecotourism activities in Orango National Park» <sup>16</sup> (Mava foundation).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |      |
| OUTSTANDING NATURAL AREAS           | <b>Community Marine Protected Area of Ilas Formosa, Nago &amp; Tchedia (Ilas Urok)</b> <ul style="list-style-type: none"><li>• WDPA ID : 342655</li><li>• Affected sector: GW1-e</li><li>• Created by Decree No. 8/2005.</li><li>• A 2004-2008 management plan for the Urok MPA was finalized in December 2003 and approved by Decree No. 9/2005.</li></ul> <b>Joeao Vieira and Poilao Marine National Park</b> <ul style="list-style-type: none"><li>• WDPA ID : 317052</li><li>• Affected sector: GW1-e</li><li>• Classification: 23 August 2000 (Decree No. 6-A/2000).</li></ul> <b>Orango Islands Group National Park</b> <ul style="list-style-type: none"><li>• WDPA ID : 33047</li><li>• Affected sector: GW1-e</li><li>• Classification: 30 November 2000 (Decree n°11/2000).</li></ul> <b>Biosphere Reserve Bolama-Bijagós</b> <ul style="list-style-type: none"><li>• RB Bilama - Bijagós : WDPA ID : 145507 ou RB Bijagós Archipelago Biosphere reserve : WDPA ID : 11611</li><li>• Affected sector: GW1-e</li><li>• Designation in 1996</li></ul> |                      |      |

<sup>16</sup> <http://mava-foundation.org/grants/ecotourism-activities-in-orango-national-park-guinea-bissau/>



| GW1-e           | 50 - BIJAGÓS ISLANDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
|                 | <ul style="list-style-type: none"> <li>It includes the following OUTSTANDING NATURAL AREAS: MPA community of Formosa, Nago and Tchedia Islands, the Joao Vieira and Poilao Marine National Park and the Orango Group of Islands National Park.</li> <li>Inscription on the Tentative List of UNESCO World Heritage Sites since 2006 (ref : 5081)</li> </ul> <p><b>Ramsar Site Bolama Archipelago-Bijagós</b></p> <ul style="list-style-type: none"> <li>ZHII / Ramsar : ZHII ID : 1GW002 - 2198 / WDPA ID: 555592547</li> <li>Affected sector: GW1-e</li> <li>Designation on 14 January 2014 (1,046,950 ha).</li> </ul> |                  |
| HAZARDS         | Localized erosion as a result of mangrove cutting.<br>Flooding due to heavy rains.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |
| RECOMMENDATIONS | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |
| MONITORING      | Regular and low                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY High |



| GW1-f                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 51 - SOUTH CACINE |           |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |           |
| DIAGNOSTIC                          | <p>Considered as a very important rice-growing area due to the rainfall exceeding 2000 mm, providing secure yields of rainfed rice on mangrove lands.</p> <p>The continental part has been heavily cleared and the few massifs of maritime Guinean forest still present thirty years ago have almost all disappeared.</p> <p>In the post-forest regime, very fragile soils are quickly leached and transformed into savannah (sandy soils under a high rainfall regime).</p>                                |                   |           |
| DYNAMICS                            | Very dynamic mangrove system to be appreciated in every situation.                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |           |
| STAKES                              | Importance of the risks related to sea level rise on rice cultivation in the sector (performance of the system and limits of the potential for dry food production as a food alternative to rice cultivation). If the hypothesis of a rise in sea level is confirmed, a necessary reconfiguration of rice cultivation on the lowest lands will have to be envisaged: costly labor-intensive reinforcement of the dyking system, abandonment of certain lands that have become too difficult to manage, etc. |                   |           |
| RECOMMENDATIONS                     | Global reflection to be undertaken on the sustainability of mangrove rice-growing systems and relevant developments in the context of rising sea levels.                                                                                                                                                                                                                                                                                                                                                    |                   |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY       | Very high |
| EVOLUTION OVER THE PERIOD 2010-2016 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |           |
| EVOLUTION OF STAKES                 | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |           |
| HAZARDS                             | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |           |
| EVOLUTION OVER THE PERIOD 2016-2020 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |           |
| EVOLUTION OF STAKES                 | <p>Expansion of Cacine city.</p> <p>Water dynamics (erosion) on coastal lines.</p> <p>Water dynamics (flooding) on the rice area.</p> <p>High pressure on mangroves (cuts for fish conservation).</p> <p>Construction of artisanal fishing infrastructure.</p> <p>Sporadic campaign for the recovery of mangroves.</p>                                                                                                                                                                                      |                   |           |
| CURRENT PROJECTS                    | The Project « Strengthening the Resilience of Vulnerable Coastal Areas and Communities to Climate Change in Guinea Bissau » <sup>17</sup> : UNDP-GEF (4978) & GEF-6 (6988).                                                                                                                                                                                                                                                                                                                                 |                   |           |
| OUTSTANDING NATURAL AREAS           | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |           |
| HAZARDS                             | <p>Localized erosion as a consequence of mangrove cutting and natural events.</p> <p>Rice fields destroyed due to frequent flooding.</p>                                                                                                                                                                                                                                                                                                                                                                    |                   |           |
| RECOMMENDATIONS                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY       | Very high |

<sup>17</sup> <https://www.thegef.org/project/strengthening-resilience-vulnerable-coastal-areas-and-communities-climate-change-guin>



## SUMMARY TABLE

|         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                       |                                                                                     |
|---------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| HABITAT |  |  |  |  |  |  |                                                                                   |                                                                                    |                                                                                     |                                                                                       |                                                                                     |
| STAKES  | <b>Fishing</b><br>Fishing port<br><small>Landing areas</small>                    | <b>Rice-growing</b>                                                               | <b>Palm oil</b><br>Palm plantation                                                | <b>Trade</b><br>Commercial port                                                   | <b>Trade+</b><br>Commercial port<br><small>Airport</small>                        | <b>Oil &amp; Gas</b><br>Exploration<br>Exploitation                               | <b>Extractive ind.</b><br>Salt, metal-bearing sand,<br><small>gold</small>        | <b>Tourism</b>                                                                     | <b>(Tourism)</b><br>Unexploited outstanding<br><small>areas</small>                 | <b>Biodiversity</b><br>Outstanding areas<br><small>(biodiversity, landscapes)</small> |                                                                                     |
| HAZARDS | <b>h</b><br>Soil erosion<br><small>Landslide</small>                              | <b>h</b><br>Coastal erosion                                                       | <b>d</b><br>Marine submersion                                                     | <b>c</b><br>Pluvial and/or fluvial flooding                                       |  |  |  |  |  | <b>n</b><br>Industrial risk                                                           |  |

| N°                | REF   | NAME                                 | HABITAT                                                                           | STAKES                                                    | HAZARDS                                                                           | CRITICALITY |      |           | MONITORING |           |                                                                       |
|-------------------|-------|--------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------|-------------|------|-----------|------------|-----------|-----------------------------------------------------------------------|
|                   |       |                                      |                                                                                   |                                                           |                                                                                   | 2011        | 2016 | 2020      | 2011       | 2016      | 2020                                                                  |
| GW1 GUINEA-BISSAU |       |                                      |                                                                                   |                                                           |                                                                                   |             |      |           |            |           |                                                                       |
| 46                | GW1-a | North - Cap Varela maritime sector   |  | Rice-growing Fishing Extractive Ind. Tourism Biodiversity |  | High        | →    | High      | →          | High      | Regular and light → Regular and light → Regular and light             |
| 47                | GW1-b | Central Maritime Sector              |  | Rice-growing Cashew trees Biodiversity                    |  | Low         | ↗    | High      | →          | High      | No monitoring ↗ Watch-keeping ↗ Regular and light                     |
| 48                | GW1-c | Bissau - Urban zone                  |  | Fishing                                                   |  | High        | →    | High      | →          | High      | Regular and light → Regular and light → Regular and light             |
| 49                | GW1-d | Guinea-Bissau South - Tite - Tombali |  | Rice-growing Biodiversity                                 |  | Low         | →    | Low       | ↗          | High      | No monitoring ↗ Watch-keeping ↗ Regular and light                     |
| 50                | GW1-e | Bijagos islands                      |  | Oil & Gas Tourism Biodiversity                            |  | High        | →    | High      | →          | High      | Regular and light → Regular and light → Regular and light             |
| 51                | GW1-f | South Cacine                         |  | Rice-growing                                              |  | Very High   | →    | Very High | →          | Very High | Regular and intensive → Regular and intensive → Regular and intensive |







# Guinea

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GN-Guinea



GN-Guinea

Guinea is characterized by its large mangrove extents, mostly valued through rice growing perimeters, some of which are strongly affected by exceptional meteo-marine events.

The mining sector experiences a strong growth thanks to the implementation of many projects exploiting bauxite and this influences the Guinean coastline with the multiple river port platforms for the transportation of minerals by barges before offshore transshipment in vessels. Presently, these developments mainly concern the bauxite northwest corridor (several platforms are developed in Boppa such as Cap Verga exploited by ALU FER, China Powement) and the rivers of Rio Nuñez and Fatala. But, several platforms have recently been developed in the South (Marèrinyah, Konta). These new developments require monitoring namely on specific environmental and social aspects.

To face growth in the mining sector, namely the increase of bauxite production and future development of iron deposits, several projects of deep-water ports are underway or being studied and/or executed (GAC, CBG, Rio Tinto...). The suburbs of Conakry are rapidly extending, with housing development projects some of which are implemented or planned in mangrove areas, the project "Grand Conakry - Vision 2040" has been recently developed and must be continued with the design of Conakry Urban Planning and Development Master Plan.

The coastal marine and protected areas network is being consolidated with several development and management capacity building initiatives and protection statutes of existing areas as well as the identification of new areas to be protected.

The fishing sector is being modernized with the completion of the fishery management plan comprising zoning and the rehabilitation of several landing piers, processing sites as well as the development of co-management.

Aware of the many stakes of the Guinean coastline, the government with the support of partners has taken initiatives to strengthen the planning, management and monitoring of coastal areas with namely the will to develop an integrated coastal and marine zone management plan addressing the mining, farming, tourist fishing issues and environmental aspects.



## GN1

## CAP VERGA – TRISTAO NORTH ZONE

Strong increase of coastal stakes with a substantial growth of the north-west mining corridor comprising the development of mining ports, mainly river ports and deep-water port construction projects.

| GN1-a                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 52 – FAR NORTH WEST MANGROVE ISLANDS AND TRISTAO |        |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                  |        |
| DIAGNOSTIC                          | Insular or quasi-insular sets with a very complex mangrove topography, coastlines in permanent evolution. Low altitude of sites for rice growing or aquaculture, and sparse and very scattered population of fishermen with some self-consumption rice growing.<br>The island of Tristao is characterized by the extension of wrinkled sandy terraces and channels and the presence of some small villages.<br>The coastal hinterland remains poorly served (permanent road stopping in Boké), but has a network of tracks, small villages and seems to be moving towards agricultural densification (new brownfields...). Intensive exploitation of mangrove wood. |                                                  |        |
| DYNAMICS                            | Very dynamic mangrove system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                  |        |
| STAKES                              | The zone is included in the Guinea / Guinea Bissau transboundary protected area.<br>The island of Tristao is home to important marine birds' stopover places. Its tourist future will depend on a future road opening-up (towards Guinea-Bissau? Trans-coastal of NEPAD <sup>1</sup> ?).<br>The sandy coastline over more than 20 km is attractive for tourist development, but this coastline is too far from roads to contemplate a future development of this potential.                                                                                                                                                                                         |                                                  |        |
| RECOMMANDATION                      | Compliance with protection measures on the site of Tristao island and limitation of mangrove wood cuttings for various purposes (considering also the proximity of kamsar).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                  |        |
| MONITORING                          | Without recommendations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY                                      | Low    |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                  |        |
| EVOLUTION OF STAKES                 | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                  |        |
| COASTAL PROTECTION                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                  |        |
| HAZARDS                             | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                  |        |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY                                      | Medium |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                  |        |
| EVOLUTION OF STAKES                 | Recent discovery of sea-grass along the Tristao islands under the ResilienSEA <sup>2</sup> initiative.<br>The Dobali zone in the Komponi river is identified in the update of the Mines Auxiliary Infrastructure Master Plan (SDIAM) of 2018 as being one of the areas of interest for the installation of a deep-water port. If no project is yet implemented, several mining companies in research phases consider the establishment of fluvial ports on the Rio Komponi (Woula, Maison Kebo).                                                                                                                                                                    |                                                  |        |
| CURRENT PROJECTS                    | The Regional Partnership for Coastal and Marine area conservation (PRCM) coordinates the implementation of a rehabilitation project of mangrove ecosystems and support to the management of the OUTSTANDING NATURAL AREAS of Alcatraz and Tristao financed by the DOB Ecology foundation.<br>Sea-grass identification and mapping works have been carried out under the ResilienSEA initiative with the support of GRID Arendal.<br>Protection and rehabilitation of mangrove ecosystems in the islands of Tristao and peninsula of Cacine under the project coordinated by PRCM.                                                                                   |                                                  |        |
| OUTSTANDING NATURAL AREAS           | Integral Natural Reserve of the Alcatraz island <ul style="list-style-type: none"><li>• WDPA ID : non-existent</li><li>• Affected sector: GN1-a</li><li>• Creation : February 20, 2013 (Decree D/2013/038/PRG/SGG)</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                  |        |

<sup>1</sup> New partnership for Africa's development (NEPAD)

<sup>2</sup> <http://resiliensea.org/2019/11/04/la-premiere-formation-nationale-sur-lidentification-la-cartographie-et-le-monitoring-des-especes-dherbiers-marins-organisee-par-resiliensea-en-guinee/?lang=fr>

| GN1-a                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 52 – FAR NORTH WEST MANGROVE ISLANDS AND TRISTAO |      |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|------|
| OUTSTANDING NATURAL AREAS | <p><b>Ramsar Site of Alcatraz island</b></p> <ul style="list-style-type: none"> <li>• ZHII ID : 1GN001 – 571 / WDPA ID : 67983</li> <li>• Affected sector: GN1-a</li> <li>• Designation on November 18, 1992 (1 ha).</li> </ul> <p><b>Managed Natural Reserve of Tristao</b></p> <ul style="list-style-type: none"> <li>• WDPA ID : 19980</li> <li>• Affected sector: GN1-a</li> <li>• Classification : February 20, 2013 (Decree D/2013/037/PRG/SGG)</li> </ul> <p><b>Ramsar Site of Tristao islands</b></p> <ul style="list-style-type: none"> <li>• ZHII ID : 1GN002 – 572 / WDPA ID : 67984</li> <li>• Affected sector: GN1-a</li> <li>• Designation November 18, 1992 (85 000 ha).</li> </ul> |                                                  |      |
| ING                       | sect                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                  |      |
| ING                       | ct                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                  |      |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY                                      | High |

## EXTRACT OF THE ZONING MAP OF TRISTAO MANAGED NATURAL RESERVE





| GN1-b                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 53 – RIO NUÑEZ – KAMSAR |        |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                         |        |
| DIAGNOSTIC                          | Simple bauxite transport terminal with mineral wharf, Kamsar has experienced a strong urban growth, becoming one of the main agglomerations of the Guinean coastal fringe (ahead of Boké, as center city of Guinean South-West).<br>The potential of the Kapatchez low-lands, the hinterland indulges essentially in extensive agro-pastoral activity with low sustainable farming potential (soils, reliefs, etc.). Low population density.<br>Important fishing port in the North of the mineral terminal.<br>Backfilling is noted on mangrove soils.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                         |        |
| DYNAMICS                            | Strong artificialization of the shoreline.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                         |        |
| STAKES                              | No one knows until when the growth of Kamsar will go, but the high terrace being saturated at the level of the mineral port, a second small growth zone by backfilling of mangrove and rice field is being established around the fishing port which has a dock. Likewise, on the urban site in digited terrace, sa-<br>turated lands see the installation of new edged spaces on more or less backfilled mangrove or rice field (those facilities are also linked to the attraction of the center), more or less on the model of Bissau.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                         |        |
| RECOMMANDATION                      | Inscription of Kamsar development in the urban development master plan taking into account the preservation of natural sites and limitation of pollutions of all kinds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                         |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY             | Medium |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                         |        |
| EVOLUTION OF STAKES                 | Projects for the extension of Kamsar mineral port, with the construction of two new small-scale fishing jetties are being finalized, and the construction of a town for the housing of Rusal workers at Kamsar port.<br>Construction of a fluvial port upstream the Rio Nuñez by the Chinese company Winning Group for the exploitation of bauxite for a capacity of 65 tons per year.<br>Construction of a mineral port at the Rio Nuñez mouth by the company Rusal for the transportation of Djan bauxite.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                         |        |
| PORT INFRASTRUCTURE                 | The Kamsar port is the industrial center of Compagnie des Bauxites de Guinée – CBG (51% held by Halco Inc and 49% by the Government of Guinea, Rio Tinto holding 45% of the company Halco). The port is connected by railway with the plateau of Sangaredi (which is the third largest bauxite mine being exploited in the world) and has an export terminal.<br>Projects for the extension of Kamsar mineral port, with the construction of two new small-scale fishing jetties are in the process of finalization.<br>Project for the construction of a town for the housing of Rusal workers in Kamsar port;<br>The small-scale fishing port is in the process of modernization of its ground services with the support of the Japanese cooperation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                         |        |
| HAZARDS                             | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                         |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY             | Medium |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                         |        |
| EVOLUTION OF STAKES                 | Significant development of the bauxite export corridor on the Nuñez river with two options currently used: (I) transport from fluvial ports by barge then offshore transshipment and (ii) direct loading by jetty on vessels accessing to Kamsar facilities by dredged channel.<br>Since 2016, several mining fluvial ports have been developed and made operational namely (cf. Illustrations below): <ul style="list-style-type: none"><li>• The port of Katougouma on the right shore of the river (current capacity 14 Mt / maximum capacity estimated at 16 Mt) developed and exploited by the SMB-Winning consortium and which could be of interest for several other companies (<i>Woula Natural resources SARL</i>).</li><li>• The fluvial port of Dapilon on the left shore of the river (current capacity 16 Mt / maximum capacity estimated at 30 Mt) developed and exploited by the SMB-Winning consortium with the enterprises <i>AMR, CDM China and GDM</i>.</li><li>• The fluvial port of Taressa on the left shore of the river (current capacity 6 Mt / maximum capacity estimated at 15 Mt) developed and exploited by the companies Rusal and COBAD.</li></ul> Ten mining projects in different development stages consider also an outlet on the Rio Nuñez what should increase the number of port platforms on the river in the next years. |                         |        |



| GN1-b                     | 53 – RIO NUÑEZ – KAMSAR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
|                           | <p>As regards the direct loading of mineral, the Kamsar port has been subject to extension works namely following a multi-user operating agreement for the pooling of the railway line of Boké with notably the construction of a 1.5 km long jetty on piles by the company GAC (current capacity 14 Mt) and a commercial dock completing CBG existing facilities (current capacity 15 Mt / maximum capacity estimated at 30 Mt).</p> <p>Four options are presented in the SDIAM as concerns the construction of a deep-water port for the bauxite corridor, of which two are located in the Rio-Nunez-Kamsar (GN1-b) sector :</p> <ul style="list-style-type: none"> <li>• The project of a port on the Taigbé island in the south of Kamsar (deep water port for the company GAC) using the channel dredged on the same model as the Kamsar port contemplated by the company <i>Rent-a-Port</i> ;</li> <li>• The project of a port on the Gonzalez island in the south-east of the mouth which could use a natural channel.</li> </ul> <p>The other two options, the Komponi project and Cap Verga project respectively located in GN1-a and GN1-c sectors.</p> <p>The project of a new port in Taigé as well as extensions of Kamsar port should go with important works on the access channel: enlargement and deepening.</p> <p>This important development of the bauxite corridor leads to a rapid evolution (i) of coastal and marine pollution risks and (ii) a significant population growth leading to urban extensions and an increase of pressures on natural resources.</p> |                    |
| CURRENT PROJECTS          | <p>No project related to coastal risks underway.</p> <p>A Strategic Environmental and Social Assessment (SESA) of occupations by the infrastructure of the Guinean coastal zone from the Kapatchez delta to the Tristao islands was carried out in 2019-2020 under the regional project for a reduced impact of coastal infrastructure on ecosystems (PRISE). It describes the situation of the Bauxite export corridor of the Nuñez river and proposes a series of strategic recommendations.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |
| OUTSTANDING NATURAL AREAS | <p><b>Rio Kapatchez Ramsar Site</b></p> <ul style="list-style-type: none"> <li>• ZHII / Ramsar site: ZHII ID : 1GN003 – 573 / WDPA ID : 67985</li> <li>• Affected sectors : GN1-b et GN1-c</li> <li>• Designation on November 18, 1992 (20 000 ha).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |
| HAZARDS                   | <p>Saline water intrusion</p> <p>Erosion.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |
| RECOMMENDATIONS           | <p>Follow-up of the SESA recommendations.</p> <p>Follow-up of new investments.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY Medium |





KATOUGOUMA

2013



2019



DAPILON

2016



2020



TARESSA

2016



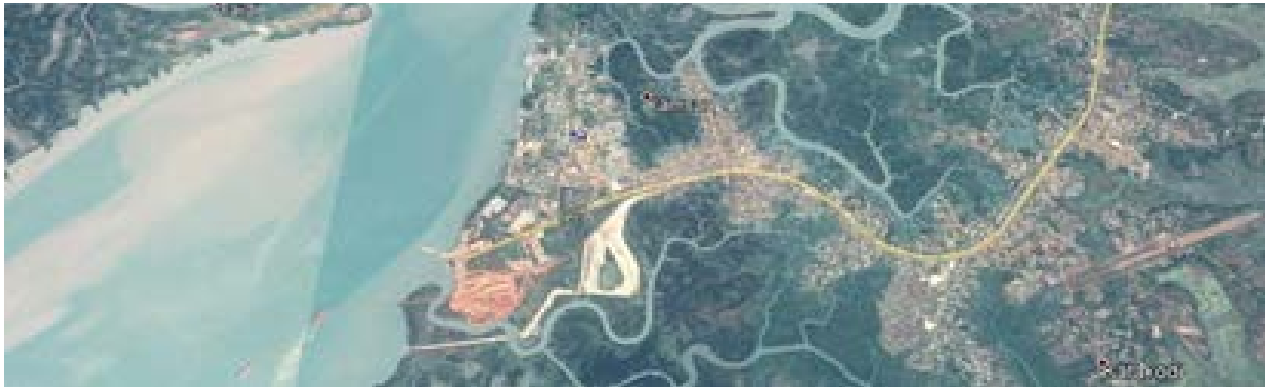
2020





KATOUGOUMA

2016



2020







| GN1-c                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 54 - KAPATCHEZ COASTAL LOWLANDS |        |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|--------|
| BASELINE - 2010                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 |        |
| DIAGNOSTIC                            | Sandy-muddy coastline with sharp discontinued sandy deposits isolating well wooded mangroves or vast stripped and tanned mudflats. Wavy longitudinal profile with a straight trend.<br><br>Impact of hydraulic works for the modification of the Kapatchez course to facilitate drainage of a rice growing area upstream having led to strong environment disturbances.<br><br>Vast rice growing lowlands in the inner coastline, some of them having been drained.<br><br>Strong potential of surfaces fit for shrimp farming already identified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                 |        |
| DYNAMICS                              | Very unstable coastline bordering a vast set of low-lands under the direct or indirect influence of tides. Strong evolution noted between 1954 and 1989 (accretion and erosion).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |        |
| STAKES                                | A known "textbook case" of the complexity in designing hydraulic developments with a positive or negative global impacts in terms of economic valuation and balance of environments, basis of sustainability. An important potential at the scale of Guinea; but very complex hydrological, pedological and geological contexts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |        |
| RECOMMENDATIONS                       | Design to be reexamined considering the results of what has been undertaken, by taking into account a sea level rise scenario.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                 |        |
| MONITORING                            | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY                     | Medium |
| EVOLUTION OVER THE 2010 - 2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 |        |
| EVOLUTION OF STAKES                   | Bauxite processing plant<br>Project for the construction of a port (linked to the intense industrial activity).<br>Building of houses (source MOLOA Guinea national office 2015).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                 |        |
| HAZARDS                               | Strong localized erosion threatening rice growing developments.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 |        |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY                     | High   |
| EVOLUTION OVER THE 2010 - 2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 |        |
| EVOLUTION OF STAKES                   | Increase of port activities and multiplication of houses.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                 |        |
| CURRENT PROJECTS                      | "Regional project for reduced impacts of coastal infrastructure on ecosystems in West Africa" (MAVA Foundation) to WA5-Regulating coastal infrastructure development. This project includes namely: <ul style="list-style-type: none"><li>the update and promotion of zoning tools (PDAL, SDAL) which integrate critical actions for the protection of ecologically and biologically significant areas (EBSA), sensitive and vulnerable to the settlement of coastal infrastructure,</li><li>the use of environmental monitoring and evaluation tools (SESA, EIA) based on proven scientific knowledge and reliable data.</li><li>adoption of coastal ecosystems protection measures,</li><li>capacity building of technical services in charge of environmental monitoring and control, frameworks and civil society in designated countries.</li></ul> planned intervention for the development and strengthening of the marine protected area of Rio Kapatchez under the natural resources, mining and environment management project. |                                 |        |
| OUTSTANDING NATURAL AREAS             | Kapatchez Ramsar Site <ul style="list-style-type: none"><li>ZHII / site Ramsar : ZHII ID : 1GN003 – 573 / WDPA ID : 67985</li><li>Affected sectors: GN1-b et GN1-c</li><li>Designation on November 18, 1992 (20 000 ha).</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                 |        |
| HAZARDS                               | Coastal erosion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 |        |
| RECOMMENDATIONS                       | Strengthening of the protection status of Rio Kapatchez Ramsar Site, of planning in zoning management and management capacities of the Office de Gestion des Parcs et Réserves (OGPR).<br>Monitoring of mangrove natural regeneration process / vegetation on abandoned rice fields.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                 |        |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY                     | High   |



PLACES CONSIDERED FOR THE CONSTRUCTION OF DEEP WATER PORTS  
FOR THE NORTH-WEST BAUXITE CORRIDOR

February 2016



1. Port of Komponi ; 2. Port of Taigbe ; 3. Port of Gonzalez island ; 4. Port of Cap Verga



| GN1-d                                 | 55 - CAP VERGA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BASELINE - 2010                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
| DIAGNOSTIC                            | Set of hard rocks over a length of nearly 10 kilometers, moving to the sea over nearly 7 kilometers with regard to the general line of the shoreline.<br>4b type complex coastline <sup>4</sup> with creeks and wetlands (not mapped at 500 000th).<br>Except for Loos islands, only point with resort tourism potential of the Guinea coastline.<br>Hinterland close to a hilly relief, diversity of sites and sandy beaches. Today connected to Conakry by a tarred road (nearly 150 kilometers of the capital city).<br>Some infrastructure: small hotels, residential areas, but not numerous. Locally numerous tracks.                                                                                                                                                                                                                                                                                                               |                       |
| DYNAMICS                              | This cap plays a key role in the coastal currentology.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |
| STAKES                                | Thirty kilometers of the coastline still saved by the tourist development, with the possibility of a future development master plan anticipating the probable tourist and resort residential future, and supervising the development of infrastructure and equipment.<br><br>Restoration of the Guinean forest (degraded by slash and burn as well as land clearing) around future tourist sites.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
| RECOMMENDATIONS                       | Anticipation of tourist development.<br>Protection of the landscape attractiveness of the site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
| MONITORING                            | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY    Medium |
| EVOLUTION OVER THE 2010 - 2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
| EVOLUTION OF STAKES                   | Project for the construction of a mineral port (Chinese company CPI and South-African company ALUFER Mining <sup>5</sup> ), project for the construction of a aluminum refinery and a city for the houses of the mining workers at Cap Verga.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |
| HAZARDS                               | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |
| MONITORING                            | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY    Medium |
| EVOLUTION OVER THE 2016 - 2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
| EVOLUTION OF STAKES                   | The company Bel-Air mining (ALUFER Mining) exploits and exports bauxite ores from Cap Verga with its barge terminal having a capacity of 5Mt.<br><br>To other mining projects (SPIC and TBEA) being studied consider exporting their minerals via Cap Verga. Cap Verga is one of the sites identified as having a potential to develop a mining deep water port which could increase its capacity to 30Mt (dredging of a channel at -14m).<br>With the modernization and improvement of its access, the small-scale pier of Koukoudé becomes one of the main piers of the country.<br>Building in 2016 of a new mineral port by SMB Winning, with a maximum production which should reach (45 000 t) in 2017.<br>Component Guinea of the West Africa Regional Fisheries Project (PRAO) financed by the World Bank.                                                                                                                        |                       |
| INVESTMENTS                           | The PRAO finances: <ul style="list-style-type: none"><li>the rehabilitation of the small-scale fishing pier of Koukoudé.</li><li>the building of fish processing facilities as well as the implementation of an income-generating activities program namely aquaculture and firewood / smoking wood planting what must allow reducing the pressure on mangroves and increase the economic resilience of fishermen communities.</li></ul> The Bel-Air project has been subject to an Environmental and Social Impact Assessment (ESIA) and of an Environmental and Social Management Plan (ESMP) followed-up by the Guinean Environmental Audit and Compliance Board (BGACE).<br>An environmental audit on existing coastal infrastructure having a significant impact on the Rio Kapatchez delta was carried out in 2019-2020 under the West Africa regional project for reduced impacts of coastal infrastructure on ecosystems (PRISE). |                       |
| OUTSTANDING NATURAL AREAS             | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |
| HAZARDS                               | Erosion<br>Sea-level rise                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |

<sup>4</sup> See « Typologie des façades » in UEMOA, 2010. Regional monitoring study of the shoreline and elaboration of the West Africa Coastal Areas Master Plan. Mapping notice. 48p.

<sup>5</sup> <https://www.alufermining.com/bel-air/>



| GN1-d           | 55 - CAP VERGA                                                                                                                                                                                                                                                             |                    |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| RECOMMENDATIONS | Monitor the evolution of facilities of the company Bel-Air and potential development of a deep-water port.<br>Build the environmental and social monitoring capacity of BGACE.<br>Ensure a monitoring of interactions between mining activities and small-scale fisheries. |                    |
| MONITORING      | Regular and light                                                                                                                                                                                                                                                          | CRITICALITY Medium |



## GN2

## CENTRAL ZONE MANGROVES

| GN2-a                                 | 56 – BOFFA MANGROVE ISLANDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BASELINE – 2010                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |
| DIAGNOSTIC                            | Insular units are distinguishable in a set of great complexity of the mangrove hydraulic network, so few sites favorable to rice growing or aquaculture.<br>Poor development level and then low human occupation density.<br>Coastline strongly subject to the conjunction of the first flush of vast estuaries and redistribution coastal sedimentary drift on narrow type 2a cordons <sup>6</sup> (lining the mangroves opposite to the ocean).                                                                                                                                                                                                                                                                                                                                                                    |                       |
| DYNAMICS                              | Very unstable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |
| STAKES                                | Maintenance of mangrove settlements with poor prospects of rice growing conquest or aquaculture considering the topographic complexity.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |
| RECOMMENDATIONS                       | No recommendations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| MONITORING                            | Without recommendations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY Low       |
| EVOLUTION OVER THE 2010 – 2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |
| EVOLUTION OF STAKES                   | Appearance of a spit in the mouth of the Bongolon River (10°11'56.79»N / 14°18'59.16»O).<br>Salt production.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
| COAST PROTECTION                      | Building of protection dikes of rice growing developments.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
| HAZARDS                               | Erosion reported in rice growing perimeters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
| MONITORING                            | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY Medium    |
| EVOLUTION OVER THE 2016 – 2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |
| EVOLUTION OF STAKES                   | The fluvial mineral port of Kokaya was developed in 2018 on the left shore of Fatala opposite the city of Boffa on the Fatala River by the company Chalco (Guinean subsidiary of Chinalco) for the export of Bauxite with a forecast of 12 Mt/year.<br>Four other projects (Eurasian, Axis, Kimbo, and Guinean Brain Touch – GBT project a transport of mineral via this port.<br>Building of a landing pier for the bauxite mine of the company ALUFER Mining <sup>7</sup> .<br>As part of the exploitation of blocks 1 and 2 of Simandou iron minerals, by the Consortium SMB-Winning (25 years mining convention) : <ul style="list-style-type: none"><li>• Project of a 650 km long railway and port platform in Matakang,</li><li>• Building of steelworks, i.e., a total investment of \$15 billion.</li></ul> |                       |
| CURRENT PROJECTS                      | Chalco, Guinean subsidiary of Chinalco, started exploiting Bauxite, in the end of 2018, in Boffa; and built a fluvial port on Fatala. The expected production is 12 million tons of Bauxite/year.<br>Intervention planned for the development and reinforcement of the Rio Pongo marine protected area under the natural, mining resources and environment management project.                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| OUTSTANDING NATURAL RESOURCES         | Rio Pongo Ramsar Site <ul style="list-style-type: none"><li>• ZHII ID : 1GN004 – 574 / WDPA ID : 67986</li><li>• Affected sector: GN2-a</li><li>• Designation on November 18, 1992 (30 000 ha)</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |
| HAZARDS                               | Erosion.<br>Sea-level rise.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| RECOMMENDATIONS                       | Strengthening of the protection status of Rio Pongo Ramsar site.<br>Planning of the management, zoning and involvement of mining companies in the management.<br>Monitoring the development of bauxite transport activities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY Very high |

<sup>6</sup> See « Typologie des façades » in UEMOA, 2010. Regional monitoring study of the shoreline and elaboration of a West Africa Coastal Areas Master Plan. Mapping sheet. 48p.

<sup>7</sup> <https://www.alufermining.com/bel-air/>



PORT OF KOKAYA

2017



2019





| GN2-b                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 57 – Koba Peninsula                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                    |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Baseline – 2010                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                    |
| DIAGNOSTIC                            | It has been subject to three hydraulic development operations: <ul style="list-style-type: none"><li>• A hillside reservoir for the complementary irrigation of a sugar cane perimeter on terraces.</li><li>• An impoundment and hydraulic development of lowlands for rice growing.</li><li>• The impoundment of protection from high tides is located in a section of its central part in contact with the surge and is then directly exposed.</li></ul> The rest of the impoundment slightly in retreat is for the moment protected by a sandy cordon with a variable width.<br>The wavy straight-lined coastline seems to present a natural point in erosion in the central part, and rather in accretion in the south spit in the mouth of the Konkouré estuary. This erosion point corresponds to the outlet of the main channel.<br>A pilot aquaculture perimeter has been settled on the former rice fields of mangrove lands, with prospects of possible extension in the Koba Peninsula. If the first years of the production turned out to be promising, the management issues encountered have led to the stagnation of the project, but the potential is considered, both for Guinea and West Africa, as one of the most interesting ones. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                    |
|                                       | DYNAMICS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Rapid erosion of the sandy cordon, essentially in relation with the drainage outlet of the developed plain.<br><i>"The erosion of Koba barrier beach is centered in sectors where drainage valves of polder waters exist. Its mechanism is structured as follows: at the time of the swamp-draining, there is on the beach drifting sand accumulated in front of the valve by littoral drift. Indeed, this first flush digs a channel towards the low beach, or even towards the front coast by forming a delta. Those sediments are dispersed by the drift current. This sand distribution brings about an acceleration of erosion in sectors located directly in the south of structures. In the flow and in open sea, the drift fills the channel with fresh sediments, which are again, expelled out of sea downstream and at low tide. This phenomenon is reinforced in period of spring tides and its repetition brings about a progressive slimming of the beach by "hemorrhage" of sand directed towards the open sea.</i><br><i>There is then a topographic lowering of the beach in the valve sector. So, this lowering allows the front surge to move toward the coast, to speed up the burial of the top beach and retreat of the cordon crest.</i><br><i>Since 1986, the loss is such that the shore jets in open sea of spring tides have already flooded the village of GAMBLAN (Koba) located on top of the cordon.</i><br><i>The MANKOURA valve being closed for several years, it then got reconstituted on the foreshore, a very beautiful convex beach of more than 60 meters of width and 3 meters of thickness backfilling one part of the valve. The 1988 rainy season was marked by heavy rainfalls, it became necessary to encase this valve at least during 8 days. After, it had lost more than 1/3 of its thickness and 15 days after, not only the top of the beach had retreated by 30 meters on the cordon but, erosion occurred in the underlying mud bottom, unearthing palm trees and shrubs in each side of the valve.</i><br><i>The natural protection of this cordon is ensured when the transit, critical element of the dynamics balance is not disturbed. However, polder drainage and beach protection against erosion must be conciliated.<sup>8</sup>».</i> |                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                    |
|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | STAKES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | The retreat of the dike-road on the most exposed section may be necessary with the clearing of a vegetalized strip at best. Remains the issue of the impact of the release of the central drain. Between the dike and the coastline, populations have settled up to the limit and are strongly exposed. The release of the draining structure from the central drain destabilizes the barrier beach. |                                                                                                                                    |
|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | RECOMMENDATIONS                                                                                                                                                                                                                                                                                                                                                                                      | Global reflection on the sustainability of mangrove rice growing systems and relevant developments in a context of sea level rise. |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY High                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                    |
| EVOLUTION OVER THE 2010 – 2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                    |
| EVOLUTION OF STAKES                   | Intervention of the RAZC project <sup>9</sup> for the impoundment of rice growing developments.<br>Project for the construction of an oil refinery on the shores of the Fatal River.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                    |
| COASTAL PROTECTION                    | Mangrove restoration operation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                    |

<sup>8</sup> Extrait de UEMOA, 2010. Extract from UEMOA, 2010. É

<sup>9</sup> Strengthening the Resilience and Adaptation to the adverse effects of Climate Change of vulnerable Coastal Areas of Guinea.





| GN2-b                                 |                                                                                                                                                                                                                                                      | 57 - Koba Peninsula      |  |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--|
| HAZARDS                               | Strong erosion affecting rice growing developments.                                                                                                                                                                                                  |                          |  |
|                                       | Destruction of tourist villages and sites (Kitikata in August 2012 for example) following a storm surge.<br>Episodes of marine submersion.                                                                                                           |                          |  |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                | CRITICALITY    Very High |  |
| EVOLUTION OVER THE 2016 - 2020 PERIOD |                                                                                                                                                                                                                                                      |                          |  |
| EVOLUTION OF STAKES                   | Reduction of surface areas of farming lands.                                                                                                                                                                                                         |                          |  |
| CURRENT PROJECTS                      | No projects<br>No investments                                                                                                                                                                                                                        |                          |  |
| OUTSTANDING NATURAL AREAS             | <b>Konkouré Ramsar Site</b> <ul style="list-style-type: none"><li>• ZHII / site Ramsar : ZHII ID : 1GN005 – 575 / WDPA ID : 67987</li><li>• Affected sectors: GN2-b / GN2-c / GN3-a</li><li>• Designation on November 18, 1992 (90 000 ha)</li></ul> |                          |  |
| HAZARDS                               | Increased marine erosion and flooding due to the conjunction of floods and marine surges.                                                                                                                                                            |                          |  |
| RECOMMENDATIONS                       | Analysis of natural regeneration processes of seafront mangrove cordons.<br>Feasibility analysis of the strengthening of those mangrove cordons' protection.                                                                                         |                          |  |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                | CRITICALITY    Very High |  |





| GN2-c                                 | 58 - KONKOURE DELTA ESTUARY                                                                                                                                                                                                                                                                                                                                                                                                      |                    |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| BASELINE - 2010                       |                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |
| DIAGNOSTIC                            | Insular units are distinguishable in a set of great complexity of the mangrove hydraulic network, so few sites favorable to rice growing or aquaculture.<br>Low development level.<br>Low human density.<br>Coastline strongly subject to the conjunction of the first flush of vast estuaries and redistribution coastal sedimentary drift on narrow type 2a cordons <sup>10</sup> (lining the mangroves opposite to the ocean) |                    |
| DYNAMICS                              | Very unstable                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |
| STAKES                                | Maintenance of mangrove settlements with poor prospects of rice growing or aquaculture conquest considering the topographic complexity.                                                                                                                                                                                                                                                                                          |                    |
| RECOMMENDATIONS                       | No action advocated.                                                                                                                                                                                                                                                                                                                                                                                                             |                    |
| MONITORING                            | Without recommendations                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY Low    |
| EVOLUTION OVER THE 2010 - 2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |
| EVOLUTION OF STAKES                   | Progressive building of houses (Source MOLOA Guinea national office), and strong deforestation of mangrove spaces.                                                                                                                                                                                                                                                                                                               |                    |
| HAZARDS                               | Effects to be monitored of the building of the Kaléta hydroelectric dam on the Konkouré in terms of sedimentary inputs.                                                                                                                                                                                                                                                                                                          |                    |
| MONITORING                            | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY Medium |
| EVOLUTION OVER THE 2016 - 2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |
| EVOLUTION OF STAKES                   | Building, on the Konkouré river, of the hydroelectric dams of Souapiti and d'Amaria (January 19, 2018). 300 MW are expected for Amaria, and 450 MW for Souapiti.                                                                                                                                                                                                                                                                 |                    |
| CURRENT PROJECTS                      | Interventions planned under the natural, mining resources and environment management.<br>Intervention planned for the development and reinforcement of the Konkouré marine protected area under the natural, mining resources and environment management project.                                                                                                                                                                |                    |
| OUTSTANDING NATURAL AREAS             | <b>Konkouré Ramsar Site</b> <ul style="list-style-type: none"><li>• ZHII / site Ramsar : ZHII ID : 1GN005 - 575 / WDPA ID : 67987</li><li>• Affected sectors: GN2-b / GN2-c / GN3-a</li><li>• Designation on November 18, 1992 (90 000 ha)</li></ul>                                                                                                                                                                             |                    |
| HAZARDS                               | Localized erosion.<br>Sedimentary inputs per place.                                                                                                                                                                                                                                                                                                                                                                              |                    |
| RECOMMENDATIONS                       | Strengthening of the protection status of Konkouré Ramsar site, planning of management and zoning.<br>Monitoring of the impacts of dam building on the estuary dynamics.                                                                                                                                                                                                                                                         |                    |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY High   |

<sup>10</sup> See « Typologie des façades » in UEMOA, 2010. Regional monitoring study of the shoreline and elaboration of a West Africa Coastal Areas Master Plan. Mapping sheet. 48p.

**GN3****CONAKRY URBAN AND PERI-URBAN ZONE**

| GN3-a                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 59 – CONAKRY – DUBREKA MANGROVES AND RICE FIELDS |        |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--------|
| BASELINE- 2010                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                  |        |
| DIAGNOSTIC                            | Partially peri-urban sector<br>Significant surfaces developed in rice growing basins on mangrove lands, but their current cultivation is not certain.                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                  |        |
| DYNAMICS                              | No observation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                  |        |
| STAKES                                | Same stakes as for the following sector (GN3-b) with problems linked to pollution, waste and urban effluent management.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                  |        |
| RECOMMENDATIONS                       | Considering the urban transport problems and economic importance of downtown Conakry, the urbanization of lowlands, but close to the city will remain a strong trend which may only be managed through structuring actions (transport plan, urban renovations).                                                                                                                                                                                                                                                                                                                  |                                                  |        |
| MONITORING                            | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY                                      | Medium |
| EVOLUTION OVER THE 2010 –2016 PERIOD  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                  |        |
| EVOLUTION OF STAKES                   | Intensive house building and progress of housing along main roads.<br>Moderate extension of the city of Dubréka.<br>Important project on the seafront plan of Sonfonia (625 ha) in order to build a new modern city in the suburbs of the capital city which would be twice more important than the current Kaloum. This project would deliver by end of 2017 a significant number of social lodgings and administrative buildings as well as high standing hotels.                                                                                                              |                                                  |        |
| COAST PROTECTION                      | Development works for the protection of the site against storm surge and tides as well as earthworks in some sections of the site are underway.                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                  |        |
| HAZARDS                               | Densification and development of housing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                  |        |
| MONITORING                            | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY                                      | High   |
| EVOLUTION OVER THE 2016 – 2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                  |        |
| EVOLUTION OF STAKES                   | Accentuation of intensive house building and progress of housing along main roads. Strong extension of the city of Dubréka, which mingles in some places with the city of Conakry. An extension project of the city of Conakry (Grand Conakry) towards the cities of Dubréka and Coyah is planned by the government.<br>Building of a small-scale fishing landing pier in Kopéring linked to Dubréka.<br>The backfilling, earthworks and access roads of the "New City" project, in Sonfonia, have started, but there is little progress with regard to the initially set dates. |                                                  |        |
| CURRENT PROJECTS                      | The backfilling, earthworks and access roads of the "New City" project, in Sonfonia, have started, but there is little progress with regard to the initially set dates.<br>Elaboration of the Grand Conakry vision 2040 financed by the European Union (2017).                                                                                                                                                                                                                                                                                                                   |                                                  |        |
| OUTSTANDING NATURAL AREAS             | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                  |        |
| HAZARDS                               | Localized coastal erosion.<br>Marine submersion due to high tides, anarchic occupation of natural urban drains and mangrove rice growing spaces.                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                  |        |
| RECOMMENDATIONS                       | Elaboration of the Conakry development and urban planning master plan.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                  |        |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY                                      | High   |



SONFONIA

2016



2020





| GN3-b                                 | 60 – COYAH MANGROVES AND PERI-URBAN EDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BASELINE- 2010                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |
| DIAGNOSTIC                            | Urban conquest from the airport until Coyah in lowlands, including mangroves, with more or less summary backfilling.<br>Appearance of a new inner shore near tides, current urban growth particularly sensitive around Coyah, with occupation of formerly rice growing low terraces on hydromorphous sands.<br>Some rice fields still remain, but many basins formerly developed on mangrove soils seem abandoned.<br>Dense and saturated urban zone of Conakry with axis extension underway along the Kindia road towards the hinterland.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
| DYNAMICS                              | No observation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |
| STAKES                                | Maintenance of mangrove vegetation which keeps being illegally exploited. Control of lowland urbanization, though not exposed to storm swell, future risks linked to sea level rise. Rocky shore of the urban peninsula rather stable, except locally for some houses near the shore and exposed to landslide. Lagooning station of waste water exposed to waves.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| RECOMMENDATIONS                       | The treatment of the Conakry coastline raises more global issues linked to the organization of urban services, equipment and road works. The restoration and development of a landscape seafront valuing built and historical heritages are in any case to be considered in the future.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY High      |
| EVOLUTION OVER THE 2010 – 2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |
| EVOLUTION OF STAKES                   | Rapid development of the urban extension in the North-East of Conakry and on mangrove zones located in the East of the peninsula.<br>Building, on 20 ha, of a luxury complex « Plaza Diamond » by a Chinese company (Guinea Mar Grandioso, local subsidiary of China Dreal Group) in the district of Kipé in Conakry (inauguration on February 4, 2015) <sup>11</sup> .<br>Conakry Coyah coastal highway which should in the end join the project of a new airport in Maférényah.<br>Extension of the Autonomous Port of Conakry.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| PORT INFRASTRUCTURE                   | The port of Conakry <sup>12</sup> is located in the Conakry Peninsula, it is made up of a set of jetties (digue de la fermeture, digue nord et digue de la prudente) protecting a series of container docks, in long distance, mining (bauxite export linked to the Kindia mine and Aluminum linked to Friguia-Kimbo) and oil terminal. The port is also used for the landing of their catches. This is the only fishing port currently accessible for this type of vessel in Guinea.<br>The management and development of the container terminal of Conakry port was awarded to Bolloré Africa Logistics in 2011 for a 25-year term under the public-private partnership with the port Authority following the cancellation of the concession of GETMA of NECOTRANS Group.<br>Modernization works of the port are engaged (treble the length of the terminal and storage surfaces, development of a dry port with railway connection) as well as passage to a 13 m draught.<br>The extension and modernization of the container port was launched in 2011 and are implemented by the company China Harbour Engineering Company Ltd.<br>Earthworks container park extension in the South of the port phase 1 in 2011-2012.<br>Extension works phase 2: earthworks enlargement of the container park and enlargement of the landing pier 2013-2015. |                       |
| COASTAL PROTECTION                    | Some private works, namely in the south-east of the city.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| HAZARDS                               | Localized erosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY Very High |
| EVOLUTION OVER THE 2016 – 2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |
| EVOLUTION OF STAKES                   | Strong coastal erosion in Tayaki (village of fishermen in the north of Conakry) and risk of disappearance of the village.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |

<sup>11</sup> <https://www.jeuneafrique.com/mag/311388/economie/guinee-plaza-diamant-quartiers-chics-bilan/>

<sup>12</sup> <http://www.portconakry.org/>



|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| CURRENT PROJECTS          | <p>Development and modernization project of the Autonomous Port of Conakry.</p> <p>Extension of the East Zone of the port.</p> <p>Construction of a 700 trucks parking lot.</p> <p>Building of a 4 km green artery (Rotunda), intended for trucks, connecting the container terminal with the highway, at the entry of the city of Kaloum. The project aims to improve the urban road traffic. The project requires the backfilling of nearly 900 m<sup>2</sup>. It is implemented by CHEC (China Harbour Engineering Company), on behalf of the company Albayrak.</p> <p>Several seafront earthworks in the north and south of the city for real estate developments or landing piers. Earthworks and housing development in mangroves in the east of the city.</p> <p>Elaboration of the Grand Conakry vision 2040 study financed by the European Union (2017).</p> <p>Elaboration of the Development Master Plan of Kaloum Et Loos islands (2017)<sup>13</sup>.</p> |                       |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
| HAZARDS                   | Localized erosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
| RECOMMENDATIONS           | Elaboration of Conakry Development and Urban Planning Master Plan.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY Very High |

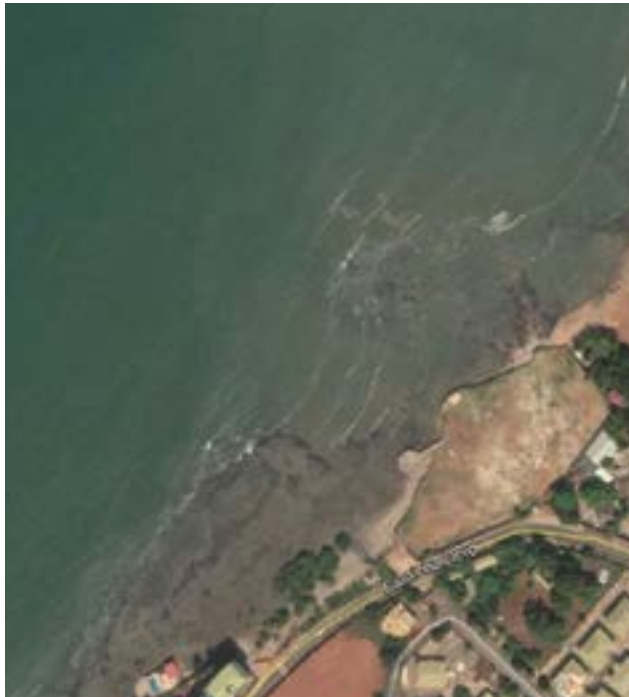
<sup>13</sup> Gouvernement de la République de Guinée, 2017. Schéma Directeur d'Aménagement de Kaloum Et des îles de Loos. Rapport de synthèse. Disponible grâce au lien suivant <https://www.invest.gov.gn/communication/grand/4.pdf>





NORTH CORNICE DIKE

2016



2020



EARTHWORKS AND HOUSING DEVELOPMENT ON MANGROVES EAST OF CONAKRY

2016



2020







BACKFILLS EXTENSION PORT RIVIERA PORT

2016



2020



MADINA

2016



2020





| GN3-c                                 | 61 - LOOS ISLANDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                       |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| BASELINE- 2010                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                       |
| DIAGNOSTIC                            | Armoured rocky coastline with some sandy creeks.<br>Some historical and heritage sites.<br>Resort tourism of Conakry residents in the absence of other beaches in less than 150 kilometers of the city.                                                                                                                                                                                                                                                                                                                                                              |                                                                                       |
| DYNAMICS                              | No observation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                       |
| STAKES                                | Maintenance of the landscape and recreational functions of the site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                       |
| RECOMMENDATIONS                       | Control of the development of tourist infrastructure.<br>Limitation of intensive house development in watersheds and protection of natural vegetation.                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                       |
| MONITORING                            | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY Low                                                                       |
| EVOLUTION OVER THE 2010 - 2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                       |
| EVOLUTION OF STAKES                   | Strong development of tourist infrastructure (twenty hotels in 2 years) in poorly monitored and controlled conditions.<br>Oil drilling in open sea by the company Tullow.                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                       |
| COASTAL PROTECTION                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                       |
| HAZARDS                               | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                       |
| MONITORING                            | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY Medium                                                                    |
| EVOLUTION OVER THE 2016 - 2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                       |
| EVOLUTION OF STAKES                   | Low development of tourist infrastructure.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                       |
| CURRENT PROJECTS                      | Interventions planned under the « natural, mining resources and environment management project » <sup>14</sup> prepared by the government of the Republic of Guinea.<br>Elaboration of the Development Master Plan of Kaloum Et Loos islands in 2017 <sup>15</sup> .<br>Intervention planned for the development and reinforcement of the OUTSTANDING NATURAL AREAS of the Loos islands under the natural, mining resources and environment management project.                                                                                                      |                                                                                       |
| OUTSTANDING NATURAL AREAS             | <p><b>Fauna sanctuary of Loos islands (îlot Cabri, de l'île Blanche and île Corail)</b></p> <ul style="list-style-type: none"><li>SF of Loos: WDPA ID: non-existent.</li><li>Affected sector: GN3-c.</li><li>Law n° 92/035/CTRN of 1992 on the classification of îlot Cabri, île Blanche and île Corail in fauna sanctuary.</li></ul> <p><b>Île Blanche Ramsar Site</b></p> <ul style="list-style-type: none"><li>ZHII / Ramsar site: ZHII ID: 1GN006 – 618 / WDPA ID: 67988.</li><li>Affected sector: GN3-c.</li><li>Designation on June 23, 1993 (10ha).</li></ul> |  |
| HAZARDS                               | Localized erosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                       |
| RECOMMENDATIONS                       | Planning of the management and zoning of Loos islands integrating tourist development and conservation.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                       |
| MONITORING                            | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY Medium                                                                    |

<sup>14</sup> <http://documents1.worldbank.org/curated/en/835001560986670046/pdf/Stakeholder-Engagement-Plan-SEP-Guinea-Natural-Resources-and-Environmental-Management-Project-P168613.pdf>

<sup>15</sup> Gouvernement de la République de Guinée, 2017. Schéma Directeur d'Aménagement de Kaloum Et des îles de Loos. Rapport de synthèse. Disponible grâce au lien suivant <https://www.invest.gov.gn/communication/grand/4.pdf>



## GN4 SOUTH GUINEA RICE GROWING ISLANDS

Acute drinking water supply problem for residing farmers depending on an assumption of a sea-level rise and significant progress of salt wedge.

| GN4-a                                 | 62 - KAKOSSA                                                                                                                                                                                                                                                                                                                                                                          |                          |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| BASELINE- 2010                        |                                                                                                                                                                                                                                                                                                                                                                                       |                          |
| DIAGNOSTIC                            | System similar to the one of Kaback (GN4-b), without development, predictable threats.<br>Rice growing surface area in mangrove soils more important in percentage, with increased risk in case of sea level rise.                                                                                                                                                                    |                          |
| DYNAMICS                              | Dynamic sector in permanent evolution.                                                                                                                                                                                                                                                                                                                                                |                          |
| STAKES                                | Production zones endangered (risk of submersion and degradation of developments) during extreme storm events and/or sea-level rise.                                                                                                                                                                                                                                                   |                          |
| RECOMMENDATIONS                       | Global reflection on the sustainability of mangrove rice growing systems and relevant developments faced with the sea level rise context.<br>Importance of the conservation of the largest possible mangrove coastal fringe.                                                                                                                                                          |                          |
| MONITORING                            | Regular and light                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY    Medium    |
| EVOLUTION OVER THE 2010 – 2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                       |                          |
| EVOLUTION OF STAKES                   | Project of construction of an international airport along with a highway towards Conakry which should cross key mangrove spaces.<br>Project underway for the construction of a mineral port aNd related infrastructure.                                                                                                                                                               |                          |
| COASTAL PROTECTION                    | Major earthworks have been completed on the left shore of the Morebaya River for the establishment of the Marine Offloading Facility –MOC) of the operating project of the iron deposit of Simandou which includes the building of a mineral port (on the MOC site), a railway of nearly 700 km and the development of Siman-dou mine by the company Simfer S.A. (Rio Tinto and IFC). |                          |
| HAZARDS                               | Strong localized erosion affecting rice growing developments. Rapid shore retreat in mangrove locally eva-luated at 30-50m / year.                                                                                                                                                                                                                                                    |                          |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY    Very High |
| EVOLUTION OVER THE 2016 – 2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                       |                          |
| EVOLUTION OF STAKES                   | Non-use of the fluvial port developed on Morebaya left shore.<br>Loss of farming lands and disappearance of some beaches.<br>Reduction of seafront mangrove areas.                                                                                                                                                                                                                    |                          |
| CURRENT PROJECTS                      | No projects.<br>No investments.                                                                                                                                                                                                                                                                                                                                                       |                          |
| OUTSTANDING NATURAL AREAS             | No                                                                                                                                                                                                                                                                                                                                                                                    |                          |
| HAZARDS                               | Strong coastal erosion.<br>Marine submersion due to floods and storm surges.                                                                                                                                                                                                                                                                                                          |                          |
| RECOMMENDATIONS                       | Feasibility analysis of the regeneration of the seafront mangrove strip for the protection of rice fields.<br>Monitoring of the commissioning of the fluvial port of the Morebaya left shore.                                                                                                                                                                                         |                          |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY    Very High |



LOSS OF FARMING LANDS – KAKOSSA

2016



2020



LOSS OF SEAFRONT MANGROVES

2016



2020







| GN4-b               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 63 – KABACK LOWLANDS                                                                                                                                                                                                                              |                          |  |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--|
| BASELINE- 2010      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                   |                          |  |
| DIAGNOSTIC          | <p>Densely rice producing island, having been subject to developments with drain and a dike more or less set on a type 2a sandy cordon<sup>16</sup>.</p> <p>Narrow mangrove strip before the dike.</p> <p>Inner sandy cordons with axial village. At the far South, peninsula connected by a very unstable sandy bank. A 1951 rural engineering study allowed developing 1,500 hectares, located between fossil cordons and the rear seafront mangrove. This development generated the formation of sulphated and acid lands, leading to poor yields of rice-growing areas and the sterilization of a significant part of rice farming lands. Besides, the maintenance of those hydraulic works irrelevant to the strong hydro-sedimentary mobility of the sector of Kaback, required a huge human and financial investment from local communities, the State and development partners.</p> <p>The major Kaback coastline redevelopment was engaged between 1975 and 1978. The works were entrusted to a Chinese company, which rehabilitated the existing 1500 ha and then an extension of 800 ha exploitable perimeter by building a 10 km seafront dike.</p> <p>Unfortunately, two years after the rehabilitation works, a sudden dredging led to the disappearance of the line cordon, by retreating at more than 30 meters towards the end of the fourth year of rehabilitation. The conditions which led to the destabilization of these developments varied according to the importance of the anthropic actions carried.</p> <p>In Kaback, the extension of the polder was not followed pas a significant runoff, usually directed towards the hinterland. The conjunction of a spring tide and an increased marine agitation typical to the end of the rainy season was enough in September 1982, for the sea to establish a first breach in the medium part of the dike, followed later by a second breach towards the South.</p> <p>Indeed, the extension zone is located in the west of the island. It forms a 1 km long strip and is situated between the coastline and a sandy dune. To protect this area against marine submersions, a 1 to 2 meter high dike was built by using materials from the sandy dune, located at 1 km from the coast. This former dike is now largely destroyed by the advance of the sea.. Cette ancienne digue est actuellement détruite en grande partie par l'avancée de la mer.</p> <p><i>The break of the Kaback dike revealed in Guinea the natural risks engendered by marine erosion. Indeed, the Kaback island shows well the impacts of coastal zone erosion in the Guinean coastal area. Despite a history characterized developments for fifty years, a run of failures in 1996 led to the building of a new dike technically comparable to the one destroyed in the late 1970s. The building works of this dike followed the same design, slightly settling in retreat of the place of the previous break. Hydraulics was reviewed and adapted to the drainage conditions and hydro-sedimentary situation noted at the time of the design of the work. So, we are still in the same situation as before. An imposing earth dike, fixed and hydraulic works irrelevant to the hydro-sedimentary mobility and requiring a time-consuming and very high maintenance costs for the State and for farmers. « Source : étude de cas plaine de Kabak<sup>17</sup> »</i></p> |                                                                                                                                                                                                                                                   |                          |  |
|                     | DYNAMICS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p>Strong trend to regressive evolution under the action of erosion.</p> <p>Fragile sector in largely artificialized mangroves.</p>                                                                                                               |                          |  |
|                     | STAKES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>Production zones endangered (risk of submersion and degradation of developments) during extreme storm events and /or sea-level rise.</p> <p>Very dynamic evolving sector, very fragile and directly sensitive to a sea level rise context.</p> |                          |  |
|                     | RECOMMENDATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p>Global reflection on the sustainability of mangrove rice producing systems and relevant developments faced with a sea level rise context.</p> <p>Importance of the conservation of the as large as possible mangrove coastal fringe.</p>       |                          |  |
|                     | MONITORING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Regular and intensive                                                                                                                                                                                                                             | CRITICALITY    Very High |  |
|                     | EVOLUTION OVER THE 2010 – 2016 PERIOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                   |                          |  |
| EVOLUTION OF STAKES | <p>Agricultural land abandonment linked to the destruction of developments.</p> <p>The mining company Bellzone studies deep water mineral port project for the iron of « Matakan ».</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                   |                          |  |

<sup>16</sup> See « Typologie des façades » in UEMOA, 2010. Étude régionale de suivi du trait de côte et élaboration d'un Schéma Directeur du Littoral de l'Afrique de l'Ouest. Notice de la cartographie. 48p.

<sup>17</sup> Extract from UEMOA, 2010. Étude de suivi du trait de côte et Schéma Directeur Littoral de l'Afrique de l'Ouest. Étude de cas en Guinée. Etudes de cas de l'érosion côtière à Koba (Boffa) et Kaback. 42p.



|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| COASTAL PROTECTION                           | <p>The strengthening and upgrade project of the dike protection the seafront lowlands (4 500 ha) was supposed to start in February 2014.</p> <p>The project « Strengthening of resilience and adaptation to the adverse impacts of climate change in vulnerable coastal areas of Guinea », financed by the GEF and UNDP, has been trying since 2011 to support the riparian population to recover spaces recently flooded with mixed results.</p> <p>The project plans:</p> <ul style="list-style-type: none"> <li>the development of knowledge and good practices (with focus on ecosystem and natural resource management),</li> <li>the promotion of mangrove adaptation technologies,</li> <li>the protection of crops in coastal regions,</li> <li>and the improvement of information, education and communication on climate change and the environmental education for coastal populations.</li> </ul> |                       |
| HAZARDS                                      | Very strong erosion and marine submersion due to floods and storm surges leading to the destruction of rice producing perimeters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |
| MONITORING                                   | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY Very High |
| <b>EVOLUTION OVER THE 2016 – 2020 PERIOD</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |
| EVOLUTION OF STAKES                          | <p>The zones of former rice fields located on the seafront having undergone major damages in 2011 are subject to active recolonization of mangrove ecosystems.</p> <p>Following the signature of agreements for the development of blocks 1 and 2 of Simandou iron minerals with the consortium SMB-Winning as well as recent progress in discussions for the development of blocks 3 &amp; 4 with Rio Tinto give fresh impetus to the possibility of building a deep-water port on the Makatang Peninsula in the south-west of Kaback.</p>                                                                                                                                                                                                                                                                                                                                                                   |                       |
| CURRENT PROJECTS                             | <p>No project</p> <p>No investments</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| OUTSTANDING NATURAL AREAS                    | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |
| HAZARDS                                      | <p>Very strong erosion.</p> <p>Marine submersion due to floods and storm surges.</p> <p>Salt intrusion.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |
| RECOMMENDATIONS                              | <p>Protection of mangrove zones in recolonization on the facade of the Kaback lowlands.</p> <p>Monitor the evolution of the project for the construction of a deep-water mineral port in Makatang in relation with the development of the iron deposit of Simandou.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| MONITORING                                   | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY Very High |

#### DESTRUCTION OF SEAFRONT RICE GROWING PERIMETERS THEN NATURAL MANGROVE REGENERATION





| GN4-c                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 64 – BENTY         |  |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--|
| BASELINE- 2010                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |  |
| DIAGNOSTIC                            | Rather concentrated rice producing zone. Dominant rice growing on hydromorphous sands, but also in basins on mangrove lands. Rice growing strips in contact with high terraces – mangroves.<br><br>Access to Benty is more or less difficult during the rainy season. Some small lowland developments.<br><br>Some palm oil tree plantations.<br><br>Subsistence crops growing on flattened hills.<br><br>Very fragile soils considering the high rainfalls.                                                                                                                                                            |                    |  |
| DYNAMICS                              | Fragile sector in largely artificialized mangrove.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |  |
| STAKES                                | More than two thirds of the rice-growing extension on hydromorphous sand, the rest on mangrove soil. Several potential shrimp farming sites. Fragility of the far « false cap » on type 2a narrow cordons. The mangrove sector fully cleared and cultivated is fragile. But then, the inner coastline has kept a mangrove strip and its North-West exposure protects it somewhat from storm surges.<br><br>Project of a mineral port mentioned, with significant impacts to be analyzed.                                                                                                                                |                    |  |
| RECOMMENDATIONS                       | Global reflection on the sustainability of mangrove rice producing systems and relevant developments faced with a sea level rise context.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |  |
| MONITORING                            | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY Medium |  |
| EVOLUTION OVER THE 2010 – 2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |  |
| EVOLUTION OF STAKES                   | Development of a barge terminal of « Konta » on the Forécariah River for the export of the iron mine of « Forécariah » by the companies <i>Bellzone</i> and <i>China International Fund</i> (9°9'46.7N / 13°16'18.42W). This sector has experienced an unprecedented migratory flow, the transformation of a hamlet of fishermen into a city of more than 8,000 inhabitants has become a reality. This formerly preserved sector, because of its inaccessibility is today occupied. The immediate consequences of this uncontrolled occupation are the destruction of the forest (Source Moloa Guinea national office). |                    |  |
| COASTAL PROTECTION                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |  |
| HAZARDS                               | Flooding.<br><br>Mangrove destruction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |  |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY High   |  |
| EVOLUTION OVER THE 2016 – 2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |  |
| EVOLUTION OF STAKES                   | Temporary suspension of the operation of the port of Konta.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |  |
| CURRENT PROJECTS                      | Project of construction of the oil terminal of Benty by the company Benti Energie.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |  |
| OUTSTANDING NATURAL AREAS             | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |  |
| HAZARDS                               | Coastal erosion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |  |
| RECOMMENDATIONS                       | Monitoring of the project for the construction of the oil terminal of Benty and rehabilitation of the port of Konta.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |  |
| MONITORING                            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY High   |  |





## SUMMARY TABLE

| HABITAT | <br>Desert area                              | <br>Mangrove<br>Wetland | <br>Camp<br>Small village       | <br>Rural                           | <br>Rurban                               | <br>Urban                                    |                                                                                                                                             |                                                                                                               |                                                                                                                                      |                                                                                                                                                       |                                                                                                          |
|---------|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| STAKES  | <br>Fishing<br>Fishing port<br>Fishing areas | <br>Rice-growing        | <br>Palm oil<br>Palm plantation | <br>Trade<br>Commercial port        | <br>Trade+<br>Commercial port<br>Airport | <br>Oil & Gas<br>Exploration<br>Exploitation | <br>Extractive ind.<br>Salt, metal-bearing sand,<br>gold | <br>Tourism                | <br>(Tourism)<br>Unexploited outstanding<br>areas | <br>Biodiversity<br>Outstanding areas<br>(biodiversity, landscape) |                                                                                                          |
| HAZARDS | <br>Soil erosion                             | <br>Coastal erosion     | <br>Marine submersion           | <br>Pluvial and/or fluvial flooding | <br>Intusion of saltwater                | <br>Pollution                                | <br>Anthropization                                       | <br>Sargasso proliferation | <br>Jellyfish proliferation                       | <br>Industrial risk                                                | <br>Nothing to report |

| N°                                           | REF   | NAME                                          | HABITAT | STAKES            | HAZARDS                      | CRITICALITY |           |           | MONITORING            |                       |                       |
|----------------------------------------------|-------|-----------------------------------------------|---------|-------------------|------------------------------|-------------|-----------|-----------|-----------------------|-----------------------|-----------------------|
|                                              |       |                                               |         |                   |                              | 2011        | 2016      | 2020      | 2011                  | 2016                  | 2020                  |
| <b>GN1 CAP VERGA – TRISTAO NORTH ZONE</b>    |       |                                               |         |                   |                              |             |           |           |                       |                       |                       |
| 52                                           | GN1-a | Far North West mangrove islands and Tristao   |         | Trade             | Biodiversity                 | Low         | Medium    | High      | No monitoring         | Watch-keeping         | Regular and intensive |
| 53                                           | GN1-b | Rio Nufez - Kamsar                            |         | Trade             | Biodiversity                 | Medium      | Medium    | Medium    | Regular and light     | Regular and light     | Regular and light     |
| 54                                           | GN1-c | Kapatchez coastal plain                       |         | Trade             | Biodiversity                 | Medium      | High      | High      | Regular and light     | Regular and intensive | Regular and intensive |
| 55                                           | GN1-d | Cap Verga                                     |         | Trade             | Extractive Ind. (Tourism)    | Medium      | Medium    | Medium    | Watch-keeping         | Watch-keeping         | Regular and light     |
| <b>GN2 CENTRAL ZONE MANGROVES</b>            |       |                                               |         |                   |                              |             |           |           |                       |                       |                       |
| 56                                           | GN2-a | Boffa mangrove islands                        |         | Trade             | Extractive Ind. Biodiversity | Low         | Medium    | Very High | No monitoring         | Regular and light     | Regular and intensive |
| 57                                           | GN2-b | Koba peninsula                                |         | Rice-growing      | Biodiversity                 | High        | Very High | Very High | Regular and intensive | Regular and intensive | Regular and intensive |
| 58                                           | GN2-c | Della estuary of Konkouré                     |         | Hydro-electricity | Tourism Biodiversity         | Low         | Medium    | High      | No monitoring         | Regular and light     | Regular and intensive |
| <b>GN3 CONAKRY URBAN AND PERI-URBAN ZONE</b> |       |                                               |         |                   |                              |             |           |           |                       |                       |                       |
| 59                                           | GN3-a | Conakry - Dubreka mangroves and rice fields   |         |                   |                              | Medium      | High      | High      | Regular and light     | Regular and light     | Regular and intensive |
| 60                                           | GN3-b | Conakry - Coyah mangroves and peri-urban edge |         | Trade             |                              | High        | Very High | Very High | Regular and intensive | Regular and intensive | Regular and intensive |
| 61                                           | GN3-c | Loos islands                                  |         |                   | Tourism Biodiversity         | Low         | Medium    | Medium    | Watch-keeping         | Regular and light     | Regular and light     |
| <b>GN4 SOUTH GUINEA RICE GROWING ISLANDS</b> |       |                                               |         |                   |                              |             |           |           |                       |                       |                       |
| 62                                           | GN4-a | Kakossa                                       |         | Rice-growing      | Trade+                       | Medium      | Very High | Very High | Regular and light     | Regular and intensive | Regular and intensive |
| 63                                           | GN4-b | Kabak lowland                                 |         | Rice-growing      | Trade                        | Very High   | Very High | Very High | Regular and intensive | Regular and intensive | Regular and intensive |
| 64                                           | GN4-c | Benty                                         |         | Rice-growing      | Trade Oil & Gas              | Medium      | High      | High      | Regular and light     | Regular and intensive | Regular and intensive |



# Sierra Leone

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## SL - Sierra Leone

The Sierra Leone coastline presents the following characteristics:

- The population is small and sparsely distributed in the coastal area. The agricultural potential is not really developed. Often limited issues
- Contrasting and diversified coastline: rectilinear/undulating shorelines, last large mangrove areas before reaching the region of Gulf of Guinea, the rocky horst of Freetown.
- The coastal area here consists in a 10km wide strip along the coast. It is mainly composed of sandy ridged terraces and channels; the soil environment, mostly changed into savannah-like soil is fragile and subject to local rainfall, trending locally to white leached out and infertile sands.
- The issues are very limited because of the low occupancy level. However, a conservation unit including inner wetlands is likely to be set up, subject to confirmation of the importance of the sites in terms of biodiversity (wildlife). The small archipelago of Sherbro islands, with its shallows is probably an ecosystem of interest for marine biodiversity.
- The rice-growing and even fish farming potential of the vast gutter of wetlands is difficult to estimate but can be high.

The major issues can be summarized as follows:

- In the northern area: rice growing is directly affected by the sea.
- In Freetown:
  - ✓ Curb urbanization due to the tourism sector (urban sprawl is to be avoided);
  - ✓ Prevent possible beach sand extraction;
  - ✓ Control mangrove wood exploitation;
  - ✓ Care for and preserve the natural hills.
- In the southern area: setting up of a conservation unit including Sherbro Islands.

Sierra Leone has probably a real potential in shrimp farming (physical conditions, terraces, hydrology, weather very similar with that of neighbouring Guinea), but substantial impacts are to be taken into consideration, i.e. mangrove degradation or competition with rice growing.

The country has just started the drawing up of a master plan for the development of its ports, in partnership with the African Development Bank (AfDB).

Lastly, Sierra Leone is one of the territories concerning by:

- The project **"Strengthening of the Enabling Environment, Ecosystem-based Management and Governance to support Implementation of the Strategic Action Programme of the Guinea Current Large Marine Ecosystem (GCLME)"** (GEF-6, GEF Project ID 9911, Approval Fiscal Year: 2018)<sup>1</sup>.

A joint project that will be implemented by FAO, UNEP, UNDP and UNIDO to strengthen the regional governance and ecosystem-based management of the Guinea Current Large Marine Ecosystem (GCLME).

The project aims to strengthen regional and national capacities for Strategic Action Programme (SAP) implementation measures related to transboundary fisheries, biodiversity conservation and pollution reduction.

<sup>1</sup> <https://www.thegef.org/project/conservation-and-sustainable-use-liberia-s-coastal-natural-capital>



The project concept was approved during the 53rd GEF Council meeting, held in November 2017.

- The project **"West Africa Regional Fisheries Program"** (WARFP) for sustainable management of fisheries (GEF-3, GEF Project ID 3558)<sup>2</sup>.

The Project Development Objective is to strengthen the capacity of Cape Verde, Liberia, Senegal and Sierra Leone to govern and manage targeted fisheries, reduce illegal fishing and increase local value added to fish products.

- The **West Africa Biodiversity and Climate Change (WA BiCC) Program**<sup>3,4</sup> funded by the U.S. Agency for International Development (USAID) and which covers 24 communities in coastal Sierra Leone. The project has three main objectives: combat wildlife trafficking; improve coastal resilience; and reduce deforestation, degradation, and biodiversity loss. Mangroves play a vital role in food security and in the local economy because they are a breeding ground for fish. The loss of mangroves reduces spawning grounds, leading to further depletion of fish. Because the trees grow near the water's edge and have a dense, woody root system, they also protect against storm surges, coastal erosion and flooding, making them all the more important because communities of the estuaries in Sierra Leone (Sierra Leone River and Sherbro River Estuary), are extremely vulnerable to the threats of the rising sea level.
- The **«Adapting to Climate Change Induced Coastal Risks Management in Sierra Leone»** project will strengthen the ability of coastal communities to systematically manage climate change risks and impacts on physical infrastructure and economic livelihoods (GEF-5, GEF Project ID 5902)<sup>5,6</sup>. The project will work along the coastal zone in six pilot sites (Conakry Dee, Lakka, Hamilton, Tombo, Shenge and Turtle Island). Key national partners include the Environmental Protection Agency (EPA SL), the Ministry of Fisheries and Marine Resources (MFMR), the Institute of Marine Biology and Oceanography (IMBO) and the National Tourist Board (NTB). The **expected outcomes are the following:**
  - ✓ **Outcome 1** - Enhanced availability of high quality climate risk information that is critical for development decision-making in the coastal zone.
  - ✓ **Outcome 2** - Appropriate protection measures, policy, budgeting and legal tools and integrated coordination mechanisms developed to improve and support policy design and implementation in dealing with current and long-term coastal challenges.
  - ✓ **Outcome 3** - Public awareness enhanced and climate resilient alternatives to sand mining promoted for better adhesion of policy makers and communities on adaptation.

<sup>2</sup> <https://www.thegef.org/project/sp-sfif-west-africa-regional-fisheries-program-warfp>

<sup>3</sup> <https://www.wabicc.org/en/mangrove-restoration-training-motivates-a-sierra-leone-coastal-community-to-expand-its-restoration-efforts/>

<sup>4</sup> <https://www.wabicc.org/en/facilitating-mangrove-restoration-through-technology/>

<sup>5</sup> <https://www.thegef.org/project/adapting-climate-change-induced-coastal-risks-management-sierra-leone>

<sup>6</sup> [https://www.sl.undp.org/content/sierraleone/en/home/operations/projects/environment\\_and\\_energy/-adapting-to-climate-change-induced-coastal-risks-in-sierra-leon.html](https://www.sl.undp.org/content/sierraleone/en/home/operations/projects/environment_and_energy/-adapting-to-climate-change-induced-coastal-risks-in-sierra-leon.html)



## SL1

## NORTHERN SIERRA LEONE

| SL1-a                     | 65 – RIGHT BANK OF KOLENTE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |
| DIAGNOSTIC                | The situation differs from the next area (described below) by its extension, near the sea, of paddy fields developed on hydromorphic sands.<br>The area is densely populated and composed of villages distributed following an axis, located on terrace ridges, at a little bit higher level (same as Benty, in the neighbouring Guinea).<br>The mangrove has been developed in the inland.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| DYNAMICS                  | Dynamic sector under permanent development.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| STAKES                    | Same comments as for the next area to be described (see below). A unique area at the mouth which shows the fertility of recent alluvium deposits.<br><br>The availability of drinking water and the advance of the saltwater wedge can be major issues for the dense population established in lowlands.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |
| RECOMMENDATIONS           | Start overall reflection on the sustainability of rice growing systems in the mangrove area and on relevant land development, taking into consideration the context of the sea-level rise.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
| MONITORING                | No recommendation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY    Medium |
| EVOLUTION 2010 – 2016     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |
| EVOLUTION OF STAKES       | The contemplated developments in the area of Benty (Guinea) – construction of the barge terminal of Konta, on the Forecariah river – will probably have a significant impact which will need to be monitored.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY    Medium |
| EVOLUTION 2016 – 2020     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |
| EVOLUTION OF STAKES       | Mangrove has been cleared for rice growing and in other parts some form of commercial fishing is on-going. This is a problem because of the soil type in the area.<br>Irrigation channels have also been dug by farmers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |
| CURRENT PROJECTS          | WA BiCC Program: Restoration of degraded mangrove areas <sup>7,8</sup> , . The WA BiCC planned activities are:<br>1. Promote community-based ecosystems management<br>2. Provide additional community livelihoods as a way of building resilience to climate change.<br>3. Promote awareness-raising and behavior change communication campaigns to support conservation; ecosystems approach to restoration of degraded mangrove areas; targeted capacity-building and sustainable management of ecosystem resources.<br>4. Promote institutional strengthening, good governance practices and the mainstreaming of climate change adaptation into local development plan.<br>Project “Management of mangrove forests from Senegal to Benin” (IUCN) <sup>9</sup> , achieved with the following outcomes:<br>• Socio-economic and sectoral activities in landscapes are coordinated in an integrated way.<br>• Effective management systems for OUTSTANDING NATURAL AREAS are being developed and operational.<br>• Waterfront populations benefit from APs and are more resilient to climate change |                       |
| OUTSTANDING NATURAL AREAS | Yelibuya Island Strict Nature Reserve<br>• WDPA ID: non-existent<br>• Affected sector: SL1-a<br>• Classification: submitted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |

<sup>7</sup> <https://www.wabicc.org/en/mangrove-restoration-training-motivates-a-sierra-leone-coastal-community-to-expand-its-restoration-efforts/>

<sup>8</sup> <https://www.wabicc.org/en/facilitating-mangrove-restoration-through-technology/>

<sup>9</sup> <https://www.iucn.org/fr/regions/afrique-centrale-et-occidentale/notre-travail/les-programme-thematiques-regionaux-dans-la-zone-du-paco/programme-regional-marin-et-cotier-pour-lafrique-centrale-et-de-louest-maco/projet>



|                |                                                                                                                                            |                       |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| HAZARDS        | Erosion.<br>Pollution.<br>Flooding.                                                                                                        |                       |
| RECOMMENDATION | Reforestation of the area.<br>Plant woodlots.<br>Try to develop alternative livelihood plans to ease the stress on mangrove deforestation. |                       |
| MONITORING     | Regular and intensive                                                                                                                      | CRITICALITY Very high |

| SL1-b                     | 66 – KOLENTE ESTUARY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| DIAGNOSTIC                | Two major catchment areas with heavy rainfall supply a large volume of sediments.<br>Major Freetown rice loft, vast surface areas developed on former mangrove areas, hydromorphic sand areas, and on freshwater paddy fields located in neighbouring lowlands (indeed the three agro-pedological and hydraulic systems coexist).<br>Hence, the density of the population which is distributed in strings of small villages on rural roads at the top of levelled off hills. Reportedly, in the past, a few water management projects in the lowest rice-growing lands were implemented. |                       |
| DYNAMICS                  | Dynamic sector under permanent development.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |
| STAKES                    | The site is likely to be flooded in the case of the occurrence of extreme events like storms associated with the rise in water level of the two rivers.<br>Maintenance of small embankments in a context of sea level rise, larger embankments are to be considered. Impacts of these situations have to be managed but also the related impacts as loss of fertility, loss of alluvium and acidification control.                                                                                                                                                                       |                       |
| RECOMMENDATIONS           | Start overall reflection on the sustainability of rice growing systems in the mangrove area and on relevant land consideration the context of the sea-level rise development, taking into consideration the context of the sea-level rise.                                                                                                                                                                                                                                                                                                                                               |                       |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY High      |
| EVOLUTION 2010 – 2016     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY High      |
| EVOLUTION 2016 – 2020     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| EVOLUTION OF STAKES       | This area is now known as Scarcies River Estuary and no longer Kolente Estuary. Not much has changed in this area. The area is still prone to flooding and erosion. Communities have moved inwards due to this                                                                                                                                                                                                                                                                                                                                                                           |                       |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |
| OUTSTANDING NATURAL AREAS | Scarcies River Estuary Marine Protected Area <ul style="list-style-type: none"><li>WDPA ID: 555547921</li><li>Affected sector: SL1-b</li><li>Classification: 2012</li><li>Delimitations are not available in WDPA.</li></ul>                                                                                                                                                                                                                                                                                                                                                             |                       |
| HAZARDS                   | Flooding<br>Pollution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |
| RECOMMENDATIONS           | Develop a reforestation plan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY Very high |



| SL1-c                     | 67 - LUNGI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| BASELINE - 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |
| DIAGNOSTIC                | Terrace on the Continental Terminal composed of hard layers, translating into small headlands.<br>Complex shoreline with narrow bars which isolate channels in a complex of thin terraces (mostly in the south) sediment transit influenced by the estuary of Rokel. The central part of the coastline of 4a type <sup>10</sup> (wide curvature coves leaning against terraces and sandy cords), has large coves and beaches limited by small headlands.<br>Development and rapid growth of Lungi related to its international airport connected to Freetown by a fast shuttle and a ferry.<br>The habitat nears the shoreline, but this latter is isolated by thin bars and channels parallel to the bank, which make it not very favourable to construction and dwelling.<br>Growth following an axis towards the north, along a rural road on the upper terrace, linear residence villages being developed over 10 km, nearby beaches. Vast market gardening plots, in the suburbs of Lungi. |                    |
| DYNAMICS                  | Dynamic estuary area constantly evolving.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |
| STAKES                    | Promising tourism sector, as the area is well served by transport which connects it to the airport<br>Anticipation of future trends of constructions on the beaches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |
| RECOMMENDATIONS           | Draw up a plan for this area, take preventive measure to improve land management and control.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY Medium |
| EVOLUTION 2010 - 2016     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY Medium |
| EVOLUTION 2016 - 2020     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |
| EVOLUTION OF STAKES       | Most parts of Lungi is still the same as indicated in the master plan.<br>Construction on the coastline here is still minimal.<br>However, in some areas such as Konakridee fishing activities have increased over the years and this has led to an increase in population in that area.<br>Thus, some areas along Lungi is densely populated while other parts are sparsely populated.<br>Construction of fish landing site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |
| CURRENT PROJECTS          | The Lungi – Freetown bridge construction.<br>Project « Adapting to Climate Change Induced Coastal Risks Management in Sierra Leone » (GEF-5, GEF Project ID 5902) <sup>11,12</sup> .<br>Government of Sierra Leone Fisheries project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |
| OUTSTANDING NATURAL AREAS | <b>Sierra Leone River Estuary Marine Protected Area</b> <ul style="list-style-type: none"><li>• WDPA ID: 555547922</li><li>• Affected sector: SL2-a / SL1-d</li><li>• Designation: 2012</li><li>• Delimitations are not available in WDPA.</li></ul> <b>Sierra Leone River Estuary Ramsar site</b> <ul style="list-style-type: none"><li>• WII ID: 1SL002 – 1014 / WDPA ID: 198331</li><li>• Designation on November 13, 1999 (295 000 ha)</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |
| HAZARDS                   | Erosion.<br>Flooding.<br>Sand collection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |
| RECOMMENDATIONS           | Draw a plan for land management.<br>Develop coastal stabilization mechanisms for the area as soon as possible.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY High   |

<sup>10</sup> Voir « Typologie des façades » in UEMOA, 2010. Étude régionale de suivi du trait de côte et élaboration d'un Schéma Directeur du Littoral de l'Afrique de l'Ouest. Notice de la cartographie. 48p.

<sup>11</sup> <https://www.thegef.org/project/adapting-climate-change-induced-coastal-risks-management-sierra-leone>

<sup>12</sup> [https://www.sl.undp.org/content/sierraleone/en/home/operations/projects/environment\\_and\\_energy/-adapting-to-climate-change-induced-coastal-risks-in-sierra-leon.html](https://www.sl.undp.org/content/sierraleone/en/home/operations/projects/environment_and_energy/-adapting-to-climate-change-induced-coastal-risks-in-sierra-leon.html)





| SL1-d                     | 68 - ESTUAIRE DU ROKEL                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |
| DIAGNOSTIC                | Strong tendency to siltation upstream of Pepel and its island.<br>Important alluvial supply from the Rokel.<br>Considerable areas of mangroves cleared (wood for fuel?).<br>No sign of rice growing.<br>Pepel: pier for ferry (abandoned?) with two wharfs in mudflat.<br>The ferry crossing to Freetown is today by Kupr towards Lungi, an airport town undergoing expansion.                                                                       |                    |
| DYNAMICS                  | Probable siltation of the estuary, disappearance of mangrove trees.                                                                                                                                                                                                                                                                                                                                                                                  |                    |
| STAKES                    | Certainly, related to the cause of the disappearance of mangrove trees in certain sectors, especially upstream of Pepel.<br>Asphyxiation of the hydrographic tuft still visible. Logging?                                                                                                                                                                                                                                                            |                    |
| RECOMMENDATIONS           | Actions to preserve natural vegetation and control its exploitation.                                                                                                                                                                                                                                                                                                                                                                                 |                    |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY Medium |
| EVOLUTION 2010 – 2016     |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |
| EVOLUTION OF STAKES       | Development of urban construction of a dam on the Rokel which could modify the hydrodynamic conditions of the sector.<br>Enlargement of the small ferry port of Tagrin is envisaged to create a mining terminal.<br>An extension of the railway from the Marampa mine is considered, it could then replace the port of Pepel for iron export.                                                                                                        |                    |
| PORT INSTALLATIONS        | The Port of Pepel in the Sierra Leone River is used to transport iron ore in bulk and processed by the African Minerals Mining Company. This port is connected to the Marampa mine by railroad (84 km).                                                                                                                                                                                                                                              |                    |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY Medium |
| TION 2016 – 2020          |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |
| EVOLUTION OF STAKES       | The river has been polluted with silt from activities of mining companies.<br>Also this area is a popular route for commercial transport.<br>Periodic dredging for the ferry.<br>Construction of houses in mangroves thus mangrove deforestation (no more mangroves).                                                                                                                                                                                |                    |
| CURRENT PROJECTS          | Project « Adapting to Climate Change Induced Coastal Risks Management in Sierra Leone » (GEF-5, GEF Project ID 5902) <sup>13,14</sup> .<br>WA BiCC Program: restoration of degraded mangrove areas <sup>15,16</sup> .                                                                                                                                                                                                                                |                    |
| OUTSTANDING NATURAL AREAS | <b>Sierra Leone River Estuary Marine Protected Area</b> <ul style="list-style-type: none"><li>• WDPA ID: 555547922</li><li>• Affected sector: SL2-a / SL1-d</li><li>• Designation: 2012</li><li>• Delimitations are not available in WDPA.</li></ul> <b>Sierra Leone River Estuary Ramsar site</b> <ul style="list-style-type: none"><li>• WII ID: 1SL002 – 1014 / WDPA ID: 198331</li><li>• Designation on November 13, 1999 (295 000 ha)</li></ul> |                    |
| HAZARDS                   | Plastic pollution                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |
| RECOMMENDATIONS           | Restoration plan for mangroves.<br>Develop waste management plan with clean up mechanisms.                                                                                                                                                                                                                                                                                                                                                           |                    |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY High   |

<sup>13</sup> <https://www.thegef.org/project/adapting-climate-change-induced-coastal-risks-management-sierra-leone>

<sup>14</sup> [https://www.sl.undp.org/content/sierraleone/en/home/operations/projects/environment\\_and\\_energy/-adapting-to-climate-change-induced-coastal-risks-in-sierra-leon.html](https://www.sl.undp.org/content/sierraleone/en/home/operations/projects/environment_and_energy/-adapting-to-climate-change-induced-coastal-risks-in-sierra-leon.html)

<sup>15</sup> <https://www.wabicc.org/en/mangrove-restoration-training-motivates-a-sierra-leone-coastal-community-to-expand-its-restoration-efforts/>

<sup>16</sup> <https://www.wabicc.org/en/facilitating-mangrove-restoration-through-technology/>

**SL2****URBAN AND PERIURBAN FREETOWN**

It is very likely that on the SL2-b, SL2-c and probably SL2-d sectors, beaches have been put to use to supply sand for urban growth. Subject to confirmation, this is one of the major stakes in this coastline.

On August 14th, 2017, Freetown experienced one of its most severe landslides. The landslide, comprising a mix of clay soil and boulders of up to 40 cubic meters, ripped through the city of Freetown with tremendous energy destroying everything in its path. Residents reported a large 'tidal wave' of material advancing down the river channel immediately after the landslide. The event had a massive human impact, with 1,141 declared dead or missing and over 6,000 people affected. The landslide caused major destruction of infrastructure, including 349 buildings, bridges, roads, schools, and health facilities. On the same day, flooding throughout the city also damaged infrastructure and affected households.

Following the event, the Government requested the World Bank's financial and technical support in a letter dated August 15th, 2017, including a request for an assessment of the impact of the disaster. So, World bank had decided to support urgent reconstruction and rehabilitation interventions and strengthen disaster risk management (DRM) capabilities with the « Freetown emergency recovery project »<sup>17</sup>.

« The Project Development Objective is to rehabilitate selected critical infrastructure and to strengthen government capacity for managing disaster risk.

The project will benefit 34,000-44,000 of Freetown's population, of which 40-50 percent are women. It will directly benefit communities impacted by the disaster of August 14 2017: (i) 400-600 people will benefit from slope stabilization works, with potentially life-saving interventions, which will reduce the overall risks to communities living close to the main landslide area; (ii) 14,000-18,000 people will benefit from restored and improved access to roads, bridges and associated drainage infrastructure; and (iii) 20,00-26,000 people will benefit from restored or improved access to water. The project will improve the quality of life of the people of Freetown by restoring public service delivery infrastructure and helping the city to manage the risk of future floods and landslides. In addition, the people of Sierra Leone will also benefit from the strengthened capacity of the Government in disaster preparedness and early warning system services. The capacities of the institutions involved in project implementation will be also be strengthened, supported by the Project Coordination Unit (PCU) and the Project Financial Management Unit (PFMU) within the Ministry of Finance (MoFED). »

The PDO will be achieved through two components and several sub-components, which align with the findings of the DaLA, and support the Government's overall recovery program:

- Component 1: Rehabilitation of Public Infrastructure and Slope Stabilization
  - ✓ Sub-Component 1.1: Slope Stabilization and Remediation measures
  - ✓ Sub-component 1.2: Road, Bridge, and Drainage Infrastructure Rehabilitation
  - ✓ Sub-component 1.3: Water Infrastructure Rehabilitation
- Component 2: Strengthening Institutional Capacity.
  - ✓ Sub-component 2.1: Strengthening Disaster Risk Management and Early Warning Systems
  - ✓ Sub-component 2.2: Strengthening Solid Waste Management Planning.

<sup>17</sup> <http://documents.worldbank.org/curated/en/796841519527638944/pdf/SIERRA-LEONE-PAD-02122018.pdf>

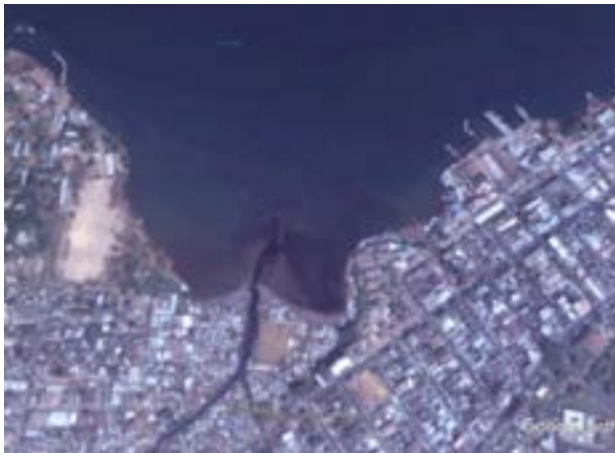


| SL2-a                     | 69 – URBAN SECTOR IN NORTH/NORTH EAST SHORELINE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |
| DIAGNOSTIC                | <p>Corresponds to the site of the historical town, with a rocky coast cleaned by the removal current of the Kokel estuary, which allows a harbour with no jetty for protection, slightly sheltered from the prevailing south-south-westerly ocean waves.</p> <p>The few creeks are marked with deposits of sand and silt.</p> <p>The mangrove stands (or mud cleared of trees) increase in thickness towards the east and the south, isolating the interior rocky coastline of the estuary in open water. However, the mangrove trees are still abundant, and the urbanisation seems to be located on the hills which have become «post-forest», rather than in the mangroves, as is the case in Monrovia.</p> |                       |
| DYNAMICS                  | No remarks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
| STAKES                    | Protection of the mangrove swamp and even restoration of some sectors.<br>Preservation of the wooded hilly area.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |
| RECOMMENDATIONS           | Draw up a sector scheme, reinforce land control.<br>Actions to preserve natural environments, hillside woods and wetlands.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY    Medium |
| EVOLUTION 2010 – 2016     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |
| EVOLUTION OF STAKES       | Extension of the port                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| PORT INSTALLATIONS        | <p>The port of Freetown's licensing has been granted to Bolloré Africa Logistics since 2010 and has been enforced since March 2011 for a period of 20 years as part of a public-private partnership with the Port Authority.</p> <p>Constructions have been undertaken to double the volumes handled in 5 years with (i) rehabilitation of the container berth (completed) (ii) implementation of a safe and computerized management, (iii) installation of handling equipment.</p>                                                                                                                                                                                                                            |                       |
| HAZARDS                   | Collection of sand                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY    Medium |
| EVOLUTION 2016 – 2020     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |
| EVOLUTION OF STAKES       | <p>In 2017, Berth 1 of Freetown port was dredged. This was done as part of the Port upgrade and extension project which started sometime in 2011. Also, other activities have been conducted under the same project.</p> <p>A seismic survey for the oil and gas sector was is to be done by the Government of Sierra Leone.</p> <p>There has been a drastic reduction of mangroves along this area also.</p> <p>Some small amount of fishing activity also happens here.</p>                                                                                                                                                                                                                                  |                       |
| CURRENT PROJECTS          | Ports upgrade and extension.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |
| OUTSTANDING NATURAL AREAS | <p><b>Sierra Leone River Estuary Marine Protected Area</b></p> <ul style="list-style-type: none"><li>• WDPA ID: 555547922</li><li>• Affected sector: SL2-a / SL1-d</li><li>• Designation: 2012</li><li>• Delimitations are not available in WDPA.</li></ul> <p><b>Sierra Leone River Estuary Ramsar site</b></p> <ul style="list-style-type: none"><li>• WII ID: 1SL002 – 1014 / WDPA ID: 198331</li><li>• Affected sectors: SL2-a / SL1-d</li><li>• Designation on November 13, 1999 (295 000 ha).</li></ul>                                                                                                                                                                                                  |                       |
| HAZARDS                   | Pollution<br>Flooding                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| RECOMMENDATIONS           | Revegetation of mangroves and protection.<br>A monitoring plan should also be developed so as to guide relevant stakeholders.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY    High   |



KROO BAY

2005



2020



CLINE TOWN NORTH - PORT

2003



2020





KROO BAY

2005



2020







| SL2-b                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 70 - GODERICH URBAN SECTOR ON WEST FRONT |           |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-----------|
| BASELINE - 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                          |           |
| DIAGNOSTIC                | Urban sector facing west.<br>Rocky section and long coves with beaches of various widths.<br>Small intra--urban wetlands in places, one of which is isolated from the sea by a narrow rim with a road and residential settlements that are potentially at risk. Vegetable growing perimeter.                                                                                                                                                       |                                          |           |
| DYNAMICS                  | Situations to be analysed in-depth in each particular situation.<br>Limited sediment stocks.                                                                                                                                                                                                                                                                                                                                                       |                                          |           |
| STAKES                    | Strong pressure of urbanisation on the residual unbuilt areas: banks of wetlands, wooded hills in this sector.<br>Restructuring of the urban grid, green area to be preserved.<br>Preservation of free access to urban beaches.                                                                                                                                                                                                                    |                                          |           |
| RECOMMENDATIONS           | Draw up a sector scheme, reinforce land control.<br>Actions to preserve natural environments, hillside woods and wetlands                                                                                                                                                                                                                                                                                                                          |                                          |           |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY                              | High      |
| EVOLUTION 2010 - 2016     |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                          |           |
| EVOLUTION OF STAKES       | Construction of a fishing port.                                                                                                                                                                                                                                                                                                                                                                                                                    |                                          |           |
| HAZARDS                   | Sand extraction                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                          |           |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY                              | High      |
| EVOLUTION 2016 - 2020     |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                          |           |
| EVOLUTION OF STAKES       | Rapid population growth in this area due to fishing activities which lead an increasing of need in housing. The high demand for land has thus led to an increase in coastal land reclamation, destruction of mangroves and increased pressure on coastal resources.<br>Open defecation on beaches.<br>Improvement of fish landing sites.<br>Huge number of entertainment complex along the coast.<br>Land reclamation.<br>No more sand extraction. |                                          |           |
| CURRENT PROJECTS          | GEF and the Adaptation Fund "West Africa Regional Fisheries Program" (WARFP) for sustainable management of fisheries (GEF-3, GEF Pro ject ID 3558) <sup>18</sup> .<br>Construction of toilets (UNDP).                                                                                                                                                                                                                                              |                                          |           |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                          |           |
| HAZARDS                   | Plastic pollution<br>Flooding<br>Erosion                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |           |
| RECOMMENDATIONS           | A proper costal defence strategy must be developed and implemented as soon as possible.<br>Regular routine clean-up activities should be also conducted along this area.                                                                                                                                                                                                                                                                           |                                          |           |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY                              | Very High |

<sup>18</sup> <https://www.thegef.org/project/sp-sfif-west-africa-regional-fisheries-program-warfp>



GODERICH URBAN SECTOR ON WEST FRONT

2005



2010



2020



Evolution from 2005 to 2020







| SL2-c                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 71 – HAMILTON – LAKKA |  |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |  |
| DIAGNOSTIC                | Residential sector in which densification is accelerating. Predominantly large huts, some with swimming pool, undergoing densification with no organised urban grid.<br>Tendency to urban sprawl on the hillsides of the wooded breakwater.<br>Development of building towards a wetland which should probably be protected.<br>Residential settlements in places on the edge of the beach and wetland.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |  |
| DYNAMICS                  | Situations to be analysed in-depth in each particular situation.<br>Limited sediment stocks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |  |
| STAKES                    | Organisation of a real urban grid system.<br>Save the last almost treeless landforms and the intra-urban wetland.<br>Preservation of free access to urban beaches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |  |
| RECOMMENDATIONS           | Draw up a sector scheme, reinforce land control.<br>Actions to preserve natural environments, hillside woods and wetlands.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |  |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY High      |  |
| EVOLUTION 2010 – 2016     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |  |
| EVOLUTION OF STAKES       | Densification of the habitat, tourist infrastructure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |  |
| HAZARDS                   | Sand extraction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |  |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY High      |  |
| EVOLUTION 2016 – 2020     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |  |
| EVOLUTION OF STAKES       | More tourist and recreation infrastructure along the beaches.<br>Pollution from open defecation.<br>Sand mining is still ongoing on both beaches; however, sand mining is more rampant in the Hamilton beach and this pose a major threat to the small fishing population.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |  |
| CURRENT PROJECTS          | Project « Adapting to Climate Change Induced Coastal Risks Management in Sierra Leone » (GEF-5, GEF Project ID 5902) <sup>19,20</sup> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |  |
| OUTSTANDING NATURAL AREAS | <b>West Area no hunting Forest (IUCN Cat. II)</b> <ul style="list-style-type: none"><li>• WDPA ID: 5179</li><li>• Affected sectors: SL2-c / SL2-d / SL2-e</li><li>• Classification: 1916</li></ul> <b>West Area Peninsula Forest National Park</b> <ul style="list-style-type: none"><li>• WDPA ID: 19249</li><li>• Affected sectors: SL2-c / SL2-d / SL2-e</li><li>• Classification: 2012</li></ul> <b>West Area Peninsula Forest National Park proposed World Heritage</b> <ul style="list-style-type: none"><li>• National Park WH ID: 5741</li><li>• Affected sectors: SL2-c / SL2-d / SL2-e</li><li>• The National Park of West Area Peninsula Forest has been included on UNESCO's tentative list of the World Heritage Sites since 2012, which Sierra Leone intends to nominate for registration as a mixed site: cultural criterion (iii ) and natural criterion (vii) and (x).</li></ul> |                       |  |
| HAZARDS                   | Flooding.<br>Coastal erosion.<br>Heavy rainfall and storms.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |  |
| RECOMMENDATIONS           | Prohibition of sand mining on both beaches.<br>Develop beach nourishment activities for locals.<br>Create a buffer zone.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |  |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY High      |  |

<sup>19</sup> <https://www.thegef.org/project/adapting-climate-change-induced-coastal-risks-management-sierra-leone>

<sup>20</sup> [https://www.sl.undp.org/content/sierraleone/en/home/operations/projects/environment\\_and\\_energy/-adapting-to-climate-change-induced-coastal-risks-in-sierra-leon.html](https://www.sl.undp.org/content/sierraleone/en/home/operations/projects/environment_and_energy/-adapting-to-climate-change-induced-coastal-risks-in-sierra-leon.html)



| SL2-d                 | 72 - WEST SHORELINE – TOKEH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| BASELINE – 2010       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                  |
| DIAGNOSTIC            | Increasingly residential tourism coast. Complex, highly diversified coastline with all the possible cases at the level of detail (classes 5, 4a, 4b, 3c, etc.).<br>Many sites have interesting landscape adjacent to striking hilly landforms.<br>Heritage of beaches interesting, with however a highway, hard surfaced in places, cut out more or less on the hillsides, with obvious collateral impacts (erosion, landslides), destruction of vegetation.<br>Urban sprawl of scattered building near the road, tracks and branches for off-road vehicles towards the coastline and the few small housing schemes and villages with a varying tourism component, and lodges that were already in existence.                                                                                                                                                                                                                                                           |                  |
| DYNAMICS              | Situations to be analyzed in-depth in each particular situation.<br>Limited sediment stocks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |
| STAKES                | The conditions are present for the development of a dense, busy tourism sector no more than 40 km from the town centre, with, at the beginning, villas with a panoramic view, lodges, hotels and then peri-urban densification.<br>A detailed urban scheme is urgent, as is the protection of the wooded breakwater (catchment area for a reservoir that supplies the town with water).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  |
| RECOMMENDATIONS       | Anticipate urban sprawl and tourist development by drawing up a sector scheme.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |
| MONITORING            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY High |
| EVOLUTION 2010 – 2016 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                  |
| EVOLUTION OF STAKES   | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |
| HAZARDS               | Urban pollution.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |
| MONITORING            | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY High |
| TION 2016 – 2020      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                  |
| EVOLUTION OF STAKES   | There has been a decrease in the water table of the dam in this area because of encroachment and deforestation.<br>Also, due to its beautiful scenery and touristic potential there has been a gradual increase in resorts and private properties.<br>Sand accretion in some areas.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  |
| CURRENT PROJECTS      | "Sustainable and Integrated landscape management of the Western Area Peninsula" <sup>21</sup> project (GEF-6, GEF Project ID 9903) with <ul style="list-style-type: none"><li>• for objective "To strengthen the sustainable and integrated management of the protected area landscape in the Western Area Peninsula Landscape to protect globally significant biodiversity and safeguard streams of ecosystem services generating local and national socio-economic benefits. »</li><li>• and for components the following:<ul style="list-style-type: none"><li>✓ Component 1: Systemic and institutional capacity for sustainable multi-use landscape management</li><li>✓ Component 2: Implementation off Integrated Management of the Western Area Peninsula Multi-Use Landscape</li><li>✓ Component 3: Financing frameworks for sustainable integrated landscape management</li><li>✓ Component 4: Gender Mainstreaming, M&amp;E and Learning</li></ul></li></ul> |                  |

<sup>21</sup> <https://www.thegef.org/project/sustainable-and-integrated-landscape-management-western-area-peninsula>


 **SL - Sierra Leone**

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| OUTSTANDING NATURAL AREAS | <p><b>West Area no hunting Forest (IUCN Cat. II)</b></p> <ul style="list-style-type: none"> <li>• WDPA ID: 5179</li> <li>• Affected sectors: SL2-c / SL2-d / SL2-e</li> <li>• Classification: 1916</li> </ul> <p><b>West Area Peninsula Forest National Park</b></p> <ul style="list-style-type: none"> <li>• WDPA ID: 19249</li> <li>• Affected sectors: SL2-c / SL2-d / SL2-e</li> <li>• Classification: 2012</li> </ul> <p><b>West Area Peninsula Forest National Park proposed World Heritage</b></p> <ul style="list-style-type: none"> <li>• National Park WH ID: 5741</li> <li>• Affected sectors: SL2-c / SL2-d / SL2-e</li> <li>• The National Park of West Area Peninsula Forest has been included on UNESCO's tentative list of the World Heritage Sites since 2012, which Sierra Leone intends to nominate for registration as a mixed site: cultural criterion (iii ) and natural criterion (vii) and (x).</li> </ul> |                  |
| HAZARDS                   | Flooding<br>Coastal erosion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |
| RECOMMENDATIONS           | Develop a proper land management plan for the area. Coastal defence mechanism (plant trees)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY High |



NOTH TOKEH – SIGN OF URBANISATION

2006



2020



SOUTH TOKEH – SIGN OF URBANISATION

2006



2020





| SL2-e                     | 73 - TOMBO– CAPE SHILLING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |
| DIAGNOSTIC                | Tombo: small town expanding along an axis towards Waterloo Freetown East.<br>Cape Shilling: rocky point with small cliffs and rocky coast.<br>Track with panoramic view on the ocean side. Point served by track. Little building but beginnings of urban sprawl.<br>Remaining wooded vegetation in vigorous hilly landform, but cleared enclaves appearing.                                                                                                                                                                                                                                                                                                                       |                  |
| DYNAMICS                  | Coastline with a tendency towards sandy silt.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |
| STAKES                    | Obvious tourist potential. Development to be controlled: Landscapes, hotel establishments, etc.<br>The point of the head land should be classified                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  |
| RECOMMENDATIONS           | Drastic limitation of buildings on both hillsides and crests, landscape insertion of possible limited tourist reception facilities.<br>Classification as a conservation unit of the point of the headland to be studied                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CRITICALITY High |
| EVOLUTION 2010 – 2016     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CRITICALITY High |
| EVOLUTION 2016 – 2020     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |
| EVOLUTION OF STAKES       | Suburban sprawl.<br>Coastal defence structures (huge stones, concrete walls, used tires etc) in some places.<br>Erosion in some areas.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |
| CURRENT PROJECTS          | Project « Adapting to Climate Change Induced Coastal Risks Management in Sierra Leone » (GEF-5, GEF Project ID 5902) <sup>22,23</sup> .<br>Government of Sierra Leone fisheries project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |
| OUTSTANDING NATURAL AREAS | <b>West Area Peninsula Forest National Park</b> <ul style="list-style-type: none"><li>WDPA ID: 19249</li><li>Affected sectors: SL2-c / SL2-d / SL2-e</li><li>Classification: 2012</li></ul> <b>West Area Peninsula Forest National Park proposed World Heritage</b> <ul style="list-style-type: none"><li>National Park WH ID: 5741</li><li>Affected sectors: SL2-c / SL2-d / SL2-e</li><li>The National Park of West Area Peninsula Forest has been included on UNESCO's tentative list of the World Heritage Sites since 2012, which Sierra Leone intends to nominate for registration as a mixed site: cultural criterion (iii ) and natural criterion (vii) and (x).</li></ul> |                  |
| HAZARDS                   | Pollution.<br>Erosion.<br>Flooding.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |
| RECOMMENDATIONS           | Continue with coastal defence structures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY High |

<sup>22</sup> <https://www.thegef.org/project/adapting-climate-change-induced-coastal-risks-management-sierra-leone>

<sup>23</sup> [https://www.sl.undp.org/content/sierraleone/en/home/operations/projects/environment\\_and\\_energy/-adapting-to-climate-change-induced-coastal-risks-in-sierra-leon.html](https://www.sl.undp.org/content/sierraleone/en/home/operations/projects/environment_and_energy/-adapting-to-climate-change-induced-coastal-risks-in-sierra-leon.html)



| SL2-f                     | 74 – BANANA ISLAND                                                                                                                                                                                                                         |                       |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BASELINE – 2010           |                                                                                                                                                                                                                                            |                       |
| DIAGNOSTIC                | Island consisting of rocky coast and hardpan.<br>Beaches, creeks, vegetation of coconut trees.<br>Some small fishing villages.                                                                                                             |                       |
| DYNAMICS                  | No remarks                                                                                                                                                                                                                                 |                       |
| STAKES                    | Obvious tourist potential. Development to be controlled: Landscapes, hotels, etc.                                                                                                                                                          |                       |
| RECOMMENDATIONS           | Island consisting of rocky coast and hardpan. Beaches, creeks, vegetation of coconut trees. Some small fishing villages.                                                                                                                   |                       |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                              | CRITICALITY    Medium |
| EVOLUTION 2010 – 2016     |                                                                                                                                                                                                                                            |                       |
| EVOLUTION OF STAKES       | Building of a hotel and resort (Source: MOLOA Sierra Leone country branch)                                                                                                                                                                 |                       |
| OUTSTANDING NATURAL AREAS | Not reported                                                                                                                                                                                                                               |                       |
| HAZARDS                   | No                                                                                                                                                                                                                                         |                       |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                              | CRITICALITY    Medium |
| EVOLUTION 2016 – 2020     |                                                                                                                                                                                                                                            |                       |
| EVOLUTION OF STAKES       | Increased resorts on the island because of the high increase in tourist on the Island over the years.<br>Because the island is surround by rocks, the most parts of the island has not been affected by climate change or coastal erosion. |                       |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                          |                       |
| INVESTMENTS               | -                                                                                                                                                                                                                                          |                       |
| OUTSTANDING NATURAL AREAS | <b>Yawri Bay Marine Protected Area</b> <ul style="list-style-type: none"><li>WDPA ID: 555547923</li><li>Affected sectors: SL2-f / SL3-a / SL3-b</li><li>Classification: 2012</li><li>Delimitations are not available in WDPA</li></ul>     |                       |
| HAZARDS                   | -                                                                                                                                                                                                                                          |                       |
| RECOMMENDATIONS           | Develop possible plan for tourism.<br>Develop a plan for protection in the event of sea level rise or any potential coastal issues.                                                                                                        |                       |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                              | CRITICALITY    Medium |



## SL3

## SIERRA LEONE SOUTH CENTER

| SL3-a                     | 75 - SOUTH BAY OF THE FREETOWN MOLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |        |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------|
| BASELINE - 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |        |
| DIAGNOSTIC                | Extension in mudflats, coastline of mangrove trees, discontinuous, sometimes absent.<br>Important rice-growing area with the two systems: Dyked paddy fields and rice-growing on thin layer of hydromorphic sand (dominant system).<br>Hilly hinterland occupied by agriculture and small plantations to supply Freetown.<br>Relatively dense habitat in villages (strings along the line of the tracks).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |        |
| DYNAMICS                  | Dynamic and unstable sector, prone to siltation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |        |
| STAKES                    | Changes in the shore in mangrove trees and siltation.<br>Rice-growing under the influence of the sea in a context of rise in sea level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |        |
| RECOMMENDATIONS           | No actions other than general ones regarding rice-growing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |        |
| MONITORING                | No survey                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY | Medium |
| EVOLUTION 2010 - 2016     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |        |
| EVOLUTION OF STAKES       | Building of a hotel and resort (Source: MOLOA Sierra Leone country branch)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |        |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY | Medium |
| EVOLUTION 2016 - 2020     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |        |
| EVOLUTION OF STAKES       | Deforestation of mangroves.<br>Land reclamation from the bay for construction of houses.<br>Pollution.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |        |
| CURRENT PROJECTS          | Sustainable utilization of mangroves using innovative fish smoking systems funded by UNDP's Small Grant Program (2017).<br>"Pilot project for sustainable coastal zone management in Sierra Leone" (Wetlands International and Conservation Society of Sierra Leone) <sup>24</sup> whose goal is to support Sierra Leone in its efforts for sustainable coastal resources management and biodiversity conservation through the establishment of a Marine Protected Area, a tool for fisheries management and coastal zone and marine resources management with the following outcomes : <ul style="list-style-type: none"><li>Sierra Leone's critical sites for the conservation of marine and coastal resources are identified and a development plan is in place and being followed to enhance their protection status</li><li>Aspects of coastal and marine management in the selected MPA s are improved through smallscale direct activities at local level</li><li>PRCM activities and the benefits of the regional approach are better known and taken into consideration by national decision</li><li>Capacity to conserve the nation's marine and coastal area is strengthened in target stakeholders at MPA and national level makers and actors concerned in marine and coastal Conservation in Sierra Leone</li></ul> |             |        |
| OUTSTANDING NATURAL AREAS | <b>Yawri Bay Marine Protected Area</b> <ul style="list-style-type: none"><li>WDPA ID: 555547923</li><li>Affected sectors: SL2-f / SL3-a / SL3-b</li><li>Classification: 2012</li><li>Delimitations are not available in WDPA</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |        |
| HAZARDS                   | Flooding                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |        |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY | Medium |

<sup>24</sup> <https://www.wetlands.org/publications/pilot-project-for-sustainable-coastal-management-in-sierra-leone/>





| SL3-b                     | 76 – SHENGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                     |
| DIAGNOSTIC                | Complex coastline structured by the headland that probably plays an important hydraulic role, with low importance of the «mangrove shores» relayed by sandy spits of type 2a <sup>25</sup> (Narrow shorelines and sandy banks backed by mangroves. Erosion and sediment very active.).<br>More intensive land use in the neighbouring sectors in the South West.<br>Appropriation of a few mangrove swamp rice-growing plots, but quite localised in contact with the hilly terraces.<br>Relicts of forests still present |                     |
| DYNAMICS                  | Very dynamic, unstable coastline. Heavy erosion transferred to the coastline of Shenge, as well as on Plantain Island.                                                                                                                                                                                                                                                                                                                                                                                                    |                     |
| STAKES                    | Probable densification of the population connected by the network of tracks in easy topography, more or less already in place, with string of small villages more or less distant from each other.<br>It should nonetheless be noted that the post-forest soils, under the high rainfall conditions of the region, can easily turn into savannah if they are developed with crops other than trees.<br>Plantain Island could disappear in the next two decades (UEMOA, 2010 <sup>26</sup> ).                              |                     |
| RECOMMENDATIONS           | Possible feasibility study of a protective system for Plantain Island if the stakes justify it                                                                                                                                                                                                                                                                                                                                                                                                                            |                     |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY    High |
| EVOLUTION 2010 – 2016     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                     |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                     |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                     |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY    High |
| EVOLUTION 2016 – 2020     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                     |
| EVOLUTION OF STAKES       | The stakes for Shenge is still the same: <ul style="list-style-type: none"><li>• The area is still made up of a string of small fishing villages.</li><li>• Plantain island is sinking gradually.</li></ul>                                                                                                                                                                                                                                                                                                               |                     |
| CURRENT PROJECTS          | Project « Adapting to Climate Change Induced Coastal Risks Management in Sierra Leone » (GEF-5 GEF Project ID 590 <sup>27,28</sup> .                                                                                                                                                                                                                                                                                                                                                                                      |                     |
| OUTSTANDING NATURAL AREAS | <b>Yawri Bay Marine Protected Area</b> <ul style="list-style-type: none"><li>• WDPA ID: 555547923</li><li>• Affected sectors: SL2-f / SL3-a / SL3-b</li><li>• Classification: 2012</li><li>• Delimitations are not available in WDPA</li></ul>                                                                                                                                                                                                                                                                            |                     |
| HAZARDS                   | Marine submersion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |
| RECOMMENDATIONS           | Develop a protective plan for Plantain Island as well as try to generate resources to aid the implementation.                                                                                                                                                                                                                                                                                                                                                                                                             |                     |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY    High |

<sup>25</sup> Voir « Typologie des façades » in UEMOA, 2010. Étude régionale de suivi du trait de côte et élaboration d'un Schéma Directeur du Littoral de l'Afrique de l'Ouest. Notice de la cartographie. 48p.

<sup>26</sup> UEMOA, 2010. Etude de suivi du trait de côte et Schéma Directeur Littoral de l'Afrique de l'Ouest. Etude de cas en Sierra Leone. Report of erosion case study : Shenge, plantain island and Bonthe. 44p.

<sup>27</sup> <https://www.thegef.org/project/adapting-climate-change-induced-coastal-risks-management-sierra-leone>.

<sup>28</sup> [https://www.sl.undp.org/content/sierraleone/en/home/operations/projects/environment\\_and\\_energy/adapting-to-climate-change-induced-coastal-risks-in-sierra-leon.html](https://www.sl.undp.org/content/sierraleone/en/home/operations/projects/environment_and_energy/adapting-to-climate-change-induced-coastal-risks-in-sierra-leon.html)

**SL4****SHERBRO AREA – LIBERIA**

Generally, this area is sparsely populated. The coastline is characterized by these natural conditions: estuarine and insular environments, shallow waters, complex current and relative aridity of leached sands despite high rainfall advocate for a conservation and preservation effort of this unique system in this sub-region, which is visibly still relatively well preserved. Considering the extent of the site, the populations living there, conservation solutions of the biosphere reserve or regional park type would seem to be the most appropriate. This conservation area could have a cross-border dimension, encompassing the neighbouring areas of Liberia.

«Support program for the preservation of biodiversity and fragile ecosystems, regional governance and climate change in West Africa - PAPBio» (ROC / FED / 039-269) officially launched on July 25, 2019. Within this program, several projects have been carried out including the "regional project for the strengthening of mangrove ecosystems" (EU, ECOWAS and UEMOA, 11th FED) which aims to strengthen the protection status of mangrove areas and to create generating activities income in 9 coastal countries of the West African sub-region. This project is currently in diagnostic phase.



| SL4-a                     | 77 - SHERBRO ESTUARY                                                                                                                                                                                                                                                                                                                                                                      |             |     |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----|
| BASELINE - 2010           |                                                                                                                                                                                                                                                                                                                                                                                           |             |     |
| DIAGNOSTIC                | From 5 to 20 km wide on the sea front. Coastline almost totally covered in mangroves. Approaching the sea, sandy spits of type 2a. Rare villages, large straw huts (farmers and probably fishermen). The hinterland is moderately inhabited with forest relics on formations of high terraces of continental terminal.<br>Some paddy fields in places on the inside edge of the mangrove. |             |     |
| DYNAMICS                  | Dynamic and unstable estuarine sector.                                                                                                                                                                                                                                                                                                                                                    |             |     |
| STAKES                    | Mangrove preserved (screen of Rhizophora and a few Avicennia stands).<br>Sites and lands probably suitable for mangrove rice-growing and perhaps shrimp farming.<br>Interesting tree vegetation in fan shaped wetlands.                                                                                                                                                                   |             |     |
| RECOMMENDATIONS           | Conservation of natural environments to be envisaged in global action to preserve the ecosystem of Sherbro island.                                                                                                                                                                                                                                                                        |             |     |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY | Low |
| EVOLUTION 2010 - 2016     |                                                                                                                                                                                                                                                                                                                                                                                           |             |     |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                                              |             |     |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                                                              |             |     |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY | Low |
| EVOLUTION 2016 – 2020     |                                                                                                                                                                                                                                                                                                                                                                                           |             |     |
| EVOLUTION OF STAKES       | The stakes for this area have not evolved much since 2010. The area still has dense mangrove vegetations in healthy states and rich biodiversity. Also, some amount of mangrove rice farming and shrimp farming is ongoing along the coast.                                                                                                                                               |             |     |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                                                                                                                                         |             |     |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                                                                                        |             |     |
| HAZARDS                   | -                                                                                                                                                                                                                                                                                                                                                                                         |             |     |
| RECOMMENDATIONS           | Develop monitoring plan.                                                                                                                                                                                                                                                                                                                                                                  |             |     |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY | Low |



| SL4-b                     | 78 – TURTLE ISLANDS BANKS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |
| DIAGNOSTIC                | Unique system of sandbanks, shallows, extremely dynamic terraces, fashioned by the multiple influences of the coastal drift current, tidal currents and fluvial sediment supply in spate season.                                                                                                                                                                                                                                                                                                                                                                                             |                  |
| DYNAMICS                  | A totally dynamic and unstable sector, there are several hypotheses concerning the origin of the bank <sup>29</sup> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |
| STAKES                    | Conservation of natural ecosystems. Area to be included in a conservation unit that also incorporates the Sherbro islands and possibly the preceding sector, Sherbro estuary.                                                                                                                                                                                                                                                                                                                                                                                                                |                  |
| RECOMMENDATIONS           | Instigate a study of a large conservation unit with an original status such as the Biosphere Reserve or Regional Natural Park, also reconciling the possibilities of developing tourism, ecotourism, residential settlement and fishing. The Turtle bank should legitimately be assigned a rigorous conservation status.                                                                                                                                                                                                                                                                     |                  |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY High |
| EVOLUTION 2010 – 2016     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY High |
| EVOLUTION 2016 – 2020     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |
| EVOLUTION OF STAKES       | Erosion on some of the islands.<br>Some of the islands are sinking.<br>Rich biodiversity around the Island. High turtle population recorded in this region.                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |
| CURRENT PROJECTS          | "Reptile and Amphibian Program – Sierra Leone" (RAPSL): Marine Turtle Conservation Project. catches. The Marine Turtle Conservation Program is a program develop with community members to monitor nesting beaches and by-catches. Through its community development program, RAP-SL has been able to get the cooperation of locals in releasing captured turtles and burying dead ones. The project is funded by U.S. Fish and Wildlife Service.<br>Project « Adapting to Climate Change Induced Coastal Risks Management in Sierra Leone » (GEF-5, GEF Project ID 5902) <sup>30,31</sup> . |                  |
| OUTSTANDING NATURAL AREAS | <b>Turtle &amp; Sherbro Island MPA</b> <ul style="list-style-type: none"><li>• WDPA ID: nil</li><li>• Affected sector: SL4-b</li><li>• Classification: submitted</li></ul> <b>Sherbro River Estuary MPA</b> <ul style="list-style-type: none"><li>• WDPA ID: 555547924</li><li>• Affected sectors: SL4-b / SL4-c</li><li>• Classification: 2012</li><li>• its delimitations are not available in WDPA.</li></ul>                                                                                                                                                                             |                  |
| HAZARDS                   | Climate change                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |
| RECOMMENDATIONS           | Conduct a state of the marine biodiversity in the area and develop possible protection/conservative mechanisms                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY High |

<sup>29</sup> Anthony. E. J. 2004.-The Turtle Bank, Sherbro bay, west Africa: estuarine-modified inner shelf shoal. Marine Sandwave and River Dune Dynamics – 1 & 2 April 2004 – Enschede, the Netherlands.8p.

<sup>30</sup> <https://www.thegef.org/project/adapting-climate-change-induced-coastal-risks-management-sierra-leone>

<sup>31</sup> [https://www.sl.undp.org/content/sierraleone/en/home/operations/projects/environment\\_and\\_energy/-adapting-to-climate-change-induced-coastal-risks-in-sierra-leon.html](https://www.sl.undp.org/content/sierraleone/en/home/operations/projects/environment_and_energy/-adapting-to-climate-change-induced-coastal-risks-in-sierra-leon.html)



| SL4-c                     | 79 - SHERBRO –MAIN ISLAND                                                                                                                                                                                                                                                                                                                                               |             |        |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                         |             |        |
| DIAGNOSTIC                | Remarkable estuary.<br>Practically uninhabited. Small strategic village and historical port of Bonthe, formerly a relatively important town. Sector not very visible on the high-resolution images. Another village to the south with a few huts.<br>Micro-lagoons in the south.<br>Attempts by private investors to promote the unique setting of this insular system. |             |        |
| DYNAMICS                  | Extremely complex current system, importance of fluvial sediment supply, east-westerly coastal drift.<br>Erosion observed on the Bonthe site.                                                                                                                                                                                                                           |             |        |
| STAKES                    | Area to be included in a conservation unit incorporating all the sectors in the area.                                                                                                                                                                                                                                                                                   |             |        |
| RECOMMENDATIONS           | Consider a study of a large conservation unit with an original status such as Biosphere Reserve or Regional Natural Park, also reconciling the possibilities of developing tourism, ecotourism, residential settlement and fishing.                                                                                                                                     |             |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY | Medium |
| EVOLUTION 2010 – 2016     |                                                                                                                                                                                                                                                                                                                                                                         |             |        |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                            |             |        |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                                            |             |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY | Medium |
| EVOLUTION 2016 – 2020     |                                                                                                                                                                                                                                                                                                                                                                         |             |        |
| EVOLUTION OF STAKES       | Seaward construction of sea wall to protect the Island.<br>Increase in population on the line                                                                                                                                                                                                                                                                           |             |        |
| CURRENT PROJECTS          | Oyster culture project.<br>Construction of jetty.<br>Sedimentation from mining up stream.                                                                                                                                                                                                                                                                               |             |        |
| OUTSTANDING NATURAL AREAS | <b>Bonthe Mangrove Swap Strict Nature Reserve</b> <ul style="list-style-type: none"><li>WDPA ID: 19268</li><li>Affected sector: SL4-c</li><li>Classification: submitted</li><li>The delimitations are not available in WDPA.</li></ul>                                                                                                                                  |             |        |
| HAZARDS                   | Erosion<br>Flooding                                                                                                                                                                                                                                                                                                                                                     |             |        |
| RECOMMENDATIONS           | Coastal defence plan.<br>Construction plan.                                                                                                                                                                                                                                                                                                                             |             |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY | Medium |



| SL4-d                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 80 – SHERBRO –MOA MOUTH |  |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                         |  |
| DIAGNOSTIC                | <p>Great homogeneity of the straight coastline along a hundred kilometres varying according to the proximity of the shoreline and the depth of multiple terraces channels. Wrinkled terraces and channels composed of recent sands with discontinuous bushy tree vegetation.</p> <p>The terraces and channels complex corresponding to successive genesis phases is bordered (between 500 m and 5 km) by a continuous interconnected wetlands«gutter», receiving waters from several rivers with large watersheds, with a final mangrove outlet near the Sherbro.</p> <p>Subject to inventory, this area has a rich floristic and wildlife setting along with poor and «arid» vegetation characteristics in climatic areas with high rainfall (&gt; 3,000 mm) on leached sandy soils.</p>                                                                                                                                                                                      |                         |  |
| DYNAMICS                  | <p>No remarks, but the coastline morphology confirms the presence of an East-Western result of coastal drift. Highly homogenous coastline along a straight stretch of around a hundred kilometres, becomes diversified depending on the proximity of the shore and the depth of multiple channels on terraces. Terraces in ridges and channels composed of recent sands with discontinuous shrubs and tree vegetation.</p> <p>The complex of terraces and channels corresponding to successive phases of genesis is bordered (between 500m and 5 km) by a continuous «gutter» of interconnected wetlands, receiving the waters of several streams with vast catchment areas, with a final outlet in mangroves approaching the Sherbro islands.</p> <p>Subject to an inventory, this area presents a rich system of flora and fauna associated with characteristics of poor, «arid» vegetation in a weather area with high rainfall (&gt; 3,000 mm) on leached sandy soils.</p> |                         |  |
| STAKES                    | <p>For 10 to 20km landward from the coastline, practically uninhabited area, without any sustainable agricultural future on sandy terrace and undetermined potential agricultural use in the wetlands. Little potential for coconut plantations (as in Ivory Coast). Possibly plantations of eucalyptus...</p> <p>More certainly, pertinent area to be included in a conservation approach as mentioned above.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                         |  |
| RECOMMENDATIONS           | <p>Consider a study of a large conservation unit with an original status such as Biosphere Reserve or Regional Natural Park, also reconciling the possibilities of developing tourism, ecotourism, residential settlement and fishing.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                         |  |
| MONITORING                | No recommendation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY Low         |  |
| EVOLUTION 2010 – 2016     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                         |  |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                         |  |
| OUTSTANDING NATURAL AREAS | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |  |
| HAZARDS                   | <p>A grounded vessel on the beach in southern Sierra Leone in 2013 at Lake Mape resulted in an accretion in the south and an erosion of the beach in the north.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |  |
| MONITORING                | No recommendation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY Low         |  |
| EVOLUTION 2016 – 2020     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                         |  |
| EVOLUTION OF STAKES       | Not much change has occurred in this area. It is still sparsely populated in some areas and the main activity on going is fish.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                         |  |
| CURRENT PROJECTS          | <p>WA BiCC Program: Restoration of degraded mangrove areas <sup>32,33</sup>. Gbongboma is a small rural community of about 90 people and depends largely on subsistence farming, fishing and harvesting and selling oysters to make ends meet. After only two years of engagement with WA BiCC, the people of Gbongboma in the Sherbro River Estuary had met their self-established goal of restoring 0.55 hectares of degraded area in their community.</p>                                                                                                                                                                                                                                                                                                                                                                                                                               |                         |  |

<sup>32</sup> <https://www.wabicc.org/en/mangrove-restoration-training-motivates-a-sierra-leone-coastal-community-to-expand-its-restoration-efforts/>

<sup>33</sup> <https://www.wabicc.org/en/facilitating-mangrove-restoration-through-technology/>



|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| OUTSTANDING NATURAL AREAS | <p><b>Lake Mape / Mabesi National Park</b></p> <ul style="list-style-type: none"> <li>• WDPA ID: 19266</li> <li>• Affected sector: SL4-d</li> <li>• A 75.11 km<sup>2</sup> area has been proposed around the coastal lakes of Mape and Mabesi for classification as a national park. The delimitations are not available in WDPA.</li> </ul> <p><b>Sewa-Waanje game reserve</b></p> <ul style="list-style-type: none"> <li>• WDPA ID: 28367</li> <li>• Affected sector: SL4-d</li> <li>• Classification: submitted</li> <li>• A 100 km<sup>2</sup> area has been proposed around the coastal rivers of Sewa - Waanje for classification as a reserve.</li> <li>• Delimitations are not available in WDPA.</li> </ul> |                 |
| HAZARDS                   | Flooding                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY Low |





| SL4-e                     | 81 - MOA MOUTH - SULIMA                                                                                                                                                                                                                            |                       |  |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--|
| BASELINE – 2010           |                                                                                                                                                                                                                                                    |                       |  |
| DIAGNOSTIC                | Sulima, a small village situated on the coast just before Liberia, some agriculture on alluvial deposits. Configuration of the estuary involves a strong, westward coastal sediment drift. This drift blocks the outlet of a vast lateral wetland. |                       |  |
| DYNAMICS                  | Unstable estuarine area.                                                                                                                                                                                                                           |                       |  |
| STAKES                    | Area to be included in a conservation unit unless, for different reasons relating to the border, Sierra Leone wished to see a densification of human land use in places.                                                                           |                       |  |
| RECOMMENDATIONS           | Consider a study of a large conservation unit with an original status such as Biosphere Reserve or Regional Natural Park, also reconciling the possibilities of developing tourism, ecotourism, residential settlement and fishing.                |                       |  |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                      | CRITICALITY    Low    |  |
| EVOLUTION 2010 – 2016     |                                                                                                                                                                                                                                                    |                       |  |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                       |                       |  |
| HAZARDS                   | Sector with active erosion at Sulima                                                                                                                                                                                                               |                       |  |
| MONITORING                | Regular and light                                                                                                                                                                                                                                  | CRITICALITY    Medium |  |
| EVOLUTION 2016 – 2020     |                                                                                                                                                                                                                                                    |                       |  |
| EVOLUTION OF STAKES       | Some exploration for oil in the area. However, the place is still sparsely populated, and the main source of livelihood is fishing.<br>Active fishing ongoing.<br>Construction of a bridge.                                                        |                       |  |
| CURRENT PROJECTS          | GEF and the Adaptation Fund “West Africa Regional Fisheries Program” (WARFP) for sustainable management of fisheries (GEF-3, GEF Project ID 3558) <sup>34</sup> .                                                                                  |                       |  |
| OUTSTANDING NATURAL AREAS | <b>Sulima Mangrove Swap Strict Nature Reserve</b> <ul style="list-style-type: none"><li>• WDPA ID: 19265</li><li>• Affected sector: SL4-e</li><li>• Classification: submitted</li><li>• The delimitations are not available in WDPA.</li></ul>     |                       |  |
| HAZARDS                   | Erosion                                                                                                                                                                                                                                            |                       |  |
| RECOMMENDATIONS           | Woodlots to ease the pressure on mangroves.                                                                                                                                                                                                        |                       |  |
| MONITORING                | Regular and light                                                                                                                                                                                                                                  | CRITICALITY    High   |  |

<sup>34</sup> <https://www.thegef.org/project/sp-sfif-west-africa-regional-fisheries-program-warfp>

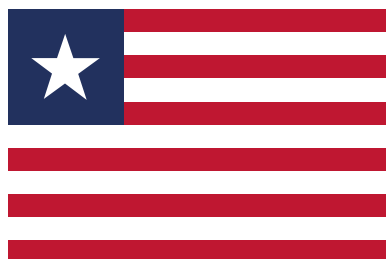


## SUMMARY TABLE

| HABITAT |  |  |  |  |  |  |                                                                                   |                                                                                   |                                                                                     |                                                                        |                                                                                     |
|---------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| STAKES  | <b>Fishing</b><br>Fishing port<br>Landing areas                                   | <b>Rice-growing</b>                                                               | <b>Palm oil</b><br>Palm plantation                                                | <b>Trade</b><br>Commercial port                                                   | <b>Trade+</b><br>Commercial port<br>Airport                                       | <b>Oil &amp; Gas</b><br>Exploration<br>Exploitation                               | <b>Extractive ind.</b><br>Salt, metal-bearing sand,<br>gold                       | <b>Tourism</b>                                                                    | <b>(Tourism)</b><br>Unexploited outstanding<br>areas                                | <b>Biodiversity</b><br>Outstanding areas<br>(biodiversity, landscapes) |                                                                                     |
| HAZARDS | <b>h</b><br>Soil erosion                                                          | <b>h</b><br>Coastal erosion                                                       | <b>d</b><br>Marine submersion                                                     | <b>c</b><br>Pluvial and/or fluvial flooding                                       |  | <b>i</b><br>Pollution                                                             |  |  |  | <b>n</b><br>Industrial risk                                            |  |

| N°                                       | REF   | NAME                                         | HABITAT | STAKES                                              | HAZARDS | CRITICALITY                        | MONITORING                                                                   |
|------------------------------------------|-------|----------------------------------------------|---------|-----------------------------------------------------|---------|------------------------------------|------------------------------------------------------------------------------|
|                                          |       |                                              |         |                                                     |         | 2011 2016 2020                     | 2011 2016 2020                                                               |
| <b>SL1 NORTH SIERRA LEONE</b>            |       |                                              |         |                                                     |         |                                    |                                                                              |
| 65                                       | SL1-a | Kolente right shore                          |         | Fishing Rice-growing Biodiversity                   |         | Medium → Medium → <b>Very High</b> | No monitoring → Regular and light → <b>Regular and intensive</b>             |
| 66                                       | SL1-b | Kolente estuary                              |         | Fishing Rice-growing Biodiversity                   |         | High → High → <b>High</b>          | Regular and light → Regular and light → <b>Regular and light</b>             |
| 67                                       | SL1-c | Lungi                                        |         | Fishing Trade+ Extractive Ind. Tourism Biodiversity |         | Medium → Medium → <b>High</b>      | Watch-keeping → Watch-keeping → <b>Regular and light</b>                     |
| 68                                       | SL1-d | Rokel estuary                                |         | Fishing Trade Extractive Ind. Tourism Biodiversity  |         | Medium → Medium → <b>High</b>      | Watch-keeping → Regular and light → <b>Regular and light</b>                 |
| <b>SL2 URBAN AND PERI-URBAN FREETOWN</b> |       |                                              |         |                                                     |         |                                    |                                                                              |
| 69                                       | SL2-a | Urban sector on the North / North East front |         | Fishing Trade Biodiversity                          |         | Medium → Medium → <b>High</b>      | Watch-keeping → Regular and light → <b>Regular and light</b>                 |
| 70                                       | SL2-b | Goderich urban sector on the West side       |         | (Tourism)                                           |         | High → High → <b>Very High</b>     | Regular and light → Regular and light → <b>Regular and intensive</b>         |
| 71                                       | SL2-c | Hamilton - Lakka                             |         | Extractive Ind. Tourism Biodiversity                |         | High → High → <b>High</b>          | Regular and light → Regular and light → <b>Regular and light</b>             |
| 72                                       | SL2-d | West side - Tokeh                            |         | Tourism Biodiversity                                |         | High → High → <b>High</b>          | Regular and intensive → Regular and intensive → <b>Regular and intensive</b> |
| 73                                       | SL2-e | Tombou - Cape Shilling                       |         | Tourism Biodiversity                                |         | High → High → <b>High</b>          | Watch-keeping → Watch-keeping → <b>Regular and light</b>                     |
| 74                                       | SL2-f | Banana Island                                |         | Tourism Biodiversity                                |         | Medium → Medium → <b>Medium</b>    | Watch-keeping → Watch-keeping → <b>Watch-keeping</b>                         |
| <b>SL3 CENTER SOUTH SIERRA LEONE</b>     |       |                                              |         |                                                     |         |                                    |                                                                              |
| 75                                       | SL3-a | Freetown bay of south pier                   |         | Rice-growing Fishing Tourism Biodiversity           |         | Medium → Medium → <b>Medium</b>    | No monitoring → Watch-keeping → <b>Regular and light</b>                     |
| 76                                       | SL3-b | Shenge                                       |         | Rice-growing Fishing Biodiversity                   |         | High → High → <b>High</b>          | Regular and intensive → Regular and intensive → <b>Regular and intensive</b> |
| <b>SL4 SHERBRO - LIBERIA ZONE</b>        |       |                                              |         |                                                     |         |                                    |                                                                              |
| 77                                       | SL4-a | Sherbro estuary                              |         | Rice-growing Fishing (Biodiversity)                 |         | Low → Low → <b>Low</b>             | Watch-keeping → Watch-keeping → <b>Watch-keeping</b>                         |
| 78                                       | SL4-b | Stocks of Turtle Islands                     |         | Fishing Biodiversity                                |         | High → High → <b>High</b>          | Regular and light → Regular and light → <b>Regular and intensive</b>         |
| 79                                       | SL4-c | Sherbro - Main island                        |         | Ostréiculture Fishing Biodiversity                  |         | Medium → Medium → <b>Medium</b>    | Regular and light → Regular and light → <b>Regular and light</b>             |
| 80                                       | SL4-d | Sherbro - Moa mouth                          |         | Fishing Biodiversity                                |         | Low → Low → <b>Low</b>             | No monitoring → No monitoring → <b>Watch-keeping</b>                         |
| 81                                       | SL4-e | Moa - Sulima mouth                           |         | Fishing Oil & Gas Biodiversity                      |         | Low → Medium → <b>High</b>         | Watch-keeping → Regular and light → <b>Regular and light</b>                 |





# Libéria

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## LR – Liberia

Liberia's coast is largely composed of rocky littoral zones. Its shores are thin and very sensitive to erosion, especially because of the low sediment stocks which are gradually reduced with sand extraction for construction purposes.

A large proportion of the coastal community live in temporary and poorly constructed housing with little protection from rising sea levels or storm surges.

Many live on very low lying land, often in unplanned, illegal settlements and with the expected rise in sea levels as a result of climate change, combined with increasing storms and sea-surges with significant negative impacts on the lives and livelihoods of people in coastal areas.

Already, major economic sectors like fishing and farming are seriously affected as a result of increasing displacement of people caused by flooding and other climate change related disasters.

Considering this context, several project GEF at regional scale, national scales are effective in this territory:

- **"Strengthening of the Enabling Environment, Ecosystem-based Management and Governance to support Implementation of the Strategic Action Programme of the Guinea Current Large Marine Ecosystem (GCLME)"** (GEF-6, GEF Project ID 9911, Approval Fiscal Year: 2018)<sup>1</sup>.

A joint project that will be implemented by FAO, UNEP, UNDP and UNIDO to strengthen the regional governance and ecosystem-based management of the Guinea Current Large Marine Ecosystem (GCLME).

The project aims to strengthen regional and national capacities for Strategic Action Programme (SAP) implementation measures related to transboundary fisheries, biodiversity conservation and pollution reduction.

The project concept was approved during the 53rd GEF Council meeting, held in November 2017.

- **"Conservation and Sustainable use of Liberia's Coastal Natural Capital"** (GEF-6, GEF Project ID 9573, Approval Fiscal Year: 2019)<sup>2</sup>.

The project objective is to improve conservation and sustainable use of Liberia's coastal natural capital by mainstreaming the value of nature into Liberia's development trajectory.

The project outcomes are the following:

- ✓ Outcome 1.1 Decision-making improved in coastal ecosystem governance by mainstreaming natural capital accounting (NCA) into Government of Liberia (GOL) development strategy, policy and planning.
  - ➔ At least one natural capital account (mangroves) established and embedded in key government policies and plans.
  - ➔ At least 50 government officials and other relevant stakeholders trained on the technical aspects of NCA.

<sup>1</sup> <https://www.thegef.org/project/conservation-and-sustainable-use-liberia-s-coastal-natural-capital>

<sup>2</sup> <https://www.thegef.org/project/conservation-and-sustainable-use-liberia-s-coastal-natural-capital>



- ✓ Outcome 2.1 Funding sources for sustainable management and restoration of coastal ecosystems increased
  - ➔ Financial resources for the sustainable management and restoration of coastal ecosystems increased by 50%.
  - ➔ At least 2 new revenue streams to support the long-term sustainability developed.
  - ➔ Small grants provided to at least three local organizations.
- ✓ Outcome 3.1 Community-level conservation and sustainable use of coastal resources improved through performance-based payments using conservation agreements
  - ➔ 11,975 additional hectares of mangrove ecosystems under protection across Liberia.
  - ➔ 5,000 additional hectares of terrestrial forest ecosystems under sustainable management in coastal areas.
  - ➔ Income within coastal and mangrove communities targeted by the project improved by 50%.
- **"Improve Sustainability of Mangrove Forests and Coastal Mangrove Areas in Liberia through Protection, Planning and Livelihood Creation– as a Building Block Towards Liberia's Marine and Coastal OUTSTANDING NATURAL AREAS"** (GEF-5, GEF Project ID 5712, Approval Fiscal Year: 2014)<sup>3</sup>.
  - ✓ Outcome 1.1: Improved management effectiveness of existing and new OUTSTANDING NATURAL AREAS.
    - ➔ 15% of priority mangrove areas have been identified, delineated, and management plans to safeguard them completed.
    - ➔ 5% of priority mangrove forests is safeguarded through community-based Conservation Agreements and other legal mechanisms.
  - ✓ Outcome 2.1: Increase in sustainably managed landscapes and seascapes that integrate biodiversity conservation.
    - ➔ Priority Mangrove forest land-use planning integrated and mainstreamed in the wider landscape and subjected to 5- year M&E program for adaptive management.
    - ➔ No further deforestation within the 15% of priority mangroves and surrounding buffer areas through addressing drivers of deforestation and improving people's livelihoods.
    - ➔ Capacity and awareness of key government agencies and local communities on mangrove forest conservation and sustainable use substantially improved.

Project at localities scale are presented in the rest of the document.

<sup>3</sup> <https://www.thegef.org/project/improve-sustainability-mangrove-forests-and-coastal-mangrove-areas-liberia-through>



# LR1 SIERRA LEONE – ROBERTSPORT – MONROVIA

| LR1-a                     | 82 – SIERRA LEONE – ROBERTSPORT                                                                                                                                                                                                                                                                                                                                                   |             |     |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                   |             |     |
| DIAGNOSTIC                | Vast sector of wetlands behind the coastline.<br>Practically uninhabited, but some agricultural clearing on sandy terraces.<br>Straight coastline, narrow rims-lidos separating channels parallel to the shore.                                                                                                                                                                   |             |     |
| DYNAMICS                  | Highly localized situations related to the presence of rocky outcrops and exposure to ocean waves at the level of the Robertsport breakwater.<br>North part very unstable with sandy spits in the lagoon mouth and long rim–lido separating a lagoon channel from the shore towards the north.                                                                                    |             |     |
| STAKES                    | Area not suitable for agriculture, in wetlands or very fragile sands (white sands leached by the high rainfall as soon as the vegetation coverage has disappeared).<br>Would be suitable rather to be included in a vast bi–national protected area stretching as far as Sherbro island.                                                                                          |             |     |
| RECOMMANDATION            | Consider a study of transboundary conservation unit with Sierra Leone (see above).                                                                                                                                                                                                                                                                                                |             |     |
| MONITORING                | No survey                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY | Low |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                                                                                                                                                                   |             |     |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                                      |             |     |
| HAZARDS                   | Sector in accretion                                                                                                                                                                                                                                                                                                                                                               |             |     |
| MONITORING                | No survey                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY | Low |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                                                                                                                                                                   |             |     |
| EVOLUTION OF STAKES       | No report                                                                                                                                                                                                                                                                                                                                                                         |             |     |
| CURRENT PROJECTS          | –                                                                                                                                                                                                                                                                                                                                                                                 |             |     |
| OUTSTANDING NATURAL AREAS | <b>Lake Piso National Park (proposed)</b> <ul style="list-style-type: none"><li>WDPA ID: 555542457</li><li>Affected sectors: LR1-a / LR1-b / LR1-c</li></ul> <b>Lake Piso Ramsar site</b> <ul style="list-style-type: none"><li>WII ID: 1LR001 – 1306 / WDPA ID: 901219</li><li>Affected sectors: LR1-a / LR1-b / LR1-c</li><li>Designation on July 2, 2003 (76,091 ha)</li></ul> |             |     |
| HAZARDS                   | Area needs to be given priority because it has been subjected to constant sea erosion. These is a need for the construction of revetment to prevent further sea erosion.                                                                                                                                                                                                          |             |     |
| RECOMMENDATIONS           | Sector in accretion, and growing amount of seagrass that is hampering fishery activities (pollution).                                                                                                                                                                                                                                                                             |             |     |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY | Low |





SIERRE-LEONE – ROBERTSPORT

2006



2016





| LR1-b                     |                                                                                                                                                                                                                                                                                                                                                                                   | 83 – ROBERTSPORT      |  |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                   |                       |  |
| DIAGNOSTIC                | The intrusion of basic rocks from the Robertsport breakwater plays an important role in the structuring of the coastal current system.<br>Marine protected area of Cape Mount.<br>Robertsport is a small village at the foot of the rocky breakwater connected by a track towards Monrovia.<br>The coast north of Robertsport is straight and fragile.                            |                       |  |
| DYNAMICS                  | Highly localised situations related to the presence of rocky outcrops and exposure to ocean waves at the level of the breakwater. Sandy spits very unstable at the level of the mouth of the lagoon.                                                                                                                                                                              |                       |  |
| STAKES                    | Preservation of the biological diversity of a system of more or less well-preserved landscape and forestry sites.                                                                                                                                                                                                                                                                 |                       |  |
| RECOMMENDATION            | Consider a study of transboundary conservation unit with Sierra Leone (see above).                                                                                                                                                                                                                                                                                                |                       |  |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY    Low    |  |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                                                                                                                                                                   |                       |  |
| EVOLUTION OF STAKES       | Hotel and Tourism developments.                                                                                                                                                                                                                                                                                                                                                   |                       |  |
| HAZARDS                   | Sector in accretion                                                                                                                                                                                                                                                                                                                                                               |                       |  |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY    Low    |  |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                                                                                                                                                                   |                       |  |
| EVOLUTION OF STAKES       | Hotel and Tourism developments.<br>Construction of facility for fish preservation under the West Africa Regional Fishery Project <sup>4</sup> (WARFP).                                                                                                                                                                                                                            |                       |  |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                                                                                                                                 |                       |  |
| OUTSTANDING NATURAL AREAS | <b>Lake Piso National Park (proposed)</b> <ul style="list-style-type: none"><li>WDPA ID: 555542457</li><li>Affected sectors: LR1-a / LR1-b / LR1-c</li></ul> <b>Lake Piso Ramsar site</b> <ul style="list-style-type: none"><li>WII ID: 1LR001 – 1306 / WDPA ID: 901219</li><li>Affected sectors: LR1-a / LR1-b / LR1-c</li><li>Designation on July 2, 2003 (76,091 ha)</li></ul> |                       |  |
| HAZARDS                   | Sector in accretion.<br>Pollution from residential activities.<br>Seagrass affecting fishery activities.                                                                                                                                                                                                                                                                          |                       |  |
| RECOMMENDATIONS           | Area needs to be given priority because it has been subjected to constant sea erosion. There is a need for the construction of revetment to prevent further sea erosion.                                                                                                                                                                                                          |                       |  |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY    Medium |  |

<sup>4</sup> <http://spsr.org/en/west-africa-regional-fisheries-program-warfp>



| LR1-c                     | 84 – LAKE PISO                                                                                                                                                                                                                                                                                                                                                                                      |                    |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                     |                    |
| DIAGNOSTIC                | Vast lagoon of around 100,000 hectares, subject to the tide with adjoining wetlands. Tendency to siltation, and to filling in of outlets.                                                                                                                                                                                                                                                           |                    |
| DYNAMICS                  | No remarks.                                                                                                                                                                                                                                                                                                                                                                                         |                    |
| STAKES                    | Preservation of the biological diversity of a system of sites and wetlands.                                                                                                                                                                                                                                                                                                                         |                    |
| RECOMMANDATION            | Consider a study of transboundary conservation unit with Sierra Leone.                                                                                                                                                                                                                                                                                                                              |                    |
| MONITORING                | No survey                                                                                                                                                                                                                                                                                                                                                                                           | CRITICALITY Low    |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                                                                                                                                                                                     |                    |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                                                        |                    |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                                                                        |                    |
| MONITORING                | No survey                                                                                                                                                                                                                                                                                                                                                                                           | CRITICALITY Low    |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                                                                                                                                                                                     |                    |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                                                        |                    |
| CURRENT PROJECTS          | –                                                                                                                                                                                                                                                                                                                                                                                                   |                    |
| OUTSTANDING NATURAL AREAS | <b>Lake Piso National Park (proposed)</b> <ul style="list-style-type: none"><li>• WDPA ID: 555542457</li><li>• Affected sectors: LR1-a / LR1-b / LR1-c</li></ul> <b>Lake Piso Ramsar site</b> <ul style="list-style-type: none"><li>• WII ID: 1LR001 – 1306 / WDPA ID: 901219</li><li>• Affected sectors: LR1-a / LR1-b / LR1-c / LR1-d</li><li>• Designation on July 2, 2003 (76,091 ha)</li></ul> |                    |
| HAZARDS                   | Harvesting of mangrove.<br>Sand mining.                                                                                                                                                                                                                                                                                                                                                             |                    |
| RECOMMENDATIONS           | Area should be developed into a research and training center because of its high ecological values.                                                                                                                                                                                                                                                                                                 |                    |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY Medium |



| LR1-d                     |                                                                                                                                                                                                                                                                                                                                                                                           | 85 – EAST ROBERTSPORT – MONROVIA |        |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                           |                                  |        |
| DIAGNOSTIC                | Slightly undulating, straight littoral to Lofa estuary, then straight.<br>Almost continuous presence of channels and wetlands parallel to the shore.<br>Very narrow littoral rims.<br>Practically uninhabited coastline.<br>Wetlands around the Lofa estuary, the whole area seems to offer great diversity.                                                                              |                                  |        |
| DYNAMICS                  | No remarks.                                                                                                                                                                                                                                                                                                                                                                               |                                  |        |
| STAKES                    | Conservation of the biological diversity of a system of sites and wetlands.                                                                                                                                                                                                                                                                                                               |                                  |        |
| RECOMMENDATION            | Consider a study of transboundary conservation unit with Sierra Leone (see above).                                                                                                                                                                                                                                                                                                        |                                  |        |
| MONITORING                | No survey                                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY                      | Low    |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                                                                                                                                                                           |                                  |        |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                                              |                                  |        |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                                                              |                                  |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY                      | Medium |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                                                                                                                                                                           |                                  |        |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                                              |                                  |        |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                                                                                                                                         |                                  |        |
| OUTSTANDING NATURAL AREAS | <b>Lake Piso National Park (proposed)</b> <ul style="list-style-type: none"><li>WDPA ID: 555542457</li><li>Affected sectors: LR1-a / LR1-b / LR1-c</li></ul> <b>Lake Piso Ramsar site</b> <ul style="list-style-type: none"><li>WII ID: 1LR001 – 1306 / WDPA ID: 901219</li><li>Affected sectors: LR1-a / LR1-b / LR1-c / LR1-d</li><li>Designation on July 2, 2003 (76,091 ha)</li></ul> |                                  |        |
| HAZARDS                   | Growing of seagrass that's affecting fishery activities.                                                                                                                                                                                                                                                                                                                                  |                                  |        |
| RECOMMENDATIONS           | Develop a robust observer program to track changes in the environment.                                                                                                                                                                                                                                                                                                                    |                                  |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY                      | Low    |



## LR2 AREA UNDER THE INFLUENCE OF MONROVIA

The entire Monrovia area has been subject to large influxes of populations during the periods of instability in Liberia. The rehabilitation of precarious settlements appears to be a priority for urban development, which should be associated with the structuring of a sea front and secured urban beaches. The establishment of suitable infrastructure for landing fishing catches on a site which remains to be determined.

Monrovia has accumulated a number of problems with a high level of settlements concerned that generate real risks:

- Risk of flooding,
- Risks related to sea level rise,
- Coastal erosion, including rocky coasts,
- Instability of the coast which is extremely sensitive to any coastal developments.

In terms of local geodynamics, Monrovia breakwater plays a structural role in all Liberia's coastal current system.

**"Enhancing Resilience Of Liberia Montserrado County Vulnerable Coastal Areas To Climate Change Risks"** (GEF-6, GEF Project ID 8015, Approval Fiscal Year: 2017) . The project objective is to reduce CRITICALITY and build resilience of local communities and socio-economic sectors to the threats of climate change in Liberia's coastal County of Montserrado with two outcomes:

- Capacity of Montserrado County Authority to plan and respond to climate change is strengthened
- At the sites of Hotel Africa and Kru Town, sustainable and affordable measures to protect coastal areas against climate change impacts are demonstrated.

This add-on, an extension of the previous coastal project directly responds to the NAPA-identified priority.

Within that priority, the project will directly intervene at D-Tweh and New Kru Town areas. The two areas are seriously under threat from climate change induced coastal erosion.

As demonstrated in Buchanan under the previous project, this initiative will demonstrate how low-cost, low-technology sustainable measures can be adapted to address the effects of climate change in the Liberian context.

New Kru Town has a population of 20,000 people and has the second referral hospital in Montserrado County. The most important Government High School, D-Tweh, is also strategically located in that community and has been partially wiped out due to the rising sea levels.



| LR2-a                     |                                                                                                                                                                                                                                                                                    | 86 – NORTH OF SAINT-PAUL RIVER – RIGHT BANK |           |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-----------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                    |                                             |           |
| DIAGNOSTIC                | Very narrow fluviomarine terrace with the Africa hotel complex / OAU village in an almost insular position.<br>Coastline in a thin rim bordered with wetlands.                                                                                                                     |                                             |           |
| DYNAMICS                  | Area undergoing erosion still subject to impacts of the development of Monrovia harbour.                                                                                                                                                                                           |                                             |           |
| STAKES                    | While the terraces situated in depth can bear urban development as an alternative to the saturation of the Monrovia site, the characteristics of this coastal fringe make it unsuitable for the safe, sustainable development of periurban residential districts on the sea front. |                                             |           |
| RECOMMANDATION            | Anticipate the development of residential districts and possibly planning of such districts in a global sea front scheme that respects the constraints of the site.                                                                                                                |                                             |           |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                              | CRITICALITY                                 | High      |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                                                                    |                                             |           |
| EVOLUTION OF STAKES       | Border of the urban extension North-West of Monrovia                                                                                                                                                                                                                               |                                             |           |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                       |                                             |           |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                              | CRITICALITY                                 | High      |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                                                                    |                                             |           |
| EVOLUTION OF STAKES       | Urbanization (Hotel and Tourism development)                                                                                                                                                                                                                                       |                                             |           |
| CURRENT PROJECTS          | –                                                                                                                                                                                                                                                                                  |                                             |           |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                 |                                             |           |
| HAZARDS                   | Flooding<br>Coastal erosion<br>Sand mining                                                                                                                                                                                                                                         |                                             |           |
| RECOMMENDATIONS           | Consider the need for the construction of revetment due to intense erosion of the coastline.                                                                                                                                                                                       |                                             |           |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                              | CRITICALITY                                 | Very high |



| LR2-b                     | 87 – INTERIOR LAGOON – NEWKRU TOWN                                                                                                                                                                                                                                                |             |           |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                   |             |           |
| DIAGNOSTIC                | Sector with significant amount of precarious human settlement on flood-prone former mangrove swamp, surrounding more or less planned urbanisation on low fan-shaped hills opening onto wetlands.                                                                                  |             |           |
| DYNAMICS                  | High risk of flooding / submersion.                                                                                                                                                                                                                                               |             |           |
| STAKES                    | Large area of dense habitation in an area with a high risk of flooding in the event of surges associated with continental spates and/or a future rise in sea level.                                                                                                               |             |           |
| RECOMMENDATION            | Early warning system.<br>Flood risk prevention plan.<br>In the long term, relocation of the population.                                                                                                                                                                           |             |           |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                             | CRITICALITY | Very high |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                                                                   |             |           |
| EVOLUTION OF STAKES       | -                                                                                                                                                                                                                                                                                 |             |           |
| HAZARDS                   | -                                                                                                                                                                                                                                                                                 |             |           |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                             | CRITICALITY | Very high |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                                                                   |             |           |
| EVOLUTION OF STAKES       | Urbanization (Hotel and Tourism development).                                                                                                                                                                                                                                     |             |           |
| CURRENT PROJECTS          | Global Environmental Facility/UNDP (2018/2019), Government of Liberia (2020). The outcome of the project was to protect the township of Newkru town, safe vulnerable women, improve climate resilience and built the capacity of technicians at the Ministry of Mines and Energy. |             |           |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                |             |           |
| HAZARDS                   | Flooding.<br>Coastal erosion.<br>Sand mining.                                                                                                                                                                                                                                     |             |           |
| RECOMMENDATIONS           | Should consider the construction of revetment.<br>Extension of the project by the Government of Liberia should cover the entire area in order to protect the settlement and its inhabitants.                                                                                      |             |           |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                             | CRITICALITY | Very high |





| LR2-c                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 88 - WEST POINT – MESURADO MOUTH AND PORT AREA |           |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-----------|
| BASELINE - 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                |           |
| DIAGNOSTIC                | This sector and the previous one (former interior lagoon, former mangrove) concentrate almost all of the most serious risks in Liberia.<br>Coastline in a complex, highly artificialised situation.<br>Harbour sheltered by the sediment systems of the interior lagoon and the St Paul river by two dykes.                                                                                                                                              |                                                |           |
| DYNAMICS                  | Sediment drift current oriented somewhat westward.<br>Tendency to accretion blocked by the South pier and to erosion guided by the North pier on the urban beach North of the harbour, also of fishing landing point.<br>The sandy spit of West point seems to be in a state of dynamic equilibrium in the medium term, with, however, phases of erosion and accretion and serious risks of submersion in the event of ocean overhang.                   |                                                |           |
| STAKES                    | Very low area topographically with large sectors of unplanned, very dense, at risk habitation at the level of West Point and North of the port.                                                                                                                                                                                                                                                                                                          |                                                |           |
| RECOMMANDATION            | Control of sea front urbanization. Draw up sector scheme allowing for requalification (withdrawal? Relocation?) of the at-risk fishermen's districts.                                                                                                                                                                                                                                                                                                    |                                                |           |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY                                    | Very high |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                |           |
| EVOLUTION OF STAKES       | -                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                |           |
| COASTAL PROTECTION        | Monrovia's free port is composed of two piers / breakwater in the bay of Monrovia. It is a port which has licensing partners with APM Terminals, Firestone, China and the Western Cluster. It is the largest port in Liberia. It was originally built by the US military for strategic purposes during the Second World War.<br>3 piers belong to Liberia Mining Company (LMC), National Iron Ore Company (NIOC) and the Bong Mines Company (BMC) Piers. |                                                |           |
| HAZARDS                   | Extraction of sand for construction purposes.                                                                                                                                                                                                                                                                                                                                                                                                            |                                                |           |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY                                    | Very high |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                |           |
| EVOLUTION OF STAKES       | -                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                |           |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                |           |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                |           |
| HAZARDS                   | Coastal erosion, serious flooding, plastic pollution and sand mining.                                                                                                                                                                                                                                                                                                                                                                                    |                                                |           |
| RECOMMENDATIONS           | The need for the construction of revetment particularly on the West Point side (in the township of Westpoint).                                                                                                                                                                                                                                                                                                                                           |                                                |           |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY                                    | Very high |



| LR2-d                     | 89 – MAMBA POINT – SINKOR                                                                                                                                                                                                                                                                                  |             |      |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                            |             |      |
| DIAGNOSTIC                | Historical town with planned grid on the peninsular site, with precarious islets of habitation. Coastline with headlands, undulating, very exposed to ocean waves, with residential settlements on the seashore. Vast urban beach, divided by rocky headland but subject to erosion                        |             |      |
| DYNAMICS                  | Straight coastline undergoing erosion in places.                                                                                                                                                                                                                                                           |             |      |
| STAKES                    | Main urban beach in Monrovia, sector scheme and sea front development desirable.                                                                                                                                                                                                                           |             |      |
| RECOMMENDATION            | Main urban beach in Monrovia, sector scheme and sea front development desirable.                                                                                                                                                                                                                           |             |      |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                      | CRITICALITY | High |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                                                                                            |             |      |
| EVOLUTION OF STAKES       | -                                                                                                                                                                                                                                                                                                          |             |      |
| HAZARDS                   | Sand extraction for construction purposes.                                                                                                                                                                                                                                                                 |             |      |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                      | CRITICALITY | High |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                                                                                            |             |      |
| EVOLUTION OF STAKES       | -                                                                                                                                                                                                                                                                                                          |             |      |
| CURRENT PROJECTS          | Global Environmental Facility/UNDP (2018/2019), Government of Liberia (2020). The outcome of the project was to protect the township of Newkru town, safe vulnerable women, improve climate resilience and built the capacity of technicians at the Ministry of Mines and Energy.                          |             |      |
| OUTSTANDING NATURAL AREAS | <b>Mesurado Wetlands Ramsar site</b> <ul style="list-style-type: none"><li>WII / Ramsar: WII ID: 1LR004 – 1631 / WDPA ID: 902909</li><li>Affected sectors: LR2-d / LR2-e / LR2-f</li><li>Designation on August 24, 2006 (6,760 ha)</li><li>The Ramsar site boundaries are not available in WDPA.</li></ul> |             |      |
| HAZARDS                   | Sand extraction<br>Coastal erosion<br>Flooding<br>Plastic pollution.                                                                                                                                                                                                                                       |             |      |
| RECOMMENDATIONS           | Consider for the construction of revetment from Mamba point to Sinkor.                                                                                                                                                                                                                                     |             |      |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                          | CRITICALITY | High |



| LR2-e                     | 90 - SINKOR – PAYNESVILLE                                                                                                                                                                                                                                                                                          |                          |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| BASELINE - 2010           |                                                                                                                                                                                                                                                                                                                    |                          |
| DIAGNOSTIC                | Straight coastline sector adjacent to wetlands. urbanised, mixed residential, islets of precarious settlements.                                                                                                                                                                                                    |                          |
| DYNAMICS                  | Straight coastline undergoing littoral with local erosion.                                                                                                                                                                                                                                                         |                          |
| STAKES                    | Low-lying landform, flood risks.                                                                                                                                                                                                                                                                                   |                          |
| RECOMMANDATION            | Control urbanization along sea front.                                                                                                                                                                                                                                                                              |                          |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                              | CRITICALITY    High      |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                                                                                                    |                          |
| EVOLUTION OF STAKES       | -                                                                                                                                                                                                                                                                                                                  |                          |
| HAZARDS                   | Sand extraction for construction purposes.                                                                                                                                                                                                                                                                         |                          |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                  | CRITICALITY    High      |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                                                    |                          |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                       |                          |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                                                                  |                          |
| OUTSTANDING NATURAL AREAS | <b>Mesurado Wetlands Ramsar site</b> <ul style="list-style-type: none"><li>• WII / Ramsar: WII ID: 1LR004 – 1631 / WDPA ID: 902909</li><li>• Affected sectors: LR2-d / LR2-e / LR2-f</li><li>• Designation on August 24, 2006 (6,760 ha)</li><li>• The Ramsar site boundaries are not available in WDPA.</li></ul> |                          |
| HAZARDS                   | Sand extraction.<br>Serious sea erosion (Sinkor).<br>Flooding.<br>Plastic pollution.                                                                                                                                                                                                                               |                          |
| RECOMMENDATIONS           | Consider for the construction of revetment.                                                                                                                                                                                                                                                                        |                          |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                              | CRITICALITY    Very high |



| LR2-f                     |                                                                                                                                                                                                                                                                                                                    | 91 – PAYNESVILLE – MARGIBI (MAMGBALI) |           |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                    |                                       |           |
| DIAGNOSTIC                | Predominantly residential housing, concessions on the edge of the seafront.                                                                                                                                                                                                                                        |                                       |           |
| DYNAMICS                  | Littoral with headlands and coves subject to erosion.                                                                                                                                                                                                                                                              |                                       |           |
| STAKES                    | Mastery of buildings in gradual densification on the seaside.                                                                                                                                                                                                                                                      |                                       |           |
| RECOMMANDATION            | Mastery of seafront urbanisation.                                                                                                                                                                                                                                                                                  |                                       |           |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                              | CRITICALITY                           | Medium    |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                                                                                                    |                                       |           |
| EVOLUTION OF STAKES       | Development of some tourist infrastructure.                                                                                                                                                                                                                                                                        |                                       |           |
| HAZARDS                   | Sand extraction for construction purposes.                                                                                                                                                                                                                                                                         |                                       |           |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                  | CRITICALITY                           | High      |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                                                                                                    |                                       |           |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                       |                                       |           |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                                                                  |                                       |           |
| OUTSTANDING NATURAL AREAS | <b>Mesurado Wetlands Ramsar site</b> <ul style="list-style-type: none"><li>• WII / Ramsar: WII ID: 1LR004 – 1631 / WDPA ID: 902909</li><li>• Affected sectors: LR2-d / LR2-e / LR2-f</li><li>• Designation on August 24, 2006 (6,760 ha)</li><li>• The Ramsar site boundaries are not available in WDPA.</li></ul> |                                       |           |
| HAZARDS                   | Extraction of sand.<br>Flooding.<br>Sea erosion.                                                                                                                                                                                                                                                                   |                                       |           |
| RECOMMENDATIONS           | Full assessment of Paynesville to Margibi block needs to be done. This will allow for adequate reporting in the future and selection of sites for the construction of revetment.                                                                                                                                   |                                       |           |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                  | CRITICALITY                           | Very high |



| LR2-g                     | 92 – MARGIBI (MAMGBALI) – SOPWE TOWN                                                                                                                                                                                                                                           |             |      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                |             |      |
| DIAGNOSTIC                | Urbanisation growing towards the coast, residential huts and some hotels, all on the edge of the beach or North of the lagoon (Schefflin lagoon – approximately 3.5 km2) on terrain with often very low, complex topography (fan-shaped wetlands).<br>Extraction of materials. |             |      |
| DYNAMICS                  | Highly unstable straight coastline undergoing erosion. Reflective beaches on the rim. Marked erosion in the west of the sector (Barnes).                                                                                                                                       |             |      |
| STAKES                    | Schefflin lagoon is managed by the armed forces. It can therefore theoretically be considered protected. However, the opening of new sand extraction sites in the east may further deteriorate an already highly unstable rim.                                                 |             |      |
| RECOMMANDATION            | Reinforce protection of Schefflin lagoon.<br>Sector scheme to organise urban and residential development.                                                                                                                                                                      |             |      |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                              | CRITICALITY | High |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                |             |      |
| EVOLUTION OF STAKES       | -                                                                                                                                                                                                                                                                              |             |      |
| HAZARDS                   | Sand extraction for construction purposes.                                                                                                                                                                                                                                     |             |      |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                              | CRITICALITY | High |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                |             |      |
| EVOLUTION OF STAKES       | -                                                                                                                                                                                                                                                                              |             |      |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                              |             |      |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                             |             |      |
| HAZARDS                   | Sea erosion.<br>Flooding.                                                                                                                                                                                                                                                      |             |      |
| RECOMMENDATIONS           | Full assessment of Margibi to Sopwe Town block needs to be done. This will allow for adequate reporting in the future and selection of sites for the construction of revetment.                                                                                                |             |      |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                              | CRITICALITY | High |



| LR2-h                     | 93 - SOPWE TOWN – DOLOTA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |        |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------|
| BASELINE - 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |        |
| DIAGNOSTIC                | Discontinuous urbanisation extends along a narrow site in a peninsular situation surrounded by a system of wetlands and lagoons landward and isolated from the coastline by a series of lagoons and channels closed by a narrow, more or less straight coastal rim-lido.                                                                                                                                                                                                                                                                                  |             |        |
| DYNAMICS                  | Site of estuarine mouth, very unstable. Highly unstable estuary outlet site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |        |
| STAKES                    | Installation on the sandy spit seems to present high risks and should be reserved for temporary, light tourist facilities.                                                                                                                                                                                                                                                                                                                                                                                                                                |             |        |
| RECOMMANDATION            | Total ban on building on the sandy spit.<br>Withdrawal and relocation of at-risk habitations                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY | Medium |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |        |
| EVOLUTION OF STAKES       | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |        |
| HAZARDS                   | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY | Medium |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |        |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |        |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |        |
| OUTSTANDING NATURAL AREAS | <b>Margibi Mangrove National Park (proposed)</b> <ul style="list-style-type: none"><li>WDPA ID: 555542456</li><li>Affected sectors: LR2-h / LR3-a</li><li>A proposal to classify the Margibi Mangrove area as a national park was made in 2003.</li></ul> <b>Marshall Wetlands Ramsar site</b> <ul style="list-style-type: none"><li>WII ID: 1LR004 – 1630 / WDPA ID: 902909</li><li>Affected sectors: LR2-h / LR3-a</li><li>Designation on 24 August 2006 (12 168 ha)</li><li>The delineation of the Ramsar site is not available in the WDPA.</li></ul> |             |        |
| HAZARDS                   | Extraction of sand.<br>Flooding.<br>Sea erosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |        |
| RECOMMENDATIONS           | Need to be accessed by field visitation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY | Medium |



## LR3

## DOLOTA – BUCHANAN

| LR3-a                     | 94 – DOLOTA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| DIAGNOSTIC                | Very sparsely occupied area, with numerous wetlands close to the coastline.<br>Track close to the coast from Buchanan stretching for around thirty kilometres.<br>Long, very narrow rim – lido effective as the shore of a lagoon parallel to the coast.                                                                                                                                                                                                                                                                                                 |                       |
| DYNAMICS                  | The opportunity and the possibility of preserving areas of interest in terms of biodiversity: Wetlands, terraced forests, in particular around Buchanan.<br>The one around the small village of Dolota is connected to an almost intra-urban wetland in the eastern extension of Monrovia.                                                                                                                                                                                                                                                               |                       |
| STAKES                    | The opportunity and the possibility of preserving areas of interest in terms of biodiversity: Wetlands, terraced forests, in particular around Buchanan.<br>The one around the small village of Dolota is connected to an almost intra-urban wetland in the eastern extension of Monrovia.                                                                                                                                                                                                                                                               |                       |
| RECOMMENDATION            | Validate and define options to protect biodiversity.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY    Medium |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| EVOLUTION OF STAKES       | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |
| HAZARDS                   | Sand extraction for construction purposes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY    Medium |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| EVOLUTION OF STAKES       | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |
| OUTSTANDING NATURAL AREAS | <b>Margibi Mangrove National Park (proposed)</b> <ul style="list-style-type: none"><li>WDPA ID: 555542456</li><li>Affected sectors: LR2-h / LR3-a</li><li>A proposal to classify the Margibi Mangrove area as a national park was made in 2003.</li></ul> <b>Marshall Wetlands Ramsar site</b> <ul style="list-style-type: none"><li>WII ID: 1LR004 – 1630 / WDPA ID: 902909</li><li>Affected sectors: LR2-h / LR3-a</li><li>Designation on 24 August 2006 (12 168 ha)</li><li>The delineation of the Ramsar site is not available in the WDPA</li></ul> |                       |
| HAZARDS                   | Erosion.<br>Sand mining.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |
| RECOMMENDATIONS           | Requires actions to protect biodiversity.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY    Medium |





MARSHALL – DOLOTA

2012



2020





| LR3-b                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 95 – BUCHANAN            |  |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                          |  |
| DIAGNOSTIC                | Complex site, artificial, submerged groynes, erosion generalised despite a few sites undergoing accretion in places.<br>Urban habitations sometimes planned near the shore                                                                                                                                                                                                                                                                                                                                                                                                                |                          |  |
| DYNAMICS                  | Very dynamic site, alternating erosion and accretion areas.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          |  |
| STAKES                    | A site undergoing erosion to be controlled, extractions of materials prohibited today and relocated to Upper Buchanan on the St John River estuary in the North.<br>Erosion seems to be largely related to harbour developments and material extraction.                                                                                                                                                                                                                                                                                                                                  |                          |  |
| RECOMMENDATION            | Total ban on building between the urban coastal roads and the shore.<br>Withdrawal and relocation of at-risk habitations.<br>Sector scheme able to incorporate some improvements if cost compatible with the stakes.                                                                                                                                                                                                                                                                                                                                                                      |                          |  |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY    High      |  |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                          |  |
| EVOLUTION OF STAKES       | Port upgrade/railway connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |  |
| PORT INSTALLATIONS        | The port of Buchanan is the second port of Liberia, it is located in the south of the city of Buchanan, at 270 km southeast of Monrovia. It consists of two jetties / breakwater, the one located to the northwest includes a wooden pier. The port includes an iron ore terminal owned by Arcelor Mittal.<br>The modernization projects of the port are undertaken by UMARCO (subsidiary of Bolloré Africa Logistics). The development of the port of Buchanan is of interest to several companies that could use it in the long term (Chevron, Equatorial Palm Oil, African Petroleum). |                          |  |
| HAZARDS                   | Construction of the «first structured breakwater coating» of the coastal protection structure over a distance of six hundred (600) meters. This work was carried out between 2010 and 2014.                                                                                                                                                                                                                                                                                                                                                                                               |                          |  |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY    Very high |  |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                          |  |
| EVOLUTION OF STAKES       | Port upgrade and railway connection, urban area, fisheries activities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                          |  |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                          |  |
| OUTSTANDING NATURAL AREAS | Requires extension of revetment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |  |
| HAZARDS                   | Sea erosion<br>Sand mining                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |  |
| RECOMMENDATIONS           | Requires extension of revetment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |  |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY    Very high |  |



LR4

## BUCHANAN – RIVERCESS – GREENVILLE – GRANCESS

Zone 4 «Buchanan – Rivercess – Greenville – Granceess» is characterized as follows:

- Practically uninhabited sectors on the edge of the coastline, apart from a few villages always located in proximity to a headland and a small estuary.
- Sectors that are very isolated regarding the road network.
- Dense network of coastal rivers and five large rivers flowing into the coast in more or less extensive estuarine wetland complexes.
- Only one significant agglomeration apart from Greenville.
- Relatively uninhabited, post forest type coastal strip 50 km long. Islets of forestry under exploitation.

In the long term, the stakes concern the colonisation and intensification of clearing (as in Côte d'Ivoire) more in an inland direction. In general, the first two kilometres from the shore are relatively unsuitable for agriculture: wetlands, small terraces of fragile white sands.

The implementation of a programme to preserve the small estuaries (inventory of biological resources, organise and inform population and local authorities, sector schemes for areas under development) would be pertinent, with a view to early promotion of sustainable management methods for these rich, fragile milieus, in a context where human land use is still limited in an isolated environment.



| LR4-a                     | 96 – BUCHANAN – RIVERCESS                                                                                                                           |                 |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| BASELINE – 2010           |                                                                                                                                                     |                 |
| DIAGNOSTIC                | Coastal area of headlands and coves.<br>50 kilometres strip served by a secondary road.<br>Plantations and significant density of agricultural use. |                 |
| DYNAMICS                  | -                                                                                                                                                   |                 |
| STAKES                    | -                                                                                                                                                   |                 |
| RECOMMENDATION            | -                                                                                                                                                   |                 |
| MONITORING                | -                                                                                                                                                   | CRITICALITY -   |
| EVOLUTION 2010–2016       |                                                                                                                                                     |                 |
| EVOLUTION OF STAKES       | -                                                                                                                                                   |                 |
| HAZARDS                   | -                                                                                                                                                   |                 |
| MONITORING                | No survey                                                                                                                                           | CRITICALITY -   |
| EVOLUTION 2016–2020       |                                                                                                                                                     |                 |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                        |                 |
| CURRENT PROJECTS          | -                                                                                                                                                   |                 |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                  |                 |
| HAZARDS                   | Sea erosion.                                                                                                                                        |                 |
| RECOMMENDATIONS           | No                                                                                                                                                  |                 |
| MONITORING                | Watch-keeping                                                                                                                                       | CRITICALITY Low |



| LR4-b                     | 97 – RIVERCESS                                                                                                  |                 |
|---------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------|
| BASELINE - 2010           |                                                                                                                 |                 |
| DIAGNOSTIC                | Small town with landing strip.<br>Complex estuarine site difficult to turn into a port because of nearby reefs. |                 |
| DYNAMICS                  | -                                                                                                               |                 |
| STAKES                    | -                                                                                                               |                 |
| RECOMMANDATION            | -                                                                                                               |                 |
| MONITORING                | -                                                                                                               | CRITICALITY -   |
| EVOLUTION 2010-2016       |                                                                                                                 |                 |
| EVOLUTION OF STAKES       | -                                                                                                               |                 |
| HAZARDS                   | -                                                                                                               |                 |
| MONITORING                | No survey                                                                                                       | CRITICALITY Low |
| EVOLUTION 2016-2020       |                                                                                                                 |                 |
| EVOLUTION OF STAKES       | Not reported                                                                                                    |                 |
| CURRENT PROJECTS          | -                                                                                                               |                 |
| OUTSTANDING NATURAL AREAS | No                                                                                                              |                 |
| HAZARDS                   | Sea erosion.                                                                                                    |                 |
| RECOMMENDATIONS           | -                                                                                                               |                 |
| MONITORING                | Watch-keeping                                                                                                   | CRITICALITY Low |



| LR4-c                     | 96 – BUCHANAN – RIVERCESS                                                                                                                                                                                                           |                 |  |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--|
| BASELINE – 2010           |                                                                                                                                                                                                                                     |                 |  |
| DIAGNOSTIC                | Relatively uninhabited.<br>Coastal landscape sites of headlands and coves (Sasstown and King William) but tourist developments practically non-existent.                                                                            |                 |  |
| DYNAMICS                  | -                                                                                                                                                                                                                                   |                 |  |
| STAKES                    | -                                                                                                                                                                                                                                   |                 |  |
| RECOMMENDATION            | -                                                                                                                                                                                                                                   |                 |  |
| MONITORING                | -                                                                                                                                                                                                                                   | CRITICALITY -   |  |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                     |                 |  |
| EVOLUTION OF STAKES       | -                                                                                                                                                                                                                                   |                 |  |
| HAZARDS                   | -                                                                                                                                                                                                                                   |                 |  |
| MONITORING                | No survey                                                                                                                                                                                                                           | CRITICALITY Low |  |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                     |                 |  |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                        |                 |  |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                   |                 |  |
| OUTSTANDING NATURAL AREAS | <b>Senkwehn National Park (proposed)</b> <ul style="list-style-type: none"><li>• WDPA ID: 36026</li><li>• Affected sector: LR4-c</li><li>• A proposal was made in 2003 to classify the Senkhwehn area as a national park.</li></ul> |                 |  |
| HAZARDS                   | Sea erosion.                                                                                                                                                                                                                        |                 |  |
| RECOMMENDATIONS           | Required field visitation.                                                                                                                                                                                                          |                 |  |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                       | CRITICALITY Low |  |

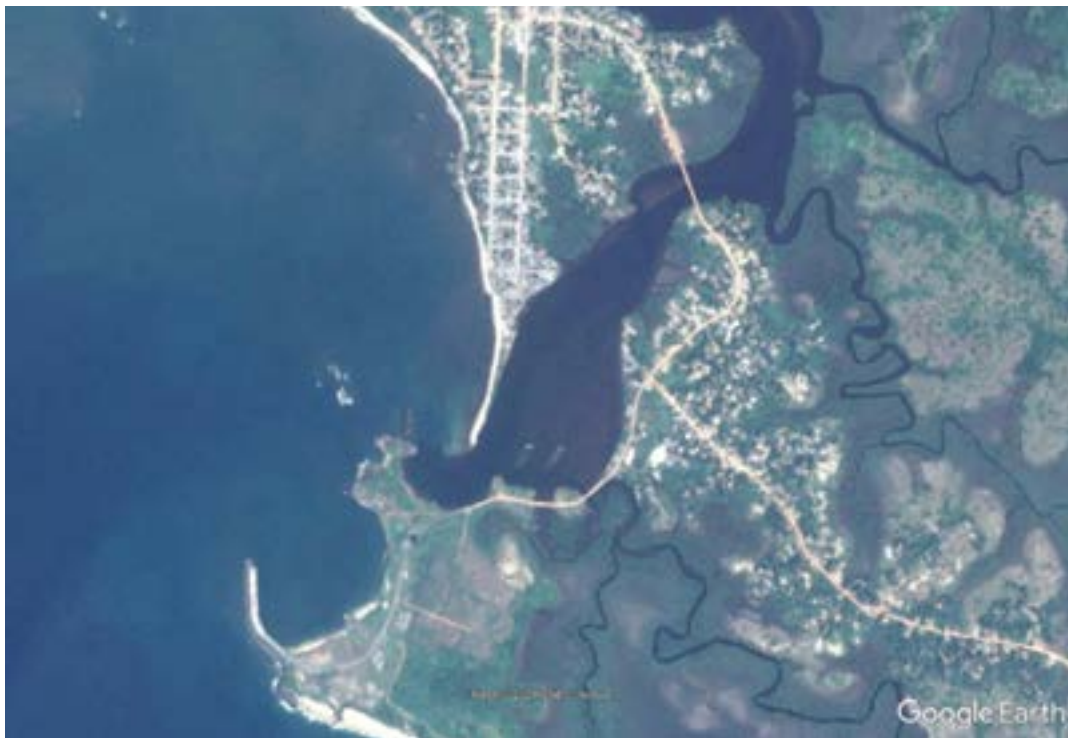


| LR4-d                     | 99 – GREENVILLE                                                                                                                                                                                                                                                                                                                                       |                       |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                       |                       |
| DIAGNOSTIC                | Agglomeration with planned grid, town structured in several natural islets separated by wetlands and port on the estuary.<br>Headland with port and pier.<br>Town relatively isolated from the road network.                                                                                                                                          |                       |
| DYNAMICS                  | -                                                                                                                                                                                                                                                                                                                                                     |                       |
| STAKES                    | -                                                                                                                                                                                                                                                                                                                                                     |                       |
| RECOMMENDATION            | -                                                                                                                                                                                                                                                                                                                                                     |                       |
| MONITORING                | -                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY -         |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                                                                                       |                       |
| EVOLUTION OF STAKES       | Rapid, though still moderate development of Greenville, following the planned scheme.                                                                                                                                                                                                                                                                 |                       |
| PORT INSTALLATIONS        | The port of Greenville is located in the South-Eastern region of the country, about 673 kilometres away from the Port of Monrovia in the Sino Bay.<br>The port is protected by a 400m-pier that includes two wharfs on its internal face.<br>The port is currently closed and it should reopen in 2012, to handle timber, iron, and palm oil exports. |                       |
| HAZARDS                   | -                                                                                                                                                                                                                                                                                                                                                     |                       |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                         | CRITICALITY Medium    |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                                                                                       |                       |
| EVOLUTION OF STAKES       | Gradual development of port and its facilities.                                                                                                                                                                                                                                                                                                       |                       |
| CURRENT PROJECTS          | No, but there are plans to begin the coastal protection process by 2021 GEF.                                                                                                                                                                                                                                                                          |                       |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                                                    |                       |
| HAZARDS                   | Sea erosion.<br>Flooding.<br>Sand mining.                                                                                                                                                                                                                                                                                                             |                       |
| RECOMMENDATIONS           | Needs for the construction of revetment                                                                                                                                                                                                                                                                                                               |                       |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                 | CRITICALITY Very high |



GREENVILLE

2012



2020







| LR4-e                     | 100 – GREENVILLE – GRANCESS                                                                                                                                                                                                                               |                       |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                           |                       |
| DIAGNOSTIC                | Almost deserted coastline very marked headlands with rocky banks jutting out into the sea and reefs. Numerous segments of straight coastline with narrow rims-lidos, wetlands and channels parallel to the shore.                                         |                       |
| DYNAMICS                  | -                                                                                                                                                                                                                                                         |                       |
| STAKES                    | -                                                                                                                                                                                                                                                         |                       |
| RECOMMANDATION            | -                                                                                                                                                                                                                                                         |                       |
| MONITORING                | -                                                                                                                                                                                                                                                         | CRITICALITY -         |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                           |                       |
| EVOLUTION OF STAKES       | Rapid, though still moderate development of Greenville, following the planned scheme.                                                                                                                                                                     |                       |
| HAZARDS                   | Local accretion situations in the mouths of small estuaries.                                                                                                                                                                                              |                       |
| MONITORING                | No survey                                                                                                                                                                                                                                                 | CRITICALITY Low       |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                           |                       |
| EVOLUTION OF STAKES       | -                                                                                                                                                                                                                                                         |                       |
| CURRENT PROJECTS          | No, but there are plans to begin the coastal protection process by 2021 particularly on the Greenville side.                                                                                                                                              |                       |
| OUTSTANDING NATURAL AREAS | <b>Grand Kru-River Gee National Park (proposed)</b> <ul style="list-style-type: none"><li>• WDPA ID: 555512169</li><li>• Affected sector: LR4-e</li><li>• A proposal was made in 2003 to classify the «GrendKru» river area as a national park.</li></ul> |                       |
| HAZARDS                   | Sea erosion.<br>Flooding.<br>Sand mining.                                                                                                                                                                                                                 |                       |
| RECOMMENDATIONS           | Needs for the construction of revetment.                                                                                                                                                                                                                  |                       |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                     | CRITICALITY Very high |



## LR5

## GRANCESS – CAP PALMAS

| LR5-a                     | 101 – GRANCESS                                                                                                                                                                                                                                                                                                                                                                                   |                       |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| DIAGNOSTIC                | Vast system of more or less wooded wetlands, coastal white sands and estuarine lagoons.<br>Sector uninhabited in the eastern part.<br>Granceess is a small town with a planned grid, including an attempted housing scheme.<br>Road connection to the north on hills turned into savannah towards Niebo and rubber plantations.<br>Track on a small terrace in the east<br>Oil palm plantations. |                       |
| DYNAMICS                  | No information.                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| STAKES                    | Conservation unit to be envisaged, development of ecotourism.                                                                                                                                                                                                                                                                                                                                    |                       |
| RECOMMANDATION            | Encourage low impact tourist development in organised circuits.                                                                                                                                                                                                                                                                                                                                  |                       |
| MONITORING                | No survey                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY    Low    |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| EVOLUTION OF STAKES       | -                                                                                                                                                                                                                                                                                                                                                                                                |                       |
| HAZARDS                   | Localised erosion.                                                                                                                                                                                                                                                                                                                                                                               |                       |
| MONITORING                | No survey                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY    Low    |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| EVOLUTION OF STAKES       | -                                                                                                                                                                                                                                                                                                                                                                                                |                       |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                                                                                                                                                |                       |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                                                                                               |                       |
| HAZARDS                   | Sea erosion                                                                                                                                                                                                                                                                                                                                                                                      |                       |
| RECOMMENDATIONS           | Require field visitation.                                                                                                                                                                                                                                                                                                                                                                        |                       |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY    Medium |



| LR5-b                     | 102 – GRANCESS – HARPER                                                                                                                                        |             |        |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------|
| BASELINE – 2010           |                                                                                                                                                                |             |        |
| DIAGNOSTIC                | Coastline uninhabited except for two small villages.<br>Two rocky headlands of probable landscape value.<br>Several complexes of estuarine wetlands and lidos. |             |        |
| DYNAMICS                  | -                                                                                                                                                              |             |        |
| STAKES                    | -                                                                                                                                                              |             |        |
| RECOMMENDATION            | -                                                                                                                                                              |             |        |
| MONITORING                | -                                                                                                                                                              | CRITICALITY | Low    |
| EVOLUTION 2010–2016       |                                                                                                                                                                |             |        |
| EVOLUTION OF STAKES       | -                                                                                                                                                              |             |        |
| HAZARDS                   | -                                                                                                                                                              |             |        |
| MONITORING                | No survey                                                                                                                                                      | CRITICALITY | Low    |
| EVOLUTION 2016–2020       |                                                                                                                                                                |             |        |
| EVOLUTION OF STAKES       | -                                                                                                                                                              |             |        |
| CURRENT PROJECTS          | -                                                                                                                                                              |             |        |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                             |             |        |
| HAZARDS                   | Sea erosion                                                                                                                                                    |             |        |
| RECOMMENDATIONS           | Require field visitation.                                                                                                                                      |             |        |
| MONITORING                | Watch-keeping                                                                                                                                                  | CRITICALITY | Medium |



| LR5-c                     | 103 – HARPER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |
| DIAGNOSTIC                | Estuarine site, town on rocky, hilly peninsula.<br>Former administrative centre.<br>Wetlands at the back of the estuary to the north.<br>The surroundings of the town have been largely cleared.<br>Future harbour town if the area undergoes significant development.                                                                                                                                                                                                                                                                                                                                       |                 |
| DYNAMICS                  | No information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |
| STAKES                    | Future centre of border area development?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |
| RECOMMENDATION            | No recommendations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY Low |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |
| EVOLUTION OF STAKES       | The port of Harper is located in the South-eastern region of Liberia, close to the border with Côte-d'Ivoire, about 761 kilometres away from the port of Monrovia. It is built on the Russ wurn Rocky Island, connecting the latter to the mainland via a causeway-bridge, protected by a 150-metre levee. Its activities are mainly related to the export of log and sawn timbers from the country's South-eastern hinterland.<br>The port of Harper should be expanded to handle the traffic that will likely follow the palm oil sector's revival and other associated economic activities in the region. |                 |
| HAZARDS                   | There are some sites faced with localized erosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY Low |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |
| EVOLUTION OF STAKES       | Survey to anticipate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |
| HAZARDS                   | Sea erosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |
| RECOMMENDATIONS           | Flooding.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY Low |



| LR5-d                     | 104 – CAP PALMAS                                                                                                                                                                                                  |                    |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| BASELINE – 2010           |                                                                                                                                                                                                                   |                    |
| DIAGNOSTIC                | Small rocky area extending as far as Harper by a lagoon close to the coastline (lake Sheperd).<br>Long fragile lido east of Harper.<br>Border area which will possibly be subject to densification in the future. |                    |
| DYNAMICS                  | -                                                                                                                                                                                                                 |                    |
| STAKES                    | -                                                                                                                                                                                                                 |                    |
| RECOMMANDATION            | -                                                                                                                                                                                                                 |                    |
| MONITORING                | -                                                                                                                                                                                                                 | CRITICALITY -      |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                   |                    |
| EVOLUTION OF STAKES       | -                                                                                                                                                                                                                 |                    |
| HAZARDS                   | -                                                                                                                                                                                                                 |                    |
| MONITORING                | Watch-keeping                                                                                                                                                                                                     | CRITICALITY Low    |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                   |                    |
| EVOLUTION OF STAKES       | -                                                                                                                                                                                                                 |                    |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                 |                    |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                |                    |
| HAZARDS                   | Sea erosion.<br>Flooding.<br>Plastic pollution.                                                                                                                                                                   |                    |
| RECOMMENDATIONS           | Requires field visitation                                                                                                                                                                                         |                    |
| MONITORING                | Watch-keeping                                                                                                                                                                                                     | CRITICALITY Medium |



## SUMMARY TABLE

|         |                                                                                                                               |                                                                                                          |                                                                                                                  |                                                                                                                      |                                                                                                                           |                                                                                                                              |                                                                                                                                             |                                                                                                               |                                                                                                                                      |                                                                                                                                                       |                                                                                                          |
|---------|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| HABITAT | <br>Desert area                              | <br>Mangrove<br>Wetland | <br>Camp<br>Small village       | <br>Rural                           | <br>Rurban                               | <br>Urban                                  |                                                                                                                                             |                                                                                                               |                                                                                                                                      |                                                                                                                                                       |                                                                                                          |
| STAKES  | <br>Fishing<br>Fishing port<br>Landing areas | <br>Rice-growing        | <br>Palm oil<br>Palm plantation | <br>Trade<br>Commercial port        | <br>Trade+<br>Commercial port<br>Airport | <br>Oil & Gas<br>Explosion<br>Exploitation | <br>Extractive ind.<br>Salt, metal-bearing sand,<br>gold | <br>Tourism                | <br>(Tourism)<br>Unexploited outstanding<br>areas | <br>Biodiversity<br>Outstanding areas<br>(biodiversity, landscape) |                                                                                                          |
| HAZARDS | <br>Soil erosion                             | <br>Coastal erosion     | <br>Marine submergence          | <br>Pluvial and/or fluvial flooding | <br>Intrusion of saltwater               | <br>Pollution                              | <br>Anthropization                                       | <br>Sargasso proliferation | <br>Jellyfish proliferation                       | <br>Industrial risk                                                | <br>Nothing to report |

| N°                                               | REF   | NAME                                      | HABITAT | STAKES   |                 |                          | HAZARDS | CRITICALITY |      |           | MONITORING |           |                       |   |                       |   |                       |
|--------------------------------------------------|-------|-------------------------------------------|---------|----------|-----------------|--------------------------|---------|-------------|------|-----------|------------|-----------|-----------------------|---|-----------------------|---|-----------------------|
|                                                  |       |                                           |         |          |                 |                          |         | 2011        | 2016 | 2020      | 2011       | 2016      | 2020                  |   |                       |   |                       |
| LR1 SIERRA LEONE - ROBERTSPORT - MONROVIA        |       |                                           |         |          |                 |                          |         |             |      |           |            |           |                       |   |                       |   |                       |
| 82                                               | LR1-a | Sierra Leone - Robertsport                |         | Fishing  |                 | Biodiversity             |         | Low         | →    | Low       | →          | Low       | No monitoring         | → | No monitoring         | ↗ | Watch-keeping         |
| 83                                               | LR1-b | Robertsport                               |         | Fishing  | Tourism         | Biodiversity             |         | Low         | →    | Low       | ↗          | Medium    | Watch-keeping         | → | Watch-keeping         | ↗ | Regular and light     |
| 84                                               | LR1-c | Lake Piso                                 |         | Fishing  | Extractive Ind. | Biodiversity             |         | Low         | →    | Low       | ↗          | Medium    | No monitoring         | → | No monitoring         | ↗ | Regular and light     |
| 85                                               | LR1-d | East Robertsport - Monrovia               |         | Fishing  |                 | Biodiversity             |         | Low         | ↗    | Medium    | ↘          | Low       | No monitoring         | ↗ | Regular and light     | ↘ | Watch-keeping         |
| LR2 ZONE UNDER MONROVIA INFLUENCE                |       |                                           |         |          |                 |                          |         |             |      |           |            |           |                       |   |                       |   |                       |
| 86                                               | LR2-a | Saint-Paul north river - right shore      |         | Fishing  | Extractive Ind. | Tourism                  |         | High        | →    | High      | ↗          | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| 87                                               | LR2-b | Inner Lagoon                              |         | Fishing  | Extractive Ind. | Tourism                  |         | Very High   | →    | Very High | →          | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| 88                                               | LR2-c | West Point - Mesurado mouth and port zone |         |          | Trade           |                          |         | Very High   | →    | Very High | →          | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| 89                                               | LR2-d | Mamba Point - Sinkor                      |         |          | Extractive Ind. | Tourism                  |         | High        | →    | High      | →          | High      | Regular and intensive | → | Regular and intensive | ↘ | Regular and light     |
| 90                                               | LR2-e | Sinkor - Paynesville                      |         |          | Extractive Ind. | Tourism                  |         | High        | →    | High      | ↗          | Very High | Regular and light     | → | Regular and light     | ↗ | Regular and intensive |
| 91                                               | LR2-f | Paynesville - Mamgbai                     |         | Fishing  | Extractive Ind. | Tourism                  |         | Medium      | ↗    | High      | →          | High      | Regular and light     | → | Regular and light     | → | Regular and light     |
| 92                                               | LR2-g | Mamgbai - Sowe Town                       |         |          | Extractive Ind. | Tourism                  |         | High        | →    | High      | →          | High      | Regular and light     | → | Regular and light     | → | Regular and light     |
| 93                                               | LR2-h | Sowe Town - Dolota                        |         |          | Extractive Ind. | Tourism                  |         | Medium      | →    | Medium    | →          | Medium    | Regular and light     | → | Regular and light     | ↘ | Watch-keeping         |
| LR3 DOLOTA – BUCHANAN                            |       |                                           |         |          |                 |                          |         |             |      |           |            |           |                       |   |                       |   |                       |
| 94                                               | LR3-a | Dolota                                    |         | Fishing  | Extractive Ind. | Biodiversity             |         | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | → | Watch-keeping         | → | Watch-keeping         |
| 95                                               | LR3-b | Buchanan                                  |         | Fishing  | Trade           | Extractive Ind.          |         | High        | ↗    | Very High | →          | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| LR4 BUCHANAN - RIVERCESS - GREENVILLE - GRANCESS |       |                                           |         |          |                 |                          |         |             |      |           |            |           |                       |   |                       |   |                       |
| 96                                               | LR4-a | Buchanan - Rivercess                      |         |          |                 |                          |         | Low         | →    | Low       | →          | Low       | No monitoring         | → | No monitoring         | ↗ | Watch-keeping         |
| 97                                               | LR4-b | Rivercess                                 |         |          |                 |                          |         | Low         | →    | Low       | →          | Low       | No monitoring         | → | No monitoring         | ↗ | Watch-keeping         |
| 98                                               | LR4-c | Rivercess - Greenville                    |         |          |                 | (Tourism)                |         | Low         | →    | Low       | →          | Low       | No monitoring         | → | No monitoring         | ↗ | Watch-keeping         |
| 99                                               | LR4-d | Greenville                                |         |          | Trade           | Extractive Ind.          |         | Low         |      | Medium    |            | Very High | No monitoring         | ↗ | Watch-keeping         | ↗ | Regular and intensive |
| 100                                              | LR4-e | Greenville - Granceess                    |         |          | Extractive Ind. | Biodiversity             |         | Low         | →    | Low       | ↗          | Very High | No monitoring         | → | No monitoring         | ↗ | Regular and intensive |
| LR5 GRANCESS - CAP PALMAS                        |       |                                           |         |          |                 |                          |         |             |      |           |            |           |                       |   |                       |   |                       |
| 101                                              | LR5-a | Granceess                                 |         | Palm oil |                 | Tourism (Biodiversity)   |         | Low         | →    | Low       | ↗          | Medium    | No monitoring         | → | No monitoring         | ↗ | Watch-keeping         |
| 102                                              | LR5-b | Granceess - Harper                        |         |          |                 | (Tourism) (Biodiversity) |         | Low         | →    | Low       | ↗          | Medium    | No monitoring         | → | No monitoring         | ↗ | Watch-keeping         |
| 103                                              | LR5-c | Harper                                    |         |          | Trade           | (Biodiversity)           |         | Low         | →    | Low       | ↗          | High      | Watch-keeping         | → | Watch-keeping         | ↗ | Regular and light     |
| 104                                              | LR5-d | Cap Palmas                                |         |          |                 | (Biodiversity)           |         | Low         | →    | Low       | ↗          | Medium    | No monitoring         | ↗ | Watch-keeping         | → | Watch-keeping         |



# Côte d'Ivoire

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## CI – Côte d'Ivoire

The coastline of Côte d'Ivoire extends from east to west over 566 kilometers, making it one of the most extensive West African countries, just after Nigeria. At the interface between the land and the sea, it is in fact original, regarding both its richness and the unique biodiversity of its natural environments (lagoon, mangrove, river, dense wetlands or swamp, savannah), and the extent and intensity of human pressures that are exerted on them (agro-industry, urbanization, fishery, tourism ...). The intensive development of urban areas and infrastructure on the coastline exacerbates coastal degradation.

Under the coastal planning, Côte d'Ivoire developed a multi-sectoral investment plan (MSIP) for the Grand Lahou region as a pilot, and resilience projects are currently being implemented. The MSIP should be extended to other areas, to integrate climate change adaptation, disaster risk management and land development into the national and local development plans.

Mostly, Côte d'Ivoire is involved in the "Strengthening of the Enabling Environment, Ecosystem-based Management and Governance to support Implementation of the Strategic Action Program of the Guinea Current Large Marine Ecosystem" project<sup>1</sup>: GEF-6 (9911). This project aims at strengthening the regional governance and the GCLME ecosystem-based management by assisting counties in building their capacities for the Strategic Action Program implementation measures related to transboundary fisheries, biodiversity conservation and pollution reduction.

<sup>1</sup> <https://www.thegef.org/project/strengthening-enabling-environment-ecosystem-based-management-and-governance-support>





## CI1

## LIBERIA BORDER – SAN PEDRO

An "echeloned" coastline, where small rocky capes alternate with inlets or long sandy coves, with an evolutionary dynamic depending on very local conditions at each site surrounded by accentuated hilly topographic conditions.

High density of estuarine micro-lagoons, mouths of small coastal rivers.

Human land occupation density has remained very low for a long time near the coast, and limited to the outskirts of the four towns: Tabou, Grand Bereby and San Pedro. Completing the entire road connection, most often located less than 10 km from the coastline, harbingers a post-forest agricultural situation that is almost generalized in the medium term. Broadly, the habitat and villages remain retreated from the beaches.

The potential of attractive sites in terms of landscape and locally sheltered by the swell is important, but of limited use for local populations. Tourism development projects were considered (1970s-80s), but were limited by lack of international investment.

A strong agricultural densification on the hills with accentuated landform is very unlikely and, in this context, maintaining antenna tracks from the coastal road will always remain costly.

There is little fishery tradition among the natives, who are mostly focused on cash-crop (coffee, cocoa, rubber) and food farming, and therefore little interest in the seaside or beach habitat.

In the long term, the coastal occupation is only conceivable on sites, subject to a tourist development, with national and international partners.

When the time comes, it will be essential to support the investment in complying with the attractive landscape and environmental resources, and to be careful with the seafront developments.

The Ivorian coast experienced several episodes of major surges with destroyed buildings or infrastructure (2007, 2011, 2014, 2016 and 2018).



| CI1-a                               | 105 – CAVALLY ESTUARY – LIBERIA BORDER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |
| DIAGNOSTIC                          | Complex of wetlands, forests, various plant formations.<br>Sector largely cleared on the Ivorian side up to the coastline border.<br>Particular morphology of the estuary: spits turned inwards.<br>Very sparsely populated area, characterized by two small villages on either side of the border.                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |
| DYNAMICS                            | Estuarine mouth site, very unstable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |
| STAKES                              | No particular stake, potential densification in the future in case of business development on the Libe-<br>rian side and potential development of a port city in Harper.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |
| RECOMMENDATION                      | Potential establishment of a transboundary protected area of approximately 10,000 hectares on the<br>Cavally estuary.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY    Low |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |
| EVOLUTION OF STAKES                 | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |
| HAZARDS                             | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY    Low |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |
| EVOLUTION OF STAKES                 | The coast morphology offers enormous opportunities for a developed tourism and seaside recreation.<br>However, there is almost a lack of tourist facilities in this coastal segment and a low density of human<br>presence.<br>The low human occupation density on this coastline enables to design and implement a management<br>strategy without facing major population displacement issues.                                                                                                                                                                                                                                                                                                                                        |                    |
| CURRENT PROJECTS                    | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |
| OUTSTANDING NATURAL AREAS           | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |
| HAZARDS                             | Low erosion of the shoreline overall. Sedimentary movements on the foreshore indicate a retreat of<br>about -2.27±0.50m, or -0.45m/year over the 2015-2020 period <sup>2</sup> .<br>Rainfall regime disruption: <ul style="list-style-type: none"><li>• Decreased rainfall height by about 10% (2387 mm before this date and 2155.3 mm after 1992;</li><li>• Shortened rainy season by an average of 10 days compared to that before 1992 (14-17 April to<br/>31 July);</li><li>• Average rainfall after 2016:2276.2 mm, or a 6% increase compared to the 1993-2017 average<br/>aggregation;</li><li>• High flood risk in June (28% of the annual aggregation) and October (9% of the annual aggre-<br/>gation)<sup>3</sup>.</li></ul> |                    |
| RECOMMENDATIONS                     | Classifying the existing forest in the State domain.<br>Carrying out reforestation.<br>Developing agroforestry.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY    Low |

<sup>2</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) kinematic analysis of the coastline from Sentinel 1 images provided by ESA; cross-checking with localized field observations. Follow-up report, IGT – MARISCO Program, 12p.

<sup>3</sup> Sources: analysis of data from NOAA (2018) and SODEXAM (2018).

- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a: Detected homogeneous spatiotemporal rainfall structures in Côte d'Ivoire over the 1951–2017 period. Review of Geography for Regional Planning and Development of the South (South observations). Abidjan, Côte d'Ivoire, pp. 49–64.
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Recent interannual changes of major climate parameters in Côte d'Ivoire since 1951, Climate and Development, No. 26, pp. 5–16



| CI1-b                               | 106 - WEST TABOU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |
| DIAGNOSTIC                          | Sparsely populated segment<br>Largely cleared                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 |
| DYNAMICS                            | No observation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |
| STAKES                              | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |
| RECOMMANDATION                      | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |
| MONITORING                          | No monitoring                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY Low |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |
| EVOLUTION OF STAKES                 | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 |
| HAZARDS                             | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 |
| MONITORING                          | No monitoring                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY Low |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |
| EVOLUTION OF STAKES                 | The coastal morphology offers huge opportunities for a developed tourism and seaside recreation. However, there is almost a lack of tourist facilities in this coastal segment and a low human presence density.<br>The low human occupation density on this coastline enables to design and implement a management strategy without facing major population displacement issues.                                                                                                                                                                                                                                                                                                                                            |                 |
| CURRENT PROJECTS                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |
| OUTSTANDING NATURAL AREAS           | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |
| HAZARDS                             | Low erosion of the shoreline overall. Sedimentary movements, at the level of the foreshore, indicate a retreat of about -1.91±0.50m, or -0.38 m/year over the 2015-2020 period <sup>4</sup> .<br>Rainfall regime disruption: <ul style="list-style-type: none"><li>Decreased rainfall heights by 10%: 2387 mm before this date and 2155.3 mm after 1992;</li><li>Shortened rainy season by an average of 10 days compared to that before 1992 (14-17 April to 31 July);</li><li>Average rainfall after 2016: 2276.2 mm, or a 6% increase compared to the 1993-2017 average aggregation;</li><li>High flooding risk in June (28% of the annual aggregation) and October (9% of the annual aggregation)<sup>5</sup>.</li></ul> |                 |
| RECOMMENDATIONS                     | Classifying the existing forest in the State domain.<br>Carrying out reforestation.<br>Developing agroforestry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY Low |

<sup>4</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) kinematic analysis of the coastline from Sentinel 1 images provided by ESA; cross-checked with localized field observations. Follow-up report, IGT – MARISCO Program, 12p..

<sup>5</sup> Sources : analysis of data from:

- NOAA (2018) and SODEXAM (2018)
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a : Detected homogeneous spatiotemporal rainfall structures in Côte d'Ivoire over the 1951–2017 period. Review of Geography for Regional Planning and Development of the South (South observations). Abidjan, Côte d'Ivoire, pp. 49–64.
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Recent interannual variations of major climate parameters in Côte d'Ivoire since 1951, Climate and Development, No. 26, pp 5–16.



| C11-c                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 107 – TABOU |     |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |     |
| DIAGNOSTIC                          | City planned under the oil palm development, with an attempted allotment of a satellite town to the east.<br>River channel parallel to the sea shore, but separated from it by a quite large terrace. Rocky spurs stabilizing the mouth.<br>Good road connection with Abidjan.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |     |
| DYNAMICS                            | Mouth of the Tabou River stable with some episodes of silting.<br>Stable coastline or at the very most an increasing one west of the mouth of the Tabou River or the rocky point of the lighthouse.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |     |
| STAKES                              | Few stakes and low population densities. San Pedro, located at 100 km, proves to be more attractive as a connection services and infrastructure hub to the outside world.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |     |
| RECOMMENDATION                      | No action identified                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |     |
| MONITORING                          | No monitoring                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY | Low |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |     |
| EVOLUTION OF STAKES                 | Potential effects of the San Pedro development hub in the Tabou city.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |     |
| HAZARDS                             | Low erosion of the shoreline by -0.5 m/year on the urban beach segment west of the Tabou river mouth.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |     |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY | Low |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |     |
| EVOLUTION OF STAKES                 | The city experienced strong demographic and spatial growth in the 1970s, driven by the Authority for the Development of the South-West Region (ARSO) – a land-use and regional development program carried out from 1969 to 1980 in southwestern Côte d'Ivoire. Developing the city was almost stopped with the end of the program and the various crises that followed.<br>Tabou has great potential for a developed beach tourism, ecotourism, agrotourism and cultural tourism, like the overall southwest area.<br>The majority of the attractive sites are concentrated on the coast. However, the tourist offer, still limited, is difficult to access because of the deteriorated road network, which is made impassable due to heavy rainfall.<br>The main stake here is the controlled coastal land and urbanization. Like other coastal cities, Tabou does not have a strategy and development plan that includes information on coastal risks. |             |     |
| CURRENT PROJECTS                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |     |
| OUTSTANDING NATURAL AREAS           | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |     |
| HAZARDS                             | Low shoreline erosion by 1.99±0.50m or -0.4m/year over the 2015–2020 period at the urban beach segment level east of the Tabou River mouth. The beach segment to the west remains stable overall.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |     |
| RECOMMENDATIONS                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |     |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY | Low |



| CI1-d                               | 108 - EAST TABOU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                 |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |
| DIAGNOSTIC                          | Segment of sandy terraces, sparsely populated, straight coastline.<br>Oil palm plantations on terraces and flattened hills inwards.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |
| DYNAMICS                            | Estuarine micro-outlets generally filled, but the river meander about to break the narrow lido. Completed reconfiguration of the mouth if the lido is opened.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |
| STAKES                              | Future tourist development?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |
| RECOMMANDATION                      | No action identified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY Low |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |
| EVOLUTION OF STAKES                 | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 |
| HAZARDS                             | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY Low |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |
| EVOLUTION OF STAKES                 | The East Tabou region is a rural area where forests and plantations intertwine for hundreds of kilometers. The plantations border the coast for several hundred meters in an almost uninterrupted manner outside the localities.<br>The main stakes here are agriculture (plantations), land management, fisheries and the enormous potential for tourist development.<br>The low human density on this coastline offers several opportunities for managing the coastline.                                                                                                                                                                               |                 |
| CURRENT PROJECTS                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |
| OUTSTANDING NATURAL AREAS           | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |
| HAZARDS                             | Coastline almost stable. Slight retreat of about 1.09±0.50m, i.e. -0.2 m/year over the 2015-2020 period <sup>6</sup> .<br>Rainfall regime disruption: <ul style="list-style-type: none"><li>Decreased rainfall heights by about 10% (2387 mm between 1951-1992 and 2155.3 mm after 1992;</li><li>Shortened rainy season by an average of 10 days compared to that before 1992 (14-17 April to 31 July);</li><li>Average rainfall after 2016:2276.2 mm, or a 6% increase compared to the 1993-2017 average aggregation;</li><li>High flood risk in June (28% of the annual aggregation) and October (9% of the annual aggregation)<sup>7</sup>.</li></ul> |                 |
| RECOMMENDATIONS                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY Low |

<sup>6</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) kinematic analysis of the coastline from Sentinel 1 images provided by ESA; cross-checking with localized field observations. Follow-up report, IGT – MARISCO Program, 12p.

<sup>7</sup> Sources : analysis of data from:

- NOAA (2018) and SODEXAM (2018)
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a: Detected homogeneous spatiotemporal rainfall structures in Côte d'Ivoire over the 1951–2017 period. Review of Geography for Regional Planning and Development of the South (South observations). Abidjan, Côte d'Ivoire, pp. 49–64.
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Recent interannual variations of major climate parameters in Côte d'Ivoire since 1951, Climate and Development, No. 26, pp 5–16.



| CI1-e                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 109 – GRAND BEREBY |     |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |     |
| DIAGNOSTIC                          | Largely cleared area with small villages along the coastline, but largely away from the beach (out of risk).<br>Grand Bereby, a small village with a beautiful cove sparsely inhabited.<br>South Grand Bereby, seven beautiful coves facing East with tourist potential.                                                                                                                                                                                                                                                                                                                                                                                   |                    |     |
| DYNAMICS                            | Beaches more or less stable (seasonal evolution erosion / accretion).<br>Instability of the Nero River mouth (movements of sandy spits).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |     |
| STAKES                              | Future tourist development.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |     |
| RECOMMANDATION                      | Anticipated development of buildings and reception infrastructures on the linear beaches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |     |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY        | Low |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |     |
| EVOLUTION OF STAKES                 | Closing the famous tourist complex “La Baie des Sirènes” due to the post-electoral crisis. The beaches and tourist facilities are no longer visited by international tourists. Tourism and the local economy are strongly impacted.                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |     |
| HAZARDS                             | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |     |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY        | Low |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |     |
| EVOLUTION OF STAKES                 | From 11,772 inhabitants in 1998 the population reached 19,552 inhabitants in 2014, or 60% more inhabitants in the communal area.<br>Relaunching tourist activities after the post-election crisis by reopening the tourist complex “La Baie des Sirènes” on December 1, 2016. However, access to the beach sites is made difficult by the advanced degradation of the coastline (highway) and other roads.<br>The region should meet challenges such as: taking advantage of the human potential, agricultural, mining, fishing and tourism resources; rehabilitating road infrastructure. In this context, the risk of flooding generated by heavy rains. |                    |     |
| CURRENT PROJECTS                    | Project to create a Marine Protected Area in Grand Bereby: launch in December 2019.<br>Flagship project of the tourism development plan “Sublime Côte d'Ivoire” <sup>8</sup> : <ul style="list-style-type: none"><li>• Rehabilitating the San Pedro- Abidjan coastal road;</li><li>• Extending the San Pedro air terminal;</li><li>• Creating a railroad to transport the mining production of the western zone.</li></ul>                                                                                                                                                                                                                                 |                    |     |

<sup>8</sup> The tourism offer in Côte d'Ivoire is very paradoxical. Business tourism is well positioned, ranking 3rd just behind Nigeria and Morocco. Conversely, it is more difficult for leisure tourism, which is failing to emerge. By implementing the "Sublime Côte d'Ivoire" program, the objective is "to make Côte d'Ivoire the 5th African tourist destination and to weigh 12% of the country's GDP by 2025", the Ivorian Minister of Tourism, Mr Siandou Fofana, told AfricaNews. Retrieved from <https://lepetitjournal.com/>, published on 03/02/2020 at 10 :28.



|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| OUTSTANDING NATURAL AREAS | <b>Grand Bereby Marine Protected Area<sup>9</sup></b> <ul style="list-style-type: none"> <li>The Ministry of the Environment and Sustainable Development and the Abidjan Convention have initiated the creation of a marine protected area in Grand Bereby.</li> <li>It extends over 22 kilometers offshore and over one kilometer inland, from the beach.</li> <li>This perimeter includes the localities of Kablake, Roc, Pitike and Mani.</li> <li>This project aims at protecting the marine species living in this perimeter.</li> <li>Fishing and hunting will thereby be regulated with special emphasis on the conservation of the sea turtles abundant in this area.</li> </ul>                                                                       |                 |
| HAZARDS                   | Coastline almost stable. Slight retreat of about $0.53 \pm 0.50$ m, i.e. -0.1 m/year over the 2015-2020 period <sup>10</sup> .<br>Rainfall regime disruption: <ul style="list-style-type: none"> <li>Increased rainfall heights by 10-20%: 1347.5 mm between 1951-1999 and 1533.6 mm after 1999;</li> <li>Shortened rainy season by an average of 8 days compared to that before 2000 (April 20-27 to August 6-10);</li> <li>Average rainfall after 2016: 1638 mm, or 21% higher than the 1951-1999 aggregation. There is a 7% increase compared to the 2000-2017 average aggregation;</li> <li>High risk of flooding in June (28% of the annual aggregation) and October (9% of the annual aggregation) which can cause soil erosion<sup>11</sup>.</li> </ul> |                 |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY Low |

<sup>9</sup> <https://news.abidjan.net/h/667119.html>.

<sup>10</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) kinematic analysis of the coastline from Sentinel 1 images provided by ESA; cross-checking with localized field observations. Follow-up report, IGT – MARISCO Program, 12p..

<sup>11</sup> Sources : analysis of data from:

- NOAA (2018) and SODEXAM (2018)
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a: Detected homogeneous spatiotemporal rainfall structures in Côte d'Ivoire over the 1951-2017 period. Review of Geography for Regional Planning and Development of the South (South observations). Abidjan, Côte d'Ivoire, pp. 49-64.
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Recent interannual variations of major climate parameters in Côte d'Ivoire since 1951, Climate and Development, No. 26, pp 5-16.



| C11-f                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 110 - WEST SAN PEDRO |     |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                      |     |
| DIAGNOSTIC                          | Many coastal rivers<br>Landlocked area and sparsely occupied despite the proximity to San Pedro                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                      |     |
| DYNAMICS                            | Dynamics of coastal rivers marine mouths (opening and clogging) according to climate and marine seasons.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |     |
| STAKES                              | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |     |
| RECOMMANDATION                      | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |     |
| MONITORING                          | No monitoring                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY          | Low |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                      |     |
| EVOLUTION OF STAKES                 | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |     |
| HAZARDS                             | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |     |
| MONITORING                          | No monitoring                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY          | Low |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                      |     |
| EVOLUTION OF STAKES                 | The area between Grand-Bereby and San Pedro is a rural zone where agriculture occupies the major part of the land. The forest has almost disappeared making room to coffee, cocoa, rubber, oil palm and a variety of food crops...<br>The coast is a tourism development potential which is not exploited in this segment. Developing agriculture is indeed the main stake regarding climate change (shortened climatic season and increased rainfall).Coffee, cocoa and rubber plantations are regularly flooded by heavy rains, which threatens their productivity.                                                                                                                                    |                      |     |
| CURRENT PROJECTS                    | Flagship project of the «Sublime Côte d'Ivoire» tourism development plan <sup>12</sup> : <ul style="list-style-type: none"><li>• Rehabilitating the San Pedro- Abidjan coastal road;</li><li>• Extending the San Pedro air terminal;</li><li>• Creating a railroad to transport the mining production of the western zone.</li></ul>                                                                                                                                                                                                                                                                                                                                                                     |                      |     |
| OUTSTANDING NATURAL AREAS           | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                      |     |
| HAZARDS                             | Coastline almost stable. Slight retreat of about 1.37±0.5m, i.e. -0.3m/year over the 2015-2020period <sup>13</sup> .<br>Rainfall regime disruption: <ul style="list-style-type: none"><li>• Increased rainfall heights by 10-20%:1347.5 mm between 1951-1999 and 1533.6 mm after 1999;</li><li>• Shortened rainy season by an average of 8 days compared to that before 2000 (April 20-27 to August 6-10);</li><li>• The average rainfall after 2016 is 1638 mm, or 21% higher than the 1951-1999 aggregation and 7% higher than the 2000-2017 average aggregation;</li><li>• High flood risk in June (28% of the annual aggregation) and October (9% of the annual aggregation)<sup>14</sup>.</li></ul> |                      |     |
| RECOMMENDATIONS                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |     |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY          | Low |

<sup>12</sup> The tourism offer in Côte d'Ivoire is very paradoxical. Business tourism is well positioned, ranking 3rd just behind Nigeria and Morocco. Conversely, it is more difficult for leisure tourism, which is failing to emerge. By implementing the "Sublime Côte d'Ivoire" program, the objective is "to make Côte d'Ivoire the 5th African tourist destination and to weigh 12% of the country's GDP by 2025", the Ivorian Minister of Tourism, Mr Siandou Fofana, told AfricaNews. Retrieved from <https://lepetitjournal.com/>, published on 03/02/2020 at 10:28.

<sup>13</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) kinematic analysis of the coastline from Sentinel 1 images provided by ESA; cross-checking with localized field observations. Follow-up report, IGT – MARISCO Program, 12p.

<sup>14</sup> Sources: analyzing data from NOAA (2018) and SODEXAM (2018); cross-referenced with bibliographic searches.





| CI1-g                               | 111 – WEST URBAN AND PERI-URBAN SAN PEDRO ZONE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| DIAGNOSTIC                          | <p>A new town entirely planned in the 70's at the time of the boom of the logging then of the coffee and cocoa more or less treated on site.</p> <p>Coastal road / seafront.</p> <p>Developing unplanned spontaneous habitats on the edge of the wetland to the north of the city, on potentially flood-prone land, as the extension of the river's lower reaches does not facilitate draining and evacuating floods.</p>                                                                                                                                                                                                                                                                                                                                                        |                       |
| DYNAMICS                            | <p>This segment belongs to the system of mixed echelon coasts that characterizes the West of Côte d'Ivoire.</p> <p>The port entrance channel is protected against silting by two piers preceded by coastal cross-cutting structures upstream the drift (experimental groin and riprap serving as sand stop dikes).This facility disrupted the sedimentary transit, causing unstable beaches between the port and the San Pedro mouth (reflexive profile, festooned bars).</p> <p>The general trend in the segment is erosion (between 0.3 and 1 m/year), west of the port channel, sand extraction at the Digboue lagoon mouth causes the erosion of adjacent beach segments, downstream of the coastal drift. However, in this segment, there are extending beach segments.</p> |                       |
| STAKES                              | <p>Role and place of the San Pedro port in the Ivorian economy.</p> <p>Airport place in the assumed future tourism development.</p> <p>Feasibility and sustainability of the planned port area developments (especially a container park) based on the observed coastal dynamics.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |
| RECOMMANDATION                      | <p>Improved drainage and managed storm water.</p> <p>Resettled precarious habitats located in flood-prone areas.</p> <p>Segment planning for the entire urban coastline.</p> <p>Deepened studies before extending the San Pedro port.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY High      |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| EVOLUTION OF STAKES                 | <p>San Pedro Port extension Project (the port area would increase from 5 to 23 ha), because San Pedro is experiencing significant growth, particularly due to the increased ship and goods traffic driven by transshipment.</p> <p>Oil prospecting offshore.</p> <p>Implemented new hotels.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| COASTAL PROTECTION                  | <p>The San Pedro port is located in the southwest of the country in a natural bay protected by two piers. It is managed by a public company (Autonomous Port of San Pedro).It is the world's largest cocoa bean exporting port. It is the second largest port in the country in terms of tonnage (3.5 million tons in 2012).It also includes a fisheries port on a total area of 18,727 m<sup>2</sup> (<a href="http://www.sanpedro-portci.com/site/">http://www.sanpedro-portci.com/site/</a>).</p>                                                                                                                                                                                                                                                                             |                       |
| HAZARDS                             | <p>The coastline has largely retreated over its linear. This retreat is estimated between 1 and 1.5m/year over the 2008-2012 period. On the Balmer Rock beach, the coastline retreated by 0.5 and 1.5m.</p> <p>The coastline retreat is partly of anthropogenic origin (port development, beach sand extraction at the Digboué lagoon mouth in the west of the port channel).</p>                                                                                                                                                                                                                                                                                                                                                                                                |                       |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY Very high |



| CI1-g                               | 111 – WEST URBAN AND PERI-URBAN SAN PEDRO ZONE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 |
| EVOLUTION OF STAKES                 | <p>From 131,800 inhabitants in 1998, the population reached 164,944 inhabitants in 2014 or 33,144 additional inhabitants. In parallel to this and under the weight of wear and tear, the infrastructure (especially roads) has deteriorated significantly. In recent years, the government has initiated major structuring projects to overcome these issues and promote local and regional development. These include:</p> <ul style="list-style-type: none"><li>• Rehabilitating the access roads to the town and its internal network; correcting major road and drainage works has been initiated in the town and on the San Pedro – Tabou, San Pedro-Abidjan and San Pedro-Soubre roads.</li><li>• Rehabilitating the airport, extending and modernizing the San Pedro Port, building a university;</li><li>• Major investments in tourism infrastructure are planned under the «Sublime Côte d'Ivoire» strategic plan.</li></ul> <p>In this context, the controlled erosion and flooding is an important stake. Heavy rainfall threatens the road network with erosion and flooding. On the coastline, erosion threatens the infrastructure and equipment: road cutting, nibbling of lands intended for the port extension. Here, erosion is exacerbated by urbanization: the massive sand extraction on the right beach of the Digboue lagoon and the port protective dikes are two drivers that locally influence the coastline retreat. The San Pedro city is recognized as a critical point to be addressed, but so far no sustainable management strategy for this phenomenon has been defined and implemented.</p> |                 |
| CURRENT PROJECTS                    | <p>Extending and modernizing the San Pedro Autonomous Port (SPAP)<sup>15</sup>.The objectives of the project are:</p> <ul style="list-style-type: none"><li>• Making the SPAP a transshipment port,</li><li>• Improving the supply and quality of services,</li><li>• Strengthening regional integration in West Africa, and</li><li>• Facilitating the intra-regional trade in the ECOWAS region.</li></ul> <p>Flagship project of the «Sublime Côte d'Ivoire» tourism development plan<sup>16</sup>:</p> <ul style="list-style-type: none"><li>• Rehabilitating the San Pedro- Abidjan coastal road;</li><li>• Extending the San Pedro air terminal;</li><li>• Creating a railroad to transport the mining production of the western zone.</li></ul> <p>Building a university in the port area.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |
| OUTSTANDING NATURAL AREAS           | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 |
| HAZARDS                             | <p>The coastline has largely retreated over its linear. This retreat is estimated at 8.94±0.50m, or -1.79 m/year over the 2015–2020 period. The coastline retreat is partly due to developments and to sand extraction in the Digboue lagoon, disturbing the sediment transit<sup>17</sup>.</p> <p>Rainfall regime disruption:</p> <ul style="list-style-type: none"><li>• Increased rainfall heights by 10 to 20%:1347.5 mm between 1951–1999 and 1533.6 mm after 1999;</li><li>• Shortened rainy season by an average of 8 days compared to that before 2000 (April 20–27 to August 6–10);</li><li>• The average rainfall after 2016 is 1638 mm, or 21% higher than the 1951–1999 aggregation and 7% higher than the 2000–2017 average aggregation;</li><li>• High flooding risk in June (28% of the annual aggregation) and October (9% of the annual aggregation) which can cause soil erosion<sup>18</sup>.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |
| RECOMMENDATIONS                     | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY Low |

<sup>15</sup> <http://www.sanpedro-portci.com/site/actualite/C3%A9s/port-autonome-de-san-pedro-pasp-projets-d%E2%80%99extension-et-de-modernisation-%C2%AB-le-port-de-san>

<sup>16</sup> The tourism offer in Côte d'Ivoire is very paradoxical. Business tourism is well positioned, ranking 3rd just behind Nigeria and Morocco. Conversely, it is more difficult for leisure tourism, which is failing to emerge. By implementing the "Sublime Côte d'Ivoire" program, the objective is "to make Côte d'Ivoire the 5th African tourist destination and to weigh 12% of the country's GDP by 2025", the Ivorian Minister of Tourism, Mr Siandou Fofana, told AfricaNews. Retrieved from <https://lepetitjournal.com/>, published on 03/02/2020 at 10:28.

<sup>17</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) kinematic analysis of the coastline from Sentinel 1 images provided by ESA; cross-checking with localized field observations. Follow-up report, IGT – MARISCO Program, 12p.

<sup>18</sup> Sources: analyzing data from NOAA (2018) and SODEXAM (2018); cross-referenced with bibliographic searches..



SAN PEDRO – URBAN FABRIC EVOLUTION SINCE 2004

2004



2013



2020





SAN PEDRO PORT

2004



2013



2020







## CI2 EAST SAN PEDRO – SASSANDRA – FRESCO

The entire CI2 sector "East San Pedro – Sassandra – Fresco" is part of the Taï National Park emission reduction program. The government of the Republic of Côte d'Ivoire considers this program as the first step in implementing the country's national strategy REDD+ at the jurisdictional level, and a green development model that offers alternatives and incentives based on payments to combat climate change, diversify farmers' income, create deforestation-free cocoa production, protect natural resources, recover forest cover and preserve biodiversity. The Taï National Park emissions reduction program is a unique opportunity to leverage long-term public and private funding to achieve the goals of the Paris Agreement and reach sustainable development.

| CI2-a                               |                                                                                                                                                                                                                                                                                                                                                                                                                                     | 112 - EAST SAN PEDRO |  |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                     |                      |  |
| DIAGNOSTIC                          | Bordered on the west by the San Pedro River, whose course was moved to develop its estuary into a port.<br>Landlocked coastline, unoccupied, inaccessible by road.<br>Protected forest heavily degraded by agricultural activities (cocoa, coffee, etc.).<br>Contains numerous estuarine water bodies whose mouths are regularly clogged by sandy banks constituting the beach.                                                     |                      |  |
| DYNAMICS                            | This segment belongs to the system of mixed echelon coasts that characterizes the West of Côte d'Ivoire. The coastal rivers' mouths (Brime and Monogaga) are often protected by rocky spurs. They sometimes undergo substantial silting following a developed sandy spit in the direction opposing the drift<br>Erosion observed on the Monogaga site, threatening the residential and tourist infrastructure (often poorly built). |                      |  |
| STAKES                              | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                       |                      |  |
| RECOMMANDATION                      | No                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |  |
| MONITORING                          | No monitoring                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY    Low   |  |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                     |                      |  |
| EVOLUTION OF STAKES                 | Tourist stake in the Monogaga bay<br>Preserving the forest environment and the landscape and beach attractiveness of the beach sites in order to develop high value added tourism                                                                                                                                                                                                                                                   |                      |  |
| COASTAL PROTECTION                  | Sector plan and anticipated development of hotel infrastructures on the most wanted sites (Monogaga).                                                                                                                                                                                                                                                                                                                               |                      |  |
| HAZARDS                             | Regularly observing the Monogaga bay shows periodical retreat by 1 to 2.5 m/year relating to dynamic weather marine events.                                                                                                                                                                                                                                                                                                         |                      |  |
| MONITORING                          | No monitoring                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY    Low   |  |



## EVOLUTION OVER THE 2016–2020 PERIOD

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| EVOLUTION OF STAKES       | <p>The main stake in the sector is related to the deforestation risk of the forest ecosystem. The forest has almost disappeared making room to coffee, cocoa, rubber, oil palm and a variety of food crops...However, there are still a few islets of primary forest that may be interesting for green tourism enthusiasts. The coast has remained wild on several kilometers, leaving the potential for tourism development intact. The Monogaga bay is the main tourist jewel of the area. It shelters a small fishing village (512 inhabitants) and a few private cabañas (straw huts). The only hotel "Langouste d'or" closed. And tourists have abandoned the site because of the impassability of the road connecting the bay to the coast, the Abidjan-San Pedro highway. Traditional fishing products are also difficult to sell for the same reason. In addition, living conditions are made difficult by the fact that the site is not connected to the water and electricity networks.</p> <p>Thus, developed tourism and fishing are compromised by accessibility and living conditions.</p> |                    |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |
| OUTSTANDING NATURAL AREAS | <p>Protected Forest of Monogaga</p> <ul style="list-style-type: none"> <li>• WDPA ID:29640</li> <li>• Forest part of the emission reduction program in the Tai National Park area<sup>19</sup>.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |
| HAZARDS                   | <p>The coastline retreat is moderate over the 2015–2020 period with a rate of <math>4.06 \pm 0.50\text{m}</math> or <math>-0.81\text{m}/\text{year}</math> retreat<sup>20</sup>.</p> <p>Rainfall regime disruption:</p> <ul style="list-style-type: none"> <li>• Increased rainfall heights by 10 to 20%: 1347.5 mm between 1951–1999 and 1533.6 mm after 1999;</li> <li>• Shortened rainy season by an average of 8 days compared to that before 2000 (April 20–27 to August 6–10);</li> <li>• The average rainfall after 2016 is 1638 mm, or 21% higher than the 1951–1999 aggregation and 7% higher than the 2000–2017 average aggregation;</li> <li>• High flooding risk in June (28% of the annual aggregation) and October (9% of the annual aggregation) which can cause soil erosion<sup>21</sup>.</li> </ul> <p>Sediment and litter transport.</p>                                                                                                                                                                                                                                              |                    |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY Medium |

<sup>19</sup> The World Bank, 2019. Carbon Partnership Facility (FCPF) – Carbon fund – Emissions Reduction Program Document (ER-PD). *Emissions Reduction Program Document for Tai National Park, Republic of Côte d'Ivoire*. 323p.  
See <https://www.forestcarbonpartnership.org/system/files/documents/190422-ERPDP%20RCP%20FV.pdf>

<sup>21</sup> Sources : analyzing data from NOAA (2018) and SODEXAM (2018) ; cross-referenced with bibliographic searches



| CI2-b                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 113 – SASSANDRA RIGHT BANK |        |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            |        |
| DIAGNOSTIC                          | <p>Protected Forest heavily degraded and cleared near the coastal road and almost entirely on the eastern third near Sassandra. However, there are still some uncleared islets, particularly to the west of the Protected Forest and along the coastline.</p> <p>In the absence of a drastic limitation of clearings in the Protected Forest, which is rather unrealistic in the current context, it may be possible to consider certain forms of protection in the coastal strip (over 1 km deep) with a status to be studied.</p> <p>Two interesting small lagoons locked by micro-cordon.</p> <p>Sassandra is a historical town, but also a tourist hub of the category of Grand-Bassam which includes a fishing center.</p> <p>It is a hilly landscape site, locally inhabited eastwards enabling to build a pier, a wharf and a small port settlement. It is possible that the latter will impact the nearby urban beach.</p> <p>Inland estuarine site, potential for recreational boating facilities if there is passage through the estuary.</p> <p>West Sassandra Hills near the coast, with a road serving a group of plantations.</p> <p>On the coastline, numerous beach sites, coves and creeks with tourist potential.</p> <p>Sassandra and its surroundings have been the subject of tourism development studies.</p> |                            |        |
| DYNAMICS                            | <p>The urban coastal perimeter of Sassandra recorded a stable shoreline. The beaches sometimes undergo a remarkable narrowness with the advent of exceptional unrests. Also this process would be partially of anthropic origin (beach sand extraction in the west of the urban coastal perimeter).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |        |
| STAKES                              | <p>Preserving the landscape and beach attractiveness of the beach sites in order to develop seaside tourism (Gode, Vodieko).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |        |
| RECOMMANDATION                      | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |        |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY                | Medium |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            |        |
| EVOLUTION OF STAKES                 | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |        |
| HAZARDS                             | <p>Stable coastline overall.</p> <p>Noticeable beach erosion following the exceptional unrest of August 2012, followed by a considerable refilling of the foreshore.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |        |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY                | Medium |

**EVOLUTION OVER THE 2016–2020 PERIOD**

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                  |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| EVOLUTION OF STAKES       | <p>Sassandra is a city of 26,608 inhabitants (RGPH, INS 2014). Its population increased by 10,632 inhabitants since 1998. This town has the largest traditional fishing port with more than 80 boats. To promote better exploitation of fishery resources and develop trade, the city has been equipped with a market built on 2.5 ha that will host 900 traders and a landing station on 1 ha for 300 traders.</p> <p>Accessibility, fishing and tourism are the main issues for the city. The roads are made impassable by wear and heavy rains. Recently, 11 km of roads have been asphalted in the city; the Sassandra-Gagnoa road has also been rehabilitated. However, the impassability of the Abidjan-San Pedro highway causes significant damage to the transport sector and the population.</p> <p>The region's tourism potential is significant: the beautiful beaches, the sacred forest overlooking the Sassandra bay and its small monkeys, the Gaoulou island (national park) and its forest ecosystem rich in endemic species, butterflies and birds. Around the island, you can see manatees and pygmy hippos paddling in the river...</p> <p>The colonial heritage of the city, consisting of dilapidated buildings that are deteriorating gradually every day.</p> |                                  |
| CURRENT PROJECTS          | <p>Flagship project of the tourism development plan "Sublime Côte d'Ivoire"<sup>22</sup> :</p> <ul style="list-style-type: none"> <li>Rehabilitating the San Pedro- Abidjan coastal road;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                  |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                  |
| HAZARDS                   | <p>Low shoreline erosion with a rate of <math>2.27 \pm 0.50</math> m, or <math>-0.45</math> m/year over the 2015–2020 period. Anthropogenic action effect (beach sand extraction in the bay) and the outstanding unrest of July 2018<sup>23</sup>.</p> <p>Sediment and litter transports.</p> <p>Rainfall regime disruption:</p> <ul style="list-style-type: none"> <li>Decreased rainfall heights by 25% from 1951 (1797.1 mm between 1951–1974 and 1350.2 mm after 1974;</li> <li>Shortened rainy season by an average of 15 days compared to that before 1974 (April 19–24 to August 12–04);</li> <li>High flooding risk in June (28% of the annual aggregation) and October (9% of the annual aggregation);</li> <li>Average rainfall after 2016: 1653.5 mm, or a 22.5% increase compared to the 1975–2017 average aggregation.<sup>24</sup>.</li> </ul> <p>Soil erosion.</p>                                                                                                                                                                                                                                                                                                                                                                                                     |                                  |
| RECOMMENDATIONS           | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                  |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>CRITICALITY</b> <b>Medium</b> |

<sup>22</sup> The tourism offer in Côte d'Ivoire is very paradoxical. Business tourism is well positioned, ranking 3rd just behind Nigeria and Morocco. Conversely, it is more difficult for leisure tourism, which is failing to emerge. By implementing the "Sublime Côte d'Ivoire" program, the objective is "to make Côte d'Ivoire the 5th African tourist destination and to weigh 12% of the country's GDP by 2025", the Ivorian Minister of Tourism, Mr Siandou Fofana, told AfricaNews. Retrieved from <https://lepetitjournal.com/>, published on 03/02/2020 at 10:28

<sup>23</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) kinematic analysis of the coastline from Sentinel 1 images provided by ESA; cross-checking with localized field observations. Follow-up report, IGT – MARISCO Program, 12p.

<sup>24</sup> Sources : analysis of data from:

- NOAA (2018) and SODEXAM (2018),
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a : Detected homogeneous spatiotemporal rainfall structures in Côte d'Ivoire over the 1951–2017 period. Review of Geography for Regional Planning and Development of the South (South observations). Abidjan, Côte d'Ivoire, pp. 49–64.
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Recent interannual variations of major climate parameters in Côte d'Ivoire since 1951, Climate and Development, No. 26, pp 5–16.





| CI2-c                               | 114 – SASSANDRA LEFT BANK – DAGBEGO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |
| DIAGNOSTIC                          | East oriented cape and permanent lagoon.<br>Complex of wetlands on the right bank and island.<br>Potential site of interest for biodiversity.<br>Site with tourist and landscape potential at Dagbego.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |
| DYNAMICS                            | Many fragile and unstable sites at the mouths of small estuaries (spits and lidos). To be analyzed in each local context.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |
| STAKES                              | Conserving a set of wetlands and a discovery tourist and landscape potential.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |
| RECOMMANDATION                      | No action recommended                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | CRITICALITY    Low |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |
| EVOLUTION OF STAKES                 | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |
| HAZARDS                             | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | CRITICALITY    Low |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |
| EVOLUTION OF STAKES                 | This sector represents an important stake for tourism, but is poorly exploited. The only hotel complex, the Best of Africa located in Dagbego, has been abandoned to the bush since the military-political crisis of 2002.<br>The coastline is occupied by a low-density habitat scattered in villages and camps: Brodje, Coco Beach, Kadrokpa, Arokpa and Dagbego. Dagbego, a village of 1,025 inhabitants (INS 2014) located at the mouth of the Dagbe River and threatened by erosion, was abandoned by the majority of its inhabitants, according to the Ivorian news agency <sup>25</sup> .According to the same source, this site was subject to planting coconut trees and was transformed into a village hotel. |                    |
| CURRENT PROJECTS                    | Flagship project of the tourism development plan “Sublime Côte d'Ivoire” <sup>26</sup> : <ul style="list-style-type: none"><li>Rehabilitating the San Pedro- Abidjan coastal road;</li></ul> Developing a platform on the shelves to accommodate the affected village of Dagbego by the General Council of Gbokle <sup>27</sup> .                                                                                                                                                                                                                                                                                                                                                                                       |                    |
| OUTSTANDING NATURAL AREAS           | <b>Sassandra Complex Ramsar Site – Dagbego</b> <ul style="list-style-type: none"><li>ZHII ID:1CI002 – 1581 / WDPA ID : 902796</li><li>Designation on October 18, 2005 (10,551 ha).</li><li>The delimitations are not available in the WDPA</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |

<sup>25</sup> [https://aip.ci/\\_trashed-102/](https://aip.ci/_trashed-102/)

<sup>26</sup> The tourism offer in Côte d'Ivoire is very paradoxical. Business tourism is well positioned, ranking 3rd just behind Nigeria and Morocco. Conversely, it is more difficult for leisure tourism, which is failing to emerge. By implementing the "Sublime Côte d'Ivoire" program, the objective is "to make Côte d'Ivoire the 5th African tourist destination and to weigh 12% of the country's GDP by 2025", the Ivorian Minister of Tourism, Mr Siandou Fofana, told AfricaNews. Retrieved from <https://lepetitjournal.com/>, published on 03/02/2020 at 10:28.

<sup>27</sup> [https://aip.ci/\\_trashed-102/](https://aip.ci/_trashed-102/)



|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                        |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| HAZARDS         | <p>Coastline retreat of <math>-6.05 \pm 0.5</math> m, or <math>-1.21</math> m/year over the 2015–2020 period. Periodic closure of the channel sometimes requiring a mechanical opening<sup>28</sup>.</p> <p>Rainfall regime disruption:</p> <ul style="list-style-type: none"> <li>• Decreased rainfall heights by 25% from 1951 (1797.1 mm between 1951–1974 and 1350.2 mm after 1974);</li> <li>• Shortened rainy season by an average of 15 days compared to that before 1974 (April 19–24 to August 12–04);</li> <li>• Average rainfall after 2016: 1653.5 mm, or a 22.5% increase compared to the 1975–2017 average aggregation;</li> <li>• High flood risk in June (28% of the annual aggregation) and October (9% of the annual aggregation)<sup>29</sup>.</li> </ul> |                        |
| RECOMMENDATIONS | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                        |
| MONITORING      | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>CRITICALITY</b> Low |

<sup>28</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) kinematic analysis of the coastline from Sentinel 1 images provided by ESA; cross-checking with localized field observations. Follow-up report, IGT – MARISCO Program, 12p.

<sup>29</sup> Sources : analysis of data from:

- NOAA (2018) and SODEXAM (2018),
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a: Detected homogeneous spatiotemporal rainfall structures in Côte d'Ivoire over the 1951–2017 period. Review of Geography for Regional Planning and Development of the South (South observations). Abidjan, Côte d'Ivoire, pp. 49–64.
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Recent interannual variations of major climate parameters in Côte d'Ivoire since 1951, Climate and Development, No. 26, pp 5–16.



| CI2-d                               | 115 - DAGBEGO – FRESCO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |
| DIAGNOSTIC                          | Littoral sparsely occupied for agriculture, but generalized clearing front advancing towards the coast-line.<br>Numerous small lagoons at the mouth of small coastal rivers closed by small cordons.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 |
| DYNAMICS                            | Many fragile and unstable sites at the mouths of small estuaries (spits and lidos).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |
| STAKES                              | Conserving a set of wetlands and a discovery tourist and landscape potential.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |
| RECOMMANDATION                      | No action recommended beyond the efforts of conserving sites and natural ecosystems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY Low |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |
| EVOLUTION OF STAKES                 | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |
| HAZARDS                             | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY Low |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |
| EVOLUTION OF STAKES                 | Agricultural pressure on the ecosystem bordering a wild and unexploited coast despite its high tourist potential.<br>Facing agricultural pressure, preserved ecosystems (forest, lagoon, and streams and coastal river) becomes essential.                                                                                                                                                                                                                                                                                                                                                                                                             |                 |
| CURRENT PROJECTS                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |
| OUTSTANDING NATURAL AREAS           | <b>Protected Forest of Dassioko</b> <ul style="list-style-type: none"><li>WDPA ID:300966</li><li>Forest part of the emission reduction program in the Tai National Park area<sup>30</sup>.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 |
| HAZARDS                             | Moderate coastline retreat:-3.25± 0.5m or -0.65 m/year over the 2015–2020 period <sup>31</sup> .<br>Rainfall regime disruption: <ul style="list-style-type: none"><li>Decreased rainfall heights by 25% from 1951 (1797.1 mm between 1951–1974 and 1350.2 mm after 1974);</li><li>Shortened rainy season by an average of 15 days compared to that before 1974 (April 19–24 to August 12–04);</li><li>High flooding risk in June (28% of the annual aggregation) and October (9% of the annual aggregation);</li><li>Average rainfall after 2016:1653.5 mm, or a 22.5% increase compared to the 1975–2017 average aggregation.<sup>32</sup>.</li></ul> |                 |
| RECOMMENDATIONS                     | Integrating the coastline evolution and the flooding risk to the land management project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY Low |

<sup>30</sup> The World Bank, 2019. Carbon Partnership Facility (FCPF) – Carbon fund – Emissions Reduction Program Document (ER-PD). Emissions Reduction Program Document for Tai National Park, Republic of Côte d'Ivoire. p323.  
See <https://www.forestcarbonpartnership.org/system/files/documents/190422-ERPDP%20RCI%20FV.pdf>

<sup>31</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) kinematic analysis of the coastline from Sentinel 1 images provided by ESA; cross-checking with localized field observations. Follow-up report, IGT – MARISCO Program, 12p.

<sup>32</sup> Sources : analysis of data from:  

- NOAA (2018) and SODEXAM (2018),
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a: Detected homogeneous spatiotemporal rainfall structures in Côte d'Ivoire over the 1951–2017 period. Review of Geography for Regional Planning and Development of the South (South observations). Abidjan, Côte d'Ivoire, pp. 49–64.
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Recent interannual variations of major climate parameters in Côte d'Ivoire since 1951, Climate and Development, No. 26, pp 5–16.



## CI3

## FRESCO – ASSAGNY

Area totally cleared for establishing coconut plantations, scattered relics of natural forest vegetation more or less involved. Botanical interest for the biodiversity of this forest vegetation on sandy terrace to be confirmed.

| CI3-a                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 116 – FRESCO |     |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |     |
| DIAGNOSTIC                          | A very narrow coastal cordon over about 20 km, backed by a complex of lagoons, coastal channels and interconnected wetlands up to the large Tadio lagoon.<br>Southern Fresco lagoon complex, designated as a Ramsar site. The Fresco lagoon is the only one in Côte d'Ivoire to shelter the two types of mangroves found in Côte d'Ivoire (lagoon mangrove and estuary mangrove).<br>The Fresco site is the hinge between the rocky echeloned coasts of the West of Côte d'Ivoire and the straight sandy coasts of the East.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |              |     |
| DYNAMICS                            | Many fragile and unstable sites at the mouths of small estuaries (spits and lidos).<br>The cordon at the Fresco site is eroding, foreshadowing the situation of most of the eastern Ivorian sandy coastlines.<br>Episodic closures of the channels isolating the lagoons with an influence on fishing activities and risks of organic pollution.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |              |     |
| STAKES                              | Rich and diverse area in terms of biodiversity related to the wetlands and lagoons complex (varied environments related to the hydrological regime, floral and faunal interests).<br>Low human occupation, including on the coastline.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |     |
| RECOMMANDATION                      | No action recommended beyond the efforts of conserving sites and natural ecosystems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |              |     |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY  | Low |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |     |
| EVOLUTION OF STAKES                 | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |     |
| HAZARDS                             | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |     |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY  | Low |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |     |
| EVOLUTION OF STAKES                 | Reduced forest on the mainland in favor of cocoa and rubber plantations and food crops.<br>The Protected Forest of Port Gautier was subject to a development plan, and currently presents a satisfactory conservation level. Conversely, the Okromodo Protected Forest located to the north of the coastline is in an advanced state of degradation due to the illegal logging of cocoa plantations. At the same time, there is little extension of the habitat in the segment. And even the exploitation of the Ngni island of the Fresco lagoon for tourist and agricultural purposes.<br>The wetlands (mangroves) are threatened with disappearance by the anarchic logging, and by poisoned waters fishing. <i>The mangroves between Fresco and Grand-Lahou have been replaced in some places by an herbaceous layer with Paspalum vaginatum or shrubs with Drepanocarpus lunatus and Dalbergia ecastaphyllum.</i><br>The deteriorated living environment of the lagoon complex is a threat to the fishing activity and in turn the regional economy, and the supply of the populations and fishery products. |              |     |
| CURRENT PROJECTS                    | The "Increasing resilience to climate change in the coastal landscape of Fresco" <sup>33</sup> Project carried out under the WABiiC program and officially launched on February 13, 2019 (USAID): <ul style="list-style-type: none"><li>• Restoring mangroves and highland forests;</li><li>• Promoting agroforestry techniques;</li><li>• Access of fishermen to tools that will enable them to sustainably handle resources in the Lagoon estuary.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |              |     |



|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                         |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| OUTSTANDING NATURAL AREAS | <b>Fresco Ramsar Site</b> <ul style="list-style-type: none"> <li>ZHII ID:1CI003 – 1582 / WDPA ID : 902797</li> <li>Designated on October 18, 2005 (15,507 ha).</li> </ul> <b>Protected Forest of Port-Gautier</b> <ul style="list-style-type: none"> <li>WDPA ID: 300965</li> <li>Forest part of the emission reduction program in the Tai National Park area<sup>34</sup>.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                         |
| HAZARDS                   | <p>Coastline erosion of <math>-6.7 \pm 0.5</math> m, or <math>-1.3</math> m/year over the 2015–2020 period. This high rate should be connected to the outstanding unrest of July 2018<sup>35</sup>.</p> <p>Recurrent clogging of the artificial channel during low water level and periodic opening during the flood of the Bolo and Niouniourou rivers.</p> <p>Sediment and litter transports.</p> <p>Rainfall regime disruption:</p> <ul style="list-style-type: none"> <li>Decreased rainfall heights by 25% from 1951 (1797.1 mm between 1951–1974 and 1350.2 mm after 1974);</li> <li>Shortened rainy season by an average of 15 days compared to that before 1974 (April 19–24 to August 12–04);</li> <li>Average rainfall after 2016: 1653.5 mm, or a 22.5% increase compared to the 1975–2017 average aggregation.</li> <li>High flooding risk in June (28% of the annual aggregation) and October (9% of the annual aggregation)<sup>36</sup>.</li> </ul> <p>Soil erosion.</p> |                         |
| RECOMMENDATIONS           | <p>Maintaining a permanent operation of the channel in order to restore the ecological conditions required for the biodiversity of the Fresco coastline.</p> <p>Integrating the coastline evolution and the flooding risk to the land management project.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                         |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>CRITICALITY</b> High |

<sup>33</sup> <https://www.wabicc.org/un-projet-de-lutte-contre-lerosion-cotiere-lance-a-fresco/>.

<sup>34</sup> The World Bank, 2019. Carbon Partnership Facility (FCPF) – Carbon fund – Emissions Reduction Program Document (ER-PD). Emissions Reduction Program Document for Tai National Park, Republic of Côte d'Ivoire. 323p.  
See <https://www.forestcarbonpartnership.org/system/files/documents/190422-ERPDP%20RCI%20FV.pdf>

<sup>35</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) kinematic analysis of the coastline from Sentinel 1 images provided by ESA; cross-checking with localized field observations. Follow-up report, IGT – MARISCO Program, 12p.

<sup>36</sup> Sources : analysis of data from:

- NOAA (2018) and SODEXAM (2018),
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a: Detected homogeneous spatiotemporal rainfall structures in Côte d'Ivoire over the 1951–2017 period. Review of Geography for Regional Planning and Development of the South (South observations). Abidjan, Côte d'Ivoire, pp. 49–64.
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Recent interannual variations of major climate parameters in Côte d'Ivoire since 1951, Climate and Development, No. 26, pp 5–16.



| CI3-b                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 117 - WEST GRAND LAHOU |        |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                        |        |
| DIAGNOSTIC                          | Complex estuarine and dynamic area<br>Ongoing coastal cordon reconfiguration in relation to the deficit of sedimentary input in the southwest-<br>tern coastal sector and probably that related to the developed dams on the Bandama River.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                        |        |
| DYNAMICS                            | Straight coastline apparently stable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                        |        |
| STAKES                              | Coastal forest relics conservation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |        |
| RECOMMENDATION                      | Floral recognition of coastal forest relics to be combined with the Assagny Conservation Unit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                        |        |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY            | Low    |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                        |        |
| EVOLUTION OF STAKES                 | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                        |        |
| HAZARDS                             | Proximity of the Grand Lahou area and the Kossou dam effects on the Bandama, even though the<br>sector is located upstream of the coastal drift.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                        |        |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY            | Medium |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                        |        |
| EVOLUTION OF STAKES                 | The Grand Lahou lagoon complex perimeter serves as a site of a dispersed habitat composed of villages.<br>Broadly, there is an increased number of inhabitants. In some localities, the population has more than<br>doubled; this is the case in Ebounou (2,833 inhabitants), Groguida (1,063 inhabitants)...<br>These villages are exposed to the risk of flooding by overflow of the lagoon and the Bandama waters<br>(October and November).<br>The wetlands (mangroves) are threatened with disappearance by the anarchic logging, and by poisoned<br>waters fishing. The deteriorated living environment of the lagoon complex is a threat to the fishing<br>activity and in turn the regional economy, and the supply of the populations and fishery products. |                        |        |
| CURRENT PROJECTS                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                        |        |
| OUTSTANDING NATURAL AREAS           | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |        |
| HAZARDS                             | Low coastline retreat of -1.23±0.50m, or -0.25 m/year over the 2015-2020 period <sup>37</sup> .<br>Rainfall regime disruption: <ul style="list-style-type: none"><li>Decreased rainfall heights by 20% from 1951 (1902.2 mm between 1951-1971 and 1529 mm<br/>after 1971);</li><li>Stable rainy season before and after 1971 (April 22-23 to August 10-13);</li><li>High flooding risk in June (28% of the annual aggregation) and October (9% of the annual<br/>aggregation);</li><li>Average rainfall after 2016:1940.9 mm, or a 27% increase compared to the 1972-2017 average<br/>aggregation.<sup>38</sup>.</li></ul>                                                                                                                                           |                        |        |
| RECOMMENDATIONS                     | Integrating the coastline evolution and the flooding risk to the land management project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                        |        |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY            | Medium |

<sup>37</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) kinematic analysis of the coastline from Sentinel 1 images provided by ESA; cross-checking with localized field observations. Follow-up report, IGT - MARISCO Program, 12p.

<sup>38</sup> Sources : analysis of data from:

- NOAA (2018) and SODEXAM (2018),
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a: Detected homogeneous spatiotemporal rainfall structures in Côte d'Ivoire over the 1951-2017 period. Review of Geography for Regional Planning and Development of the South (South observations). Abidjan, Côte d'Ivoire, pp. 49-64.
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Recent interannual variations of major climate parameters in Côte d'Ivoire since 1951, Climate and Development, No. 26, pp 5-16.



| CI3-c                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 118 – GRAND LAHOU, RIGHT BANK AND BANDAMA ESTUARY |           |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-----------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                   |           |
| DIAGNOSTIC                          | Initially located on the cordon near the mouth of the Bandama River, the city was relocated at 18 km inland. The reason given to justify this relocation is the erosion of the buildable area.<br>Tourist orientation weakened by the generalized instability noted at the Lahou beach.<br>Some witnesses of forest vegetation of a few tens of hectares to be preserved imperatively.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                   |           |
| DYNAMICS                            | Dynamic zone (average retreat at the lighthouse level: 1.7m/year).<br>The Grand-Lahou sandy cordon is divided into two parts: the Kpanda village to the west and the city center to the east. The sandy cordon is 365 m wide at the Kpanda village and 210 m wide near the mouth.<br>Impact of the sediment deficit related to the Kossou dam built in the 1970s on the Bandama River to be confirmed.<br>The morphological changes of the Grand-Lahou beach are oscillating and marked by seasonality, with periods of erosion and accretion corresponding to periods of high and low swell dynamics.<br>The coastal cordon erosion destroyed the town's lighthouse. Between 1985 and 1990, an erosion of about 2.5m/year was observed. The lighthouse in the background destroyed by erosion had to be moved since 1989.The large quantity of sand transported from the West by the coastal drift and the decreased Bandama river regime contribute to the seasonal silting of the lagoon channels <sup>39</sup> . |                                                   |           |
| STAKES                              | Interest for the biodiversity of the wetland complex of the Bandama estuary.<br>Threatened stability of all the urban and tourist facilities located on the sandy spit of the mouth.<br>Degraded and deforested mangroves, increasing the instability of lagoon banks.<br>Episodic clogging trend of the mouth affecting fishing activities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                   |           |
| RECOMMANDATION                      | Informing the inhabitants of the estuary sandy spit.<br>Potential development program to be studied in a very dynamic context where impacts must be anticipated and properly evaluated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                   |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY                                       | Very high |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                   |           |
| EVOLUTION OF STAKES                 | Project to create an oceanographic center in the north of the lagoons.<br>Oil prospecting, project to create a fishing port and a school.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                   |           |
| COASTAL PROTECTION                  | Project to stabilize the mouth of the Bandama River                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                   |           |
| HAZARDS                             | Coastline retreat by 19 to 23m between 2008 and 2015, or a retreat rate of 2 to 3m/year.<br>Westward migration of the Tagba lagoon channel leading to lateral erosion of the Lahou-kpandas cor-don over approximately 600 m between 2011 and 2015.The cumulative distance since 1993 is 1.5km.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                   |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY                                       | Very high |

**EVOLUTION OVER THE 2016–2020 PERIOD**

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                              |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| EVOLUTION OF STAKES       | <p>Lahou Kpanda is threatened with extinction. The sandy strip on which this village is located is constantly shrinking, nibbled away by erosion. Paradoxically, the last census showed an increased population on this site: The population increased from 1,154 inhabitants in 1998 to 2,127 inhabitants in 2014 (RGPH 1998 and 2014).</p> <p>The living environment goes on deteriorating: Destroyed village cemetery by the surges; displaced foreign fishermen for the fourth time for some of them, to cope with the coastline retreat. However, there is virtually no more space for resettlement on the site to accommodate this community.</p> <p>In addition to erosion, Lahou Kpanda and the villages settled around the lagoon are exposed to the risk of flooding by overflow of the lagoon and the Bandama waters (October and November).</p> <p>The wetlands (mangroves) are threatened with disappearance by the anarchic logging, and by poisoned waters fishing.</p> <p>The deteriorated living environment of the lagoon complex is a threat to the fishing activity and in turn the regional economy, and the supply of the populations and fishery products.</p> |                              |
| CURRENT PROJECTS          | <p>West Africa Coastal Areas Resilience Investment Project – WACA ResIP<sup>40</sup> – World Bank Group. The actions carried out in this sector are described below:</p> <ul style="list-style-type: none"> <li>• The banks of the Tiagba lagoon will be stabilized by mangrove reforestation and rehabilitation.</li> <li>• Support is also provided to the mangrove sites of the Azagny National Park, also a Ramsar site.</li> <li>• Feasibility studies and modeling will enable defining what type of coastal infrastructure to build along the Grand-Lahou sandy strip to better handle the movement of the river mouth and prevent frontal coastal erosion along the shoreline.</li> </ul> <p>Cemetery relocation study by the government.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                 |                              |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                              |
| HAZARDS                   | <p>Coastline stability and developing a broad berm in the west of the mouth. An increase by <math>2.05 \pm 0.50\text{m}</math> was recorded over the 2015–2020 period, or a rate of <math>+0.41\text{m/year}</math>. The eastern coastal cordon is eroding in places.</p> <p>Considerable westward migration from the mouth by 135m from 2016 to 2019. The migration cumulative distance since 1993 is 1.9 km<sup>41</sup>.</p> <p>Rainfall regime disruption:</p> <ul style="list-style-type: none"> <li>• Decreased rainfall heights by 20% from 1951 (1902.2 mm between 1951–1971 and 1529mm after 1971);</li> <li>• Stable rainy season before and after 1971 (April 22–23 to August 10–13);</li> <li>• Average rainfall after 2016: 1940.9mm, or a 27% increase compared to the 1972–2017 average aggregation;</li> <li>• High flooding risk in June (28% of the annual aggregation) and October (9% of the annual aggregation)<sup>42</sup>.</li> </ul>                                                                                                                                                                                                                         |                              |
| RECOMMENDATIONS           | Integrating the coastline evolution and the flooding risk to the land management project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                              |
| MONITORING                | <b>Regular and intensive</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>CRITICALITY Very high</b> |

<sup>40</sup> <https://www.wacaprogram.org/country/cote-divoire>

<sup>41</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) kinematic analysis of the coastline from Sentinel 1 images provided by ESA; cross-checking with localized field observations. Follow-up report, IGT – MARISCO Program, 12p.

<sup>42</sup> Sources : analysis of data from:

- NOAA (2018) and SODEXAM (2018),
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a: Detected homogeneous spatiotemporal rainfall structures in Côte d'Ivoire over the 1951–2017 period. Review of Geography for Regional Planning and Development of the South (South observations). Abidjan, Côte d'Ivoire, pp. 49–64.
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Recent interannual variations of major climate parameters in Côte d'Ivoire since 1951, Climate and Development, No. 26, pp 5–16.





| CI3-d                               | 119 – LEFT BANK OF THE BANDAMA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |
| DIAGNOSTIC                          | Very narrow belt, sparsely occupied, bordered by channels and wetlands, complex terraces cut by channels.<br>Coconut grove bordered on the north by the Azagny canal, southern limit of the Azagny National Park.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |
| DYNAMICS                            | Erosion. Impact of the sediment deficit linked to the Bandama dam to be confirmed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |
| STAKES                              | Interest for the biodiversity of the wetland complex of the Bandama delta.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |
| RECOMMENDATION                      | Application of the management and development provisions of the Azagny National Park.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
| MONITORING                          | No monitoring                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY    Medium |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |
| EVOLUTION OF STAKES                 | Oil exploration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |
| COASTAL PROTECTION                  | Reflections engaged to determine the solutions to be retained for the coastal sustainable management.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
| HAZARDS                             | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY    Medium |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |
| EVOLUTION OF STAKES                 | The Azagny National Park preserves on 22 000 ha, a flora and a fauna recognized as being of a great biological diversity. The other stake is the tourist development of this park. Visits supervised by agents of the Office Ivoirien des Parcs et des Réserves (OIPR) are allowed; a hotel camp, located not far from the park, offers accommodation possibilities to tourists.<br>The park enjoys good accessibility which exposes it to human pressures: rattan harvesting, poaching and clandestine agricultural practices.<br>The park borders a canal to the south that separates it from a sandy coastline that is showing worrying signs of erosion. The retreat of the coastline directly threatens the localities of Amessan N'Guessandon, Djateket, Noumouzou and Toukouzou whose population is between 301 and 1 496 inhabitants. |                       |
| CURRENT PROJECTS                    | West Africa Coastal Areas Resilience Investment Project (WACA ResIP) <sup>43</sup> – World Bank Group<br>The actions carried out at the level of this sector are described below : <ul style="list-style-type: none"><li>• The banks of the Tiagba lagoon will be stabilized by reforestation and rehabilitation of mangroves.</li><li>• Support is also given to the mangrove sites of the Azagny National Park, also a Ramsar site.</li><li>• Feasibility studies and modeling will help determine what type of coastal infrastructure to build along the Grand-Lahou sandbar to better manage the movement of the river mouth and prevent frontal coastal erosion along the shoreline.</li></ul>                                                                                                                                           |                       |
| OUTSTANDING NATURAL AREAS           | Azagny National Park (IUCN Cat II) <ul style="list-style-type: none"><li>• WDPA ID: 7522</li><li>• Created on 2 April 1981 (Decree No. 81/218)</li></ul> Azagny Ramsar site <ul style="list-style-type: none"><li>• ZHII ID : 1CI001-790 / WDPA ID: non-existent</li><li>• Designation on February 27, June 1996 (19,400 ha).</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |

<sup>43</sup> <https://www.wacaprogram.org/country/cote-divoire>



|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                  |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| HAZARDS         | Retreat of the coastline of the order of $-9.4 \pm 0.5$ m or $-1.8$ m/year over the period 2015-2020 <sup>44</sup> .<br>Disruption of rainfall patterns: <ul style="list-style-type: none"> <li>• Rainfall decreased by 20% (1902.2mm between 1951-1971 and 1529mm after 1971);</li> <li>• Rainy season stability before and after 1971 (April 23-22 to August 13-10);</li> <li>• High risk of flooding in June (28% of year-to-date) and October (9% of year-to-date);</li> <li>• Average rainfall after 2016: 1940.9mm, an increase of 27% compared to the average accumulation of 1972-2017<sup>45</sup>.</li> </ul> Soil erosion.<br>Transport of sediments and litter. |                                  |
| RECOMMENDATIONS | Include the evolution of the coastline and the risk of flooding in the management project of the territory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                  |
| MONITORING      | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>CRITICALITY</b> <b>Medium</b> |

<sup>44</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) analyse cinématique du trait de côte à partir des images Sentinel 1 fournies par l'ESA ; recoupement avec des observations terrains localisées. Rapport de suivi, Programme MARISCO, IGT, 12p.

<sup>45</sup> Sources: analysis of data from :  

- NOAA (2018) et SODEXAM (2018),
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a : Détection de structures pluviométriques spatiotemporelles homogènes en Côte d'Ivoire sur la période 1951-2017. Revue de Géographie, d'Aménagement Régional et de développement des Suds (Regard Suds). Abidjan, Côte d'Ivoire, pp. 49-64.
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Variations interannuelles récentes des paramètres climatiques majeurs en Côte d'Ivoire depuis 1951, Climat et Développement, N°26, pp 5-16.



CI4

## RURAL AREA ASSAGNY – JACQUEVILLE – ABIDJAN WEST

Rather homogeneous rectilinear coastline, with generalized extension of large plantations of coconut trees on sandy terrace.

Villages planned and served by road or track on sand parallel to the coast. Set back and out of danger from the sea. Despite the proximity of Abidjan and the initial service by a ferry crossing the lagoon, replaced since March 2015 by a bridge, very little evidence of seaside residences other than the huts associated with plantations.

The attractive coastline is rather that of the Ebrié lagoon, with numerous residences lining the lagoon shore, and nautical installations.



| CI4-a                               | 120-ASSAGNY-JACQUEVILLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |        |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |        |
| DIAGNOSTIC                          | End of the paved road, but improved track on sand set back from the beach. Same pattern as for the following sectors: villages with planned grid in the middle of plantations.<br>At the level of the Assagny canal, very narrow lagoon channels along the beach.                                                                                                                                                                                                                                                                                                                                                                        |             |        |
| DYNAMICS                            | Rectilinear coastline, very weak undulations hardly perceptible (period: approximately 10 to 15 km).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |        |
| STAKES                              | No particular stake, rural coconut grove, villages, with some exceptions, located back from the beach.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |        |
| RECOMMANDATION                      | No recommendation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |        |
| MONITORING                          | No monitoring                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY | Medium |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |        |
| EVOLUTION OF STAKES                 | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |        |
| HAZARDS                             | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |        |
| MONITORING                          | No monitoring                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY | Medium |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |        |
| EVOLUTION OF STAKES                 | The main stakes are the sustainable exploitation of natural resources (fisheries, soils, offshore gas and oil...) as well as the control of coastal risks (water pollution) and technological risks (gas leakage on the pipeline 14 of the offshore station CI-11 of the PETROCI group).<br>The development of the Ebrié lagoon crossing bridge between Songon and Njem has improved access to the coast and should accelerate its urbanization.                                                                                                                                                                                         |             |        |
| CURRENT PROJECTS                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |        |
| OUTSTANDING NATURAL AREAS           | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |        |
| HAZARDS                             | Moderate coastline retreat: -2.91±0.50m or -0.58 m/year over the period 2015-2020 <sup>46</sup> .<br>Disruption of rainfall patterns: <ul style="list-style-type: none"><li>• Rainfall decreased by 24% (2141 mm between 1951-1982 and 1631.8 mm after 1982);</li><li>• Shortening of the rainy season before and after 1982 by an average of 17 days (29 March-07 April to 11-04 August);</li><li>• Average rainfall after 2016: 1628.5 mm, a decrease of 2% compared to the average accumulation of 1982-2017 ;</li><li>• High risk of flooding in June (28% of year-to-date) and October (9% of year-to-date)<sup>47</sup>.</li></ul> |             |        |
| RECOMMENDATIONS                     | Include the evolution of the coastline, and the risks related to flooding and technology in the management project of the territory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |        |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY | Medium |

<sup>46</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) analyse cinématique du trait de côte à partir des images Sentinel 1 fournies par l'ESA ; recoupement avec des observations terrains localisées. Rapport de suivi, Programme MARISCO, IGT, 12p.

<sup>47</sup> Sources: analysis of data from :  

- NOAA (2018) et SODEXAM (2018),
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a : Détection de structures pluviométriques spatiotemporelles homogènes en Côte d'Ivoire sur la période 1951–2017. Revue de Géographie, d'Aménagement Régional et de développement des Suds (Regard Suds). Abidjan, Côte d'Ivoire, pp. 49–64.
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Variations interannuelles récentes des paramètres climatiques majeurs en Côte d'Ivoire depuis 1951, Climat et Développement, N°26, pp 5–16.



| CI4-b                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 121 – JACQUEVILLE |        |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |        |
| DIAGNOSTIC                          | Small town center surrounding a developed lagoon. Like all of the planned villages in this area, the initial layout provides a natural strip of coconut trees along the beach.<br>Locally, however, construction is beginning to approach the beach.<br>Tarmac road linking with Abidjan.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |        |
| DYNAMICS                            | Rectilinear coastline, very weak undulations hardly perceptible (period: approximately 10 to 15 km).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |        |
| STAKES                              | Issues mainly related to the occupation along the lagoon, but also to the vigilance regarding the progression of the built-up area between the coastal path and the beach.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   |        |
| RECOMMENDATION                      | No recommended action.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                   |        |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY       | Medium |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |        |
| EVOLUTION OF STAKES                 | Development of 4 offshore oil wells (Foxtrot), Marlin and Manta platforms.<br>Development of the lagoon crossing bridge.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |        |
| HAZARDS                             | Accretion of the beach. Estimated coastline advance between 2012 and 2015 at 0.18m with a rate of 0.35m/year from 1998 to 2015.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | CRITICALITY       | Medium |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |        |
| EVOLUTION OF STAKES                 | The main stakes are the sustainable exploitation of natural resources (fisheries, soils, gas and oil offshore ...) as well as the control of coastal risks (water pollution) and technological risks (gas leakage on the pipeline 14 of the offshore station CI-11 of the PETROCI group).<br>The Njem bridge built over the Ebrié lagoon has opened up the region and should accelerate the urbanization of the coastline. Since its introduction, we have seen the resumption of the activities of the Société Ivoirienne de Coco Râpé (SICOR), the opening of many bars-restaurants (maquis), an increase in the number of subdivisions, and more frequentation of beaches, hotels and bars-restaurants on weekends by Abidjan residents. |                   |        |
| CURRENT PROJECTS                    | Extension project of the city of Jacqueline: construction of a new city of 40,000 inhabitants on 500 hectares north of the current city.<br>Many subdivisions have been completed and others are underway.<br>Construction of a pilot hotel complex «Le Relais» with a capacity of fifty rooms on 4 hectares, in the village of Djacé.<br>Renovation of the hotel «M'KOA».                                                                                                                                                                                                                                                                                                                                                                  |                   |        |
| OUTSTANDING NATURAL AREAS           | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |        |
| HAZARDS                             | Moderate coastline retreat: -3.41±0.50m or a rate of -0.68 m/year over the period 2015–2020 <sup>48</sup> .<br>Disruption of rainfall patterns <ul style="list-style-type: none"><li>Rainfall decreased by 24% (2141 mm between 1951–1982 and 1631.8 mm after 1982);</li><li>Shortening of the rainy season before and after 1982 by an average of 17 days (29 March–07 April to 11–04 August);</li><li>Average rainfall after 2016: 1628.5 mm, down 2% from the 1982–2017 average cumulative total.</li><li>High risk of flooding in June (28% of year-to-date) and October (9% of year-to-date)<sup>49</sup>.</li></ul>                                                                                                                   |                   |        |
| RECOMMENDATIONS                     | Include the evolution of the coastline, and the risks related to flooding and technology in the management project of the territory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | CRITICALITY       | Medium |

<sup>48</sup> Sources: HAUHOUOT C, BAMBA Y., YAO KS, DANGUI N (2020) analyse cinématique du trait de côte à partir des images Sentinel 1 fournies par l'ESA ; recoupement avec des observations terrains localisées. Rapport de suivi, Programme MARISCO, IGT, 12p

<sup>49</sup> Sources: analysis of data from :  

- NOAA (2018) et SODEXAM (2018),
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a : Détection de structures pluviométriques spatiotemporelles homogènes en Côte d'Ivoire sur la période 1951–2017. Revue de Géographie, d'Aménagement Régional et de développement des Suds (Regard Suds). Abidjan, Côte d'Ivoire, pp. 49–64.
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Variations interannuelles récentes des paramètres climatiques majeurs en Côte d'Ivoire depuis 1951, Climat et Développement, N°26, pp 5–16.



| CI4-c                               | 122 - JACQUEVILLE - WEST ABIDJAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| DIAGNOSTIC                          | This sector borders the Ebrié lagoon, a space overlooking the lagoon, in the process of urbanization. The littoral part is very little occupied, composed of sandy terraces with little fertility and few coconut trees.<br>Almost empty area (land reserve?).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |
| DYNAMICS                            | Rectilinear coastline, very weak undulations hardly perceptible (period: approximately 10 to 15 km).<br>Tendency to slight accretion west of the Vridi jetty.<br>Green front of coconut trees at the edge of the beach.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| STAKES                              | Stakes essentially linked to the occupation along the lagoon.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |
| RECOMMANDATION                      | Anticipation of the development of the occupation and sector scheme if it densifies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY    Medium |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| EVOLUTION OF STAKES                 | Progressive development of habitat on old coconut groves.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |
| HAZARDS                             | Sector in accretion in its eastern part at the level of Vridi channel with a rate of 0.35 m/year from 1998 to 2015.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY    Medium |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| EVOLUTION OF STAKES                 | The main stakes are the sustainable exploitation of natural resources (fisheries, soils, gas and oil offshore ...) as well as the control of coastal risks (water pollution) and technological risks (gas leakage on the pipeline 14 of the offshore station CI-11 of the PETROCI group).<br>The Njem bridge built over the Ebrié lagoon has opened up the region and should accelerate the urbanization of the coastline. Since its introduction, we have seen the resumption of the activities of the Société Ivoirienne de Coco Râpé (SICOR), the opening of many bars-restaurants (maquis), an increase in the number of subdivisions, and more frequentation of beaches, hotels and bars-restaurants on weekends by Abidjan residents.                                      |                       |
| CURRENT PROJECTS                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |
| OUTSTANDING NATURAL AREAS           | Banco National Park (IUCN Cat II) <ul style="list-style-type: none"><li>• WDPA ID: 7525</li><li>• Created in 1953 (Decree of 31/10/53, 3474 ha).</li><li>• The Banco area was classified as a forest reserve in 1926 and then as a classified forest in 1929.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| HAZARDS                             | Progradation of the coastline by 3.79±0.50m, i.e. a rate of +0.76 m/year over the period 2015-2020 <sup>50</sup> .<br>Disruption of rainfall patterns: <ul style="list-style-type: none"><li>• Rainfall decreased by 24% (2141 mm between 1951-1982 and 1631.8 mm after 1982);</li><li>• Shortening of the rainy season before and after 1982 by an average of 17 days (29 March-07 April to 11-04 August);</li><li>• Average rainfall after 2016: 1628.5 mm, down 2% from the 1982-2017 average cumulative total.</li><li>• High risk of flooding in June (28% of year-to-date) and October (9% of year-to-date)<sup>51</sup>.</li></ul> Soil erosion, landslides, and mudslides.<br>Transport of sediments and litter.<br>Oil pollution (offshore exploitation and transport). |                       |
| RECOMMENDATIONS                     | Include the evolution of the coastline, and the risks related to flooding and technology in the management project of the territory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY    Medium |

<sup>50</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) analyse cinématique du trait de côte à partir des images Sentinel 1 fournies par l'ESA ; recoupement avec des observations terrains localisées. Rapport de suivi, Programme MARISCO, IGT, 12p.

<sup>51</sup> Sources: analysis of data from :  
 • NOAA (2018) et SODEXAM (2018),  
 • Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a : Détection de structures pluviométriques spatiotemporelles homogènes en Côte d'Ivoire sur la période 1951-2017. Revue de Géographie, d'Aménagement Régional et de développement des Suds (Regard Suds). Abidjan, Côte d'Ivoire, pp. 49-64.  
 • Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Variations interannuelles récentes des paramètres climatiques majeurs en Côte d'Ivoire depuis 1951, Climat et Développement, N°26, pp 5-16.



## CI5

## ABIDJAN–PORT BOUET

Continuous urban space, cuts on each side of the airport, with the western part located directly above the Trou sans Fond (deep submarine canyon cutting into the continental shelf directly below Abidjan).

Growth to the north and east (unplanned housing east of the airport).

Easily equipped sandy terrace site.

| CI5-a                               | 123 - PORT BOUET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                          |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |
| DIAGNOSTIC                          | Structured urban district including housing and activities related to the port. In addition, there are tourist facilities (beachside restaurants) and precarious housing, most often located near the beach.<br>A protection plan based on a battery of 8 unsinkable 100-meter breakwaters spaced 400 to 450 meters apart was developed, but never executed (mainly for cost reasons).<br>Work to widen the Vridi channel was planned and carried out.<br>Exceptional swells (due to a seismic event in 2007, then in 2008, 2011, 2014, 2016 and 2018 have severely affected this area, with losses of housing and a retreat of the beach of more than 15 m (source national diagnosis). |                          |
| DYNAMICS                            | Sector in very active erosion.<br>Impact of the Vridi jetty and the Trou sans Fond sediment trap located in the area.<br>Existing beach with a strongly reflexive profile, partly made up of materials from the initial eroded terrace, high granulometry. The decrease in the river's flushing currents due to the detour of water towards the Vridi canal has favored this process (case study).                                                                                                                                                                                                                                                                                       |                          |
| STAKES                              | Numerous habitats and tourist infrastructures highly threatened and exposed.<br>Local impact of beach walls and «spontaneous» protective structures put in place by the occupants.<br>Stability of the port access channel infrastructure.                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          |
| RECOMMANDATION                      | Risk Prevention Plan and preparation of the population for a requalification and relocation of the habitat away from the beach.<br>Control of the proliferation of individual defense and protection installations.<br>Planning and requalification of the waterfront (sector scheme).                                                                                                                                                                                                                                                                                                                                                                                                   |                          |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY    Very high |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |
| EVOLUTION OF STAKES                 | Numerous destructions of buildings, displacement of populations.<br>Extension and development of the port of Abidjan.<br>Implementation of a Master Plan for the city of Abidjan.<br>Private developments of building reinforcement and erosion control.                                                                                                                                                                                                                                                                                                                                                                                                                                 |                          |
| COASTAL PROTECTION                  | The port of Abidjan is made up of the Vridi canal which gives access to the lagoon area in which the various moles and quays are installed .<br>The port of Abidjan and the concession of the container terminal of the port of Abidjan was granted to Bolloré Africa Logistics in 2004 for a period of 15 years.<br>A modernization operation is underway (introduction of 8 new RTGs on quay 21).<br>Bolloré Africa Logistics manages the Sitarail rail concession (1,260 km link between Abidjan, Ouagadougou and Kayes).                                                                                                                                                             |                          |
| HAZARDS                             | Strong erosion in all the East of the Vridi canal, retreat of the coastline of 0,5 to 3 m/year. Significant retreat during storm surges including August 2011 and May 2014. Possible landslide at the head of the Trou Sans Fond (submarine canyon).                                                                                                                                                                                                                                                                                                                                                                                                                                     |                          |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY    Very high |

**EVOLUTION OVER THE 2016–2020 PERIOD**

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| EVOLUTION OF STAKES       | <p>The port of Abidjan is under construction. The entrance to the Vridi Canal has been widened and deepened to allow ships longer than 260 meters to dock in the port. Work to extend and optimize the port area is underway: construction of a new ro-ro terminal, filling in of more than 400 hectares for the establishment of industries and warehouses. Construction of a second container terminal.</p> <p>The coast shows worrying signs of erosion caused in part by the protection of the Vridi canal: loss of space, destruction of equipment and houses.</p>                                                                                                                                                                                                                                                                                                                                                                                                                        |                              |
| CURRENT PROJECTS          | Pre-feasibility study on climate change adaptation (Artélia).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |
| OUTSTANDING NATURAL AREAS | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                              |
| HAZARDS                   | <p>Remarkable erosion in the whole bay of Port Bouet linked to the development of the Vridi canal. Coast-line recession of <math>-8.21 \pm 0.50</math> m or <math>-1.64</math> m/year over the period 2015–2020. Significant coastline retreat from 2017 to 2019 due to the storm surge that occurred in July 2018. However, there is a stable point at the Bidet. Possible landslide at the head of the Trou Sans Fond (submarine canyon)<sup>53</sup>.</p> <p>Disruption of rainfall patterns:</p> <ul style="list-style-type: none"> <li>• Rainfall decreased by 24% (2141 mm between 1951–1982 and 1631.8 mm after 1982);</li> <li>• Shortening of the rainy season before and after 1982 by an average of 17 days (29 March – 07 April to 11–04 August);</li> <li>• Average rainfall after 2016: 1628.5 mm, down 2% from the 1982–2017 average cumulative total.</li> <li>• High risk of flooding in June (28% of year-to-date) and October (9% of year-to-date)<sup>54</sup>.</li> </ul> |                              |
| RECOMMENDATIONS           | Include the evolution of the coastline and the risk of flooding in the management project of the territory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                              |
| MONITORING                | <b>Regular and intensive</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>CRITICALITY Very high</b> |

<sup>53</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) analyse cinématique du trait de côte à partir des images Sentinel 1 fournies par l'ESA; recoupement avec des observations terrains localisées. Rapport de suivi, Programme MARISCO, IGT, 12p.

<sup>54</sup> Sources: analysis of data from :

- NOAA (2018) et SODEXAM (2018),
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a: Détection de structures pluviométriques spatiotemporelles homogènes en Côte d'Ivoire sur la période 1951–2017. Revue de Géographie, d'Aménagement Régional et de développement des Suds (Regard Suds). Abidjan, Côte d'Ivoire, pp. 49–64.
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Variations interannuelles récentes des paramètres climatiques majeurs en Côte d'Ivoire depuis 1951, Climat et Développement, N°26, pp 5–16.





PORT OF ABIDJAN

2005



2015



2020





| CI5-b                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 124 – PORT BOUET EAST |           |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |           |
| DIAGNOSTIC                          | Dense habitat on a narrow coastal strip delimited by the main road (4 lanes from the airport). Density increasing from the airport.<br>Only «green» right-of-way – urbanization cut-off constituted by the airport. The space, initially almost privatized, has been totally transformed through the development of the waterfront landscape and the relocation of populations.<br>Advance of the sea contributing to the precarious situation of the constructions in the immediate surroundings of the beach.<br>Low sand extraction at several points. |                       |           |
| DYNAMICS                            | Locally prograding or stable sector. The oscillations due to the effects of the 2007 storm and the subsequent recovery of the beach in the following years should not hide the very unstable character of the area.                                                                                                                                                                                                                                                                                                                                       |                       |           |
| STAKES                              | Progressive privatization of the beach.<br>Continuation and densification of urbanization to the north of the coastal road, the land located to the South by the beach being already occupied.<br>Future densification by parcelling out concessions to be considered.<br>Urban sprawl with the corresponding costs of equipment, roads, etc.<br>Urban effluent management.                                                                                                                                                                               |                       |           |
| RECOMMANDATION                      | Risk Prevention Plan and preparation of populations in case of surge.<br>On the whole eastern part of the sector, requalification and relocation of the housing set back from the road.<br>Planning and requalification of the waterfront (sector scheme).                                                                                                                                                                                                                                                                                                |                       |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY           | Very high |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |           |
| EVOLUTION OF STAKES                 | Numerous destructions of buildings, displacement of populations.<br>Eventual threats to the end of the airport runway and the coastal road.<br>Construction of the Abidjan – Grand-Bassam highway (2013-2014).                                                                                                                                                                                                                                                                                                                                            |                       |           |
| HAZARDS                             | Average retreat of the coastline of 0.5 to 3m/year.<br>Exacerbation of retreat (6-8 m) by storm surges in August 2011 and late May 2014.                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY           | Very high |



## EVOLUTION OVER THE 2016–2020 PERIOD

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| EVOLUTION OF STAKES       | Spatial recomposition of the built environment in the retro-littoral space: relocation of the inhabitants and destruction of the precarious neighborhoods located south of the Abidjan-Grand-Bassam highway. Development of a platform, construction of a promenade, parking areas and sports and leisure facilities. Eventually, this site should accommodate hotels, restaurants and other tourist facilities.                                                                                                                                                                                                                                                                                                          |                       |
| CURRENT PROJECTS          | Development of the Abidjan metro line.<br>Flagship project of the tourism development plan «Sublime Côte d'Ivoire» <sup>55</sup> :<br><ul style="list-style-type: none"> <li>Rehabilitation of the San Pedro- Abidjan axis by the coast;</li> <li>Construction of a tourist complex located in a luxury residential area of the capital «Serena Village» (delivery expected in 2022).</li> </ul> Pre-feasibility study on climate change adaptation (Artélia).                                                                                                                                                                                                                                                            |                       |
| OUTSTANDING NATURAL AREAS | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |
| HAZARDS                   | Coastline retreat of $-8.52 \pm 0.50$ m or $-1.7$ m/year over the period 2015–2020.<br>Significant foreshore sediment movement due to the storm surge that occurred in July 2018 <sup>56</sup> .<br>Disruption of rainfall patterns:<br><ul style="list-style-type: none"> <li>Rainfall decreased by 24% (2141 mm between 1951–1982 and 1631.8 mm after 1982);</li> <li>Shortening of the rainy season before and after 1982 by an average of 17 days (29 March – 07 April to 11–04 August),</li> <li>Average rainfall after 2016: 1628.5 mm, down 2% from the 1982–2017 average cumulative total.</li> <li>High risk of flooding in June (28% of year-to-date) and October (9% of year-to-date)<sup>57</sup>.</li> </ul> |                       |
| RECOMMENDATIONS           | Include the evolution of the coastline and the risk of flooding in the management project of the territory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY Very high |

<sup>55</sup> The tourist offer in Côte d'Ivoire experiences a great paradox. Business tourism occupies a good position, ranking 3rd just behind Nigeria and Morocco. On the other hand, it is more difficult for leisure tourism, which does not manage to get ahead. With the implementation of the program «Sublime Côte d'Ivoire», the objective is «by 2025 to make Côte d'Ivoire the 5th African tourist destination and to weigh 12% of the country's GDP», the Ivorian Minister of Tourism, Mr Siandou Fofana, told AfricaNews. Retrieved from <https://lepetitjournal.com/>, published on 03/02/2020 at 10:28..

<sup>56</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) analyse cinématique du trait de côte à partir des images Sentinel 1 fournies par l'ESA; recoupement avec des observations terrains localisées. Rapport de suivi, Programme MARISCO, IGT, 12p.

<sup>57</sup> Sources: analysis of data from :

- NOAA (2018) et SODEXAM (2018),
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a: Détection de structures pluviométriques spatiotemporelles homogènes en Côte d'Ivoire sur la période 1951–2017. Revue de Géographie, d'Aménagement Régional et de développement des Suds (Regard Suds). Abidjan, Côte d'Ivoire, pp. 49–64.
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Variations interannuelles récentes des paramètres climatiques majeurs en Côte d'Ivoire depuis 1951, Climat et Développement, N°26, pp 5–16.



PORT BOUET – SPATIAL AND TEMPORAL EVOLUTION OF THE URBAN FABRIC

2005



2015



2020





CI6

## EASTERN PERI-URBAN AREA ABIDJAN GRAND-BASSAM

| CI6-a                               | 125 – PERI-URBAN AREA EAST ABIDJAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                     |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                     |
| DIAGNOSTIC                          | Large terrace without channels or lagoon.<br>Coastal road set back (300m).<br>Residential «urban» strip along the beach, cadastred and continuous in coconut plantations.<br>Large subdivision «projects» in the back.<br>Progressive housing densification on the approach to Abidjan.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |
| DYNAMICS                            | Moderate erosion area.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                     |
| STAKES                              | Progressive privatization of the beach.<br>Continuation and densification of urbanization to the north of the coastal road, the land located to the South by the beach being already occupied.<br>Future densification by parcelling out concessions to be considered.<br>Urban sprawl with the corresponding costs of equipment, roads, etc.<br>Urban effluent management.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                     |
| RECOMMANDATION                      | Organization and urban structuring of subdivided districts (central district?), equipment.<br>Informing the population and residents on the beach about the risk of surge.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                     |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY    High |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                     |
| EVOLUTION OF STAKES                 | Construction of the Abidjan – Grand-Bassam international highway (2013-2014), part of the Abidjan – Lagos corridor.<br>Renovation and widening of the old Abidjan-Grand-Bassam road                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |
| HAZARDS                             | Moderate sensitivity of the coastline with sectors that are stable or increasing in size (beach Km 26).<br>Strong impact of the storm surges of August 2011 and May 2014.<br>Marine submersion of the lidos.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY    High |
| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                     |
| EVOLUTION OF STAKES                 | Tourism development.<br>Recreational facilities along the road (light structures).<br>Growing urbanization between the beach and the Abidjan – Grand-Bassam highway.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |
| CURRENT PROJECTS                    | Construction of a scientific high school.<br>Real estate operation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |
| OUTSTANDING NATURAL AREAS           | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |
| HAZARDS                             | Stability of the coastline with seasonal movements observed at the foreshore.<br>Strong impact of storm surges with a retreat of the berm of -5.36±0.5m, i.e. -1 m/year on average over the period 2015–2020, causing marine surge <sup>58</sup> .<br>Transport of sediments and litter.<br>Disruption of rainfall patterns: <ul style="list-style-type: none"><li>• Rainfall decreased by 24% (2141 mm between 1951–1982 and 1631.8 mm after 1982);</li><li>• Shortening of the rainy season before and after 1982 by an average of 17 days (March 29–April 7 to August 11–04),</li><li>• Average rainfall after 2016: 1628.5 mm, down 2% from the 1982–2017 average cumulative total.</li><li>• High risk of flooding in June (28% of year-to-date) and October (9% of year-to-date)<sup>59</sup>.</li></ul> Soil erosion. |                     |





|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                         |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| HAZARDS         | <p>Stability of the coastline with seasonal movements observed at the foreshore.<br/>           Strong impact of storm surges with a retreat of the berm of <math>-5.36 \pm 0.5\text{m}</math>, i.e. <math>-1\text{ m/year}</math> on average over the period 2015–2020, causing marine surge<sup>58</sup>.<br/>           Transport of sediments and litter.<br/>           Disruption of rainfall patterns:</p> <ul style="list-style-type: none"> <li>• Rainfall decreased by 24% (2141 mm between 1951–1982 and 1631.8 mm after 1982);</li> <li>• Shortening of the rainy season before and after 1982 by an average of 17 days (March 29–April 7 to August 11–04),</li> <li>• Average rainfall after 2016: 1628.5 mm, down 2% from the 1982–2017 average cumulative total.</li> <li>• High risk of flooding in June (28% of year-to-date) and October (9% of year-to-date)<sup>59</sup>.</li> </ul> <p>Soil erosion.</p> |                         |
| RECOMMENDATIONS | Include the evolution of the coastline and the risk of flooding in the management project of the territory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                         |
| MONITORING      | <b>Regular and intensive</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>CRITICALITY High</b> |

<sup>58</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) analyse cinématique du trait de côte à partir des images Sentinel 1 fournies par l'ESA; recoupement avec des observations terrains localisées. Rapport de suivi, Programme MARISCO, IGT, 12p.

<sup>59</sup> Sources: analysis of data from :

- NOAA (2018) et SODEXAM (2018),
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a: Détection de structures pluviométriques spatiotemporelles homogènes en Côte d'Ivoire sur la période 1951–2017. Revue de Géographie, d'Aménagement Régional et de développement des Suds (Regard Suds). Abidjan, Côte d'Ivoire, pp. 49–64.
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Variations interannuelles récentes des paramètres climatiques majeurs en Côte d'Ivoire depuis 1951, Climat et Développement, N°26, pp 5–16.



| CI6-b                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 126-GRAND-BASSAM WEST COAST |           |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                             |           |
| DIAGNOSTIC                          | Habitat on very narrow cordon-lido. Strong trend in construction, including in high-risk areas. In the western part, enlargement of the terrace.<br>Coastal road near the coast (60 to 200 m).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                             |           |
| DYNAMICS                            | Moderate erosion area.<br>Area having suffered damage and flooding during surges associated with a strong swell.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |           |
| STAKES                              | Strong tendency to build along the beach (linear urban sprawl of coconut groves), residential development near the city of Abidjan.<br>Progressive privatization of the beach.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                             |           |
| RECOMMANDATION                      | Reclaiming land control, supervising and limiting the development of buildings.<br>Informing the population and residents on the beach about the risk of surge.<br>Sector plan to control the development of buildings.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                             |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY                 | Very high |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                             |           |
| EVOLUTION OF STAKES                 | Construction of the international highway between Abidjan and Grand-Bassam (2013-2014), part of the Abidjan - Lagos corridor.<br>Renovation and widening of the old Abidjan-Grand-Bassam road.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                             |           |
| HAZARDS                             | Moderate sensitivity of the coastline with sectors that are stable or increasing in size (beach Km 26).<br>Strong impact of August 2011 and May 2014 storm surges on large berms.<br>Marine submersion of the lidos.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY                 | Very high |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                             |           |
| EVOLUTION OF STAKES                 | Tourist development between Modeste and Azuretti.<br>Recreational facilities along the road (light structures)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                             |           |
| CURRENT PROJECTS                    | Strategic plan for the development of tourism «Sublime Côte d'Ivoire».                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                             |           |
| OUTSTANDING NATURAL AREAS           | <b>Ramsar Site of Grand-Bassam</b> <ul style="list-style-type: none"><li>ZHII ID : 1CI004 - 1583 / WDPA ID: 902798</li><li>Designation October 18, 2005 (40,210 ha).</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                             |           |
| HAZARDS                             | Low sensitivity of the coastline with sectors that are stable or increasing in size (beach Km 26).<br>Punctual stabilization by individuals of the retreat of the coastline on the linear around the hotel «La maison de la lagune».<br>Strong impact of storm surges (retreat of -14.4±0.5m or -2.89 m/year of the berm over the period 2015-2020) at the origin of marine surge <sup>60</sup> .<br>Marine submersion of the lidos.<br>Transport of sediments and litter.<br>Disruption of rainfall patterns: <ul style="list-style-type: none"><li>Rainfall decreased by 24% (2141 mm between 1951-1982 and 1631.8 mm after 1982);</li><li>Shortening of the rainy season before and after 1982 by an average of 17 days (29 March-07 April to 11-04 August);</li><li>Average rainfall after 2016: 1628.5 mm, down 2% from the 1982-2017 average cumulative total.</li><li>High risk of flooding in June (28% of year-to-date) and October (9% of year-to-date)<sup>61</sup>.</li></ul> Soil erosion. |                             |           |
| RECOMMENDATIONS                     | Include the evolution of the coastline and the risk of flooding in the management project of the territory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                             |           |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY                 | Very high |

<sup>60</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) analyse cinématique du trait de côte à partir des images Sentinel 1 fournies par l'ESA; recoupement avec des observations terrains localisées. Rapport de suivi, Programme MARISCO, IGT, 12p.

<sup>61</sup> Sources: analysis of data from :  
 • NOAA (2018) et SODEXAM (2018),  
 • Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a: Détection de structures pluviométriques spatiotemporelles homogènes en Côte d'Ivoire sur la période 1951-2017. Revue de Géographie, d'Aménagement Régional et de développement des Suds (Regard Suds). Abidjan, Côte d'Ivoire, pp. 49-64.  
 • Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Variations interannuelles récentes des paramètres climatiques majeurs en Côte d'Ivoire depuis 1951, Climat et Développement, N°26, pp 5-16.



| CI6-c                               | 127-GRAND-BASSAM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |
| DIAGNOSTIC                          | Historical city on a narrow terrace leaning against a lagoon, quasi insular position, urbanizable space of the site almost saturated, hence growth towards the North and the East.<br>Road link to Abidjan.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |
| DYNAMICS                            | Precarious stability.<br>Risk of conjunction of continental flooding and marine surge.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |
| STAKES                              | High risks for all the habitats along the beach (tourist housing, old housing and precarious housing extending eastwards on the very narrow cordon-lido and on the low-lying land on the lagoon shore).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| RECOMMANDATION                      | Detailed plan for the Prevention of flooding and submersion risks.<br>Informing the population and residents along the beach of the risk of high water and the need to relocate the habitat away from the beach.<br>Resorption and relocation of precarious neighborhoods along the beach.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                     |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY    High |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |
| EVOLUTION OF STAKES                 | Project to reopen the mouth of the Comoé River.<br>Rehabilitation project of the historic town of Grand-Bassam. The historic town of Grand-Bassam was inscribed in 2012 as a UNESCO World Heritage Site for cultural criteria (iii) and (iv).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |
| HAZARDS                             | Sedimentation of the mouth of the Comoé leading to organic pollution of the lagoon at the mouth.<br>Moderate retreat of the coastline and frequent marine submersion. Coastline regression of 8m or 1m/ year between 2008 and 2015. Exacerbation of the retreat by storm surges (2011 and 2014).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY    High |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |
| EVOLUTION OF STAKES                 | Increase of the tourist and hotel offer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |
| CURRENT PROJECTS                    | Rehabilitation project of the historic town of Grand-Bassam.<br>Validated project of fixing the opening of the Comoé river mouth <sup>62</sup> , financed in the framework of the Ivorian-Moroccan cooperation. The study is carried out by the UNESCO-IHE/Deltares/Royal Haskoning-DHV consortium.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |
| OUTSTANDING NATURAL AREAS           | <b>Ramsar Site of Grand-Bassam</b> <ul style="list-style-type: none"><li>• ZHII ID : 1CI004 - 1583 / WDPA ID: 902798</li><li>• Designation October 18, 2005 (40,210 ha).</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |
| HAZARDS                             | Moderate coastline retreat.<br>Strong impact of storm surges (retreat of -13.33±0.50m or -2.67 m/year of the berm over the period 2015-2020) and frequent marine submersions during strong waves <sup>63</sup> .<br>Transport of sediments and litter.<br>Disruption of rainfall patterns: <ul style="list-style-type: none"><li>• Rainfall decreased by 24% (2141 mm between 1951-1982 and 1631.8 mm after 1982);</li><li>• Shortening of the rainy season before and after 1982 by an average of 17 days (29 March-07 April to 11-04 August);</li><li>• Average rainfall after 2016: 1628.5 mm, down 2% from the 1982-2017 average cumulative total.</li><li>• High risk of flooding in June (28% of year-to-date) and October (9% of year-to-date)<sup>64</sup>.</li></ul> Soil erosion. |                     |

<sup>62</sup> <https://www.batirici.ci/batirici-le-point-de-vue-de-jeremie-lancement-des-travaux-douverture-de-lembouchure-du-fleuve-comoe-a-grand-bassam/>; <https://www.yeclo.com/lancement-des-travaux-douverture-de-lembouchure-du-fleuve-comoe-ce-lundi-11-novembre-2019/>.

<sup>63</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) analyse cinématique du trait de côte à partir des images Sentinel 1 fournies par l'ESA; recoupement avec des observations terrains localisées. Rapport de suivi, Programme MARISCO, IGT, 12p.

<sup>64</sup> Sources: analysis of data from :  

- NOAA (2018) et SODEXAM (2018),
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a: Détection de structures pluviométriques spatiotemporelles homogènes en Côte d'Ivoire sur la période 1951-2017. Revue de Géographie, d'Aménagement Régional et de développement des Suds (Regard Suds). Abidjan, Côte d'Ivoire, pp. 49-64.
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Variations interannuelles récentes des paramètres climatiques majeurs en Côte d'Ivoire depuis 1951, Climat et Développement, N°26, pp 5-16.





|                 |                                                                                                             |                            |
|-----------------|-------------------------------------------------------------------------------------------------------------|----------------------------|
| RECOMMENDATIONS | Include the evolution of the coastline and the risk of flooding in the management project of the territory. |                            |
| MONITORING      | Regular and intensive                                                                                       | CRITICALITY High TO SEE!!! |



| CI6-d                               | 128-BASSAM ESTUARY LEFT BANK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  |
| DIAGNOSTIC                          | Terrace with narrow coconut groves backed by a lagoon served by permanent road, connected to the main road Bonoua, Grand-Bassam, Abidjan.<br>Material extraction sites.<br>Passage in all terrain vehicles on the sand of the estuary most of the time blocked.                                                                                                                                                                                                                                                                                                                                                                                                                     |                  |
| DYNAMICS                            | Observed erosion (Mondoukou).<br>Siltng dynamics and temporary openings of the estuary.<br>Fragility of the cordon-lido of very low elevation.<br>Sensitivity to surges and flooding of the lagoon system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |
| STAKES                              | Trend towards residential development in coconut groves for affluent urban populations. Annex of Grand-Bassam, but coastal habitat at risk.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                  |
| RECOMMANDATION                      | Flood-Submersion Risk Prevention Plan.<br>Informing the population and residents along the beach of the risk of high water and the need to relocate the habitat away from the beach.<br>Resorption and relocation of precarious neighborhoods along the beach.                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY High |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  |
| EVOLUTION OF STAKES                 | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |
| HAZARDS                             | Moderate retreat of the coastline and frequent marine submersion.<br>Coastline regression of 2.3m or 0.76m/year between 2011 and 2014.<br>Strong impacts of the storm surges of August 2011 and May 2014.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY High |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  |
| EVOLUTION OF STAKES                 | The site is a narrow lido, but which concentrates many stakes: second homes, hotel complexes and restaurants cohabit with lighter structures (straw huts), the core of the village of Mondoukou and its coconut grove. Here, the built environment is threatened by erosion and marine submersions. Some hotel facilities were destroyed (partially) and then rebuilt several times. The road along the beach is (often) cut off by marine submersions.                                                                                                                                                                                                                             |                  |
| CURRENT PROJECTS                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                  |
| OUTSTANDING NATURAL AREAS           | <b>Ramsar Site of Grand-Bassam</b> <ul style="list-style-type: none"><li>ZHII ID : 1CI004 - 1583 / WDPA ID: 902798</li><li>Designation October 18, 2005 (40,210 ha).</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |
| HAZARDS                             | Moderate retreat of the coastline in the order of -3.74±0.50m, i.e. -0.75 m/year and frequent marine submersions during strong waves <sup>65</sup> .<br>Disruption of rainfall patterns: <ul style="list-style-type: none"><li>Rainfall decreased by 24% (2141 mm between 1951-1982 and 1631.8 mm after 1982);</li><li>Shortening of the rainy season before and after 1982 by an average of 17 days (29 March-07 April to 11-04 August);</li><li>Average rainfall after 2016: 1628.5 mm, a decrease of 2% compared to the average accumulation of 1982-2017 ;</li><li>High risk of flooding in June (28% of year-to-date) and October (9% of year-to-date)<sup>66</sup>.</li></ul> |                  |
| RECOMMENDATIONS                     | Include the evolution of the coastline, and the risks related to flooding and technology in the management project of the territory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY High |

<sup>65</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) analyse cinématique du trait de côte à partir des images Sentinel 1 fournies par l'ESA; recoupement avec des observations terrains localisées. Rapport de suivi, Programme MARISCO, IGT, 12p.

<sup>66</sup> Sources: analysis of data from :  

- NOAA (2018) et SODEXAM (2018),
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a: Détection de structures pluviométriques spatiotemporelles homogènes en Côte d'Ivoire sur la période 1951–2017. Revue de Géographie, d'Aménagement Régional et de développement des Suds (Regard Suds). Abidjan, Côte d'Ivoire, pp. 49–64.
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Variations interannuelles récentes des paramètres climatiques majeurs en Côte d'Ivoire depuis 1951, Climat et Développement, N°26, pp 5–16.



CI7

## SANDY TERRACE AND COCONUT GROVE OF EASTERN CÔTE D'IVOIRE

| CI7-a                               | 129-GRAND-BASSAM-ASSINIE                                                                                                                                                                                                                                                                                                            |                 |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                     |                 |
| DIAGNOSTIC                          | Large terrace bordered by the Assinie canal to the north.<br>Vast coconut plantations, dispersed habitat (plantation huts), practically no villages.<br>Traffic on the «sand» track, including all-terrain vehicles along the beach. Road access by a northern branch to Bonoua.<br>The Assinie Canal is not very functional today. |                 |
| DYNAMICS                            | Rectilinear coastline with wide undulations (period about 10 km) with unstable tendency.                                                                                                                                                                                                                                            |                 |
| STAKES                              | Residential conquest of the coconut grove, without strong densification of the habitat and populations.                                                                                                                                                                                                                             |                 |
| RECOMMANDATION                      | Establishment of a sector scheme if the occupation were to become significantly denser.                                                                                                                                                                                                                                             |                 |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                       | CRITICALITY Low |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                     |                 |
| EVOLUTION OF STAKES                 | Stretch of coconut plantation as far as the eye can see, crossed by the Assinie canal. Presence of fishermen's camps.<br>Spatial recomposition in progress in the «Cocotier» orchard between Grand-Bassam and Assinie: construction of some luxury residences between the feet of coconut trees along the ocean.                    |                 |
| HAZARDS                             | Moderate retreat of the coastline and frequent marine submersion.<br>Strong impacts of the storm surges of August 2011 and May 2014.                                                                                                                                                                                                |                 |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                       | CRITICALITY Low |

**EVOLUTION OVER THE 2016–2020 PERIOD**

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                         |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| EVOLUTION OF STAKES       | <p>The vast coconut grove is always present and almost uninterrupted. However, a spatial recomposition is underway on the ocean front: luxury residential housing has densified between the village of Mohamé and Assouindé<sup>67</sup>.</p> <p>Several hundred residences (contiguous) are exposed to erosion and marine submersion. The first are less than ten meters from the front of the coastline retreat.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                         |
| CURRENT PROJECTS          | Subdivision project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                         |
| OUTSTANDING NATURAL AREAS | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                         |
| HAZARDS                   | <p>Important sedimentary movements between the periods of weak and strong agitation at the level of the foreshore and frequent marine submersions hence a marked coastal erosion:</p> <ul style="list-style-type: none"> <li>• Strong impacts of storm surges in 2016 and 2018.</li> <li>• Berm progradation in the order of <math>8.52 \pm 0.50\text{m}</math> or <math>1.7\text{m/year}</math> for the period 2015–2020.</li> <li>• Transport of sediment and litter<sup>68</sup>.</li> </ul> <p>Disruption of rainfall patterns:</p> <ul style="list-style-type: none"> <li>• Rainfall decreased by 24% (2141 mm between 1951–1982 and 1631.8 mm after 1982);</li> <li>• Shortening of the rainy season before and after 1982 by an average of 17 days (29 March–07 April to 11–04 August);</li> <li>• Average rainfall after 2016: 1628.5 mm, down 2% from the 1982–2017 average cumulative total.</li> <li>• High risk of flooding in June (28% of year-to-date) and October (9% of year-to-date)<sup>69</sup>.</li> </ul> <p>Soil erosion.</p> |                         |
| RECOMMENDATIONS           | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                         |
| MONITORING                | <b>Regular and intensive</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>CRITICALITY High</b> |

<sup>67</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) analyse cinématique du trait de côte à partir des images Sentinel 1 fournies par l'ESA ; recoupement avec des observations terrains localisées. Rapport de suivi, Programme MARISCO, IGT, 12p.

<sup>68</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) analyse cinématique du trait de côte à partir des images Sentinel 1 fournies par l'ESA ; recoupement avec des observations terrains localisées. Rapport de suivi, Programme MARISCO, IGT, 12p.

<sup>69</sup> Sources: analysis of data from :

- NOAA (2018) et SODEXAM (2018),
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., and Koli Bi Z., 2019a: Détection de structures pluviométriques spatiotemporelles homogènes en Côte d'Ivoire sur la période 1951–2017. Revue de Géographie, d'Aménagement Régional et de développement des Suds (Regard Suds). Abidjan, Côte d'Ivoire, pp. 49–64..
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Variations interannuelles récentes des paramètres climatiques majeurs en Côte d'Ivoire depuis 1951, Climat et Développement, N°26, pp 5–16.



GRAND-BASSAM-ASSINIE-SPATIO-TEMPORAL EVOLUTION BETWEEN THE VILLAGES OF MOHAME AND ASSOINDE

2005



2018





| CI7-b                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 130-ASSINIE AND THE MOUTH OF THE ABI LAGOON |           |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-----------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                             |           |
| DIAGNOSTIC                          | Long lido of Assinie isolating a longitudinal lagoon from the shore.<br>Estuary of the Abi lagoon system, the Bia River (nearby dam) and the Tano River from Ghana.<br>Estuarine islands and lagoon-ocean contact protected by the status of Îles Ehotiles National Park due to their important biological value<br>Tourist activity center with facilities essentially located on the lido or nearby.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                             |           |
| DYNAMICS                            | Estuarine mouth well open and symmetrical, but naturally fragile and unstable site.<br>Rectilinear coastline with wide undulations (period about 15 km) with unstable tendency.<br>Strong erosion observed near Assinie.<br>«The beaches of Assouindé and Assinie are tourist seaside areas par excellence. Given the narrowness of the cordon (sea-lagoon) and its very low coastline, the tourist infrastructure is subject to frequent and periodic submersion in this area. The erosion and especially the submersion during the exceptional tides of storm or equinox in this part of the coastline, have become worrying to the point where the economic operators installed in the area move for some, when others totally abandon their facilities (VALTUR vacation club and Club Méditerranée). This state of affairs considerably affects the main economic activity (tourism).» <sup>70</sup> |                                             |           |
| STAKES                              | Maintenance of a secure tourist potential.<br>Main mangrove area of the Ivorian coast.<br>Conservation of protected environments in the context of the Îles Ehotilés National Park.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                             |           |
| RECOMMANDATION                      | Flood-Submersion Risk Prevention Plan.<br>Informing the population and residents along the beach of the risk of high water and the need to relocate the habitat away from the beach.<br>Search for adapted architectural solutions to maintain reception capacities in risky situations.<br>Relocation of the most threatened facilities. The facilities are certainly not to be recommended on this site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                             |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY                                 | Very high |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                             |           |
| EVOLUTION OF STAKES                 | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                             |           |
| HAZARDS                             | Moderate retreat of the coastline and frequent marine submersion. 11m retreat of the coastline between 2008 and 2012 in Assouindé in relation to the storm surge of August 2011.<br>Progradation of the foreshore west of the mouth of the Aby lagoon.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                             |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY                                 | Very high |



## EVOLUTION OVER THE 2016–2020 PERIOD

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                        |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| EVOLUTION OF STAKES       | <p>Assinie is both a fishing village and a seaside resort. The last few years have been marked in terms of tourism development by the rehabilitation (in progress) of the old vacation villages of Assouindé and the construction of luxury second homes in Assinie Mafia and on the coast between Abouakro and Assouindé.</p> <p>The Assinie region has been declared a priority and protected tourist area since 1970. This status and the attraction that the landscape exerts on the populations and the economic operators make the control of the land a considerable stake. In addition, the narrowness of the sandy barrier and its very low coastline expose the built environment to periodic submersion and to erosion.</p>                                                                                                                                                                                                                                                                                                                                                           |                        |
| CURRENT PROJECTS          | <p>West Africa Coastal Areas Resilience Investment Project (WACA ResIP)<sup>71</sup> – World Bank Group The actions carried out in this sector are described below:</p> <ul style="list-style-type: none"> <li>• Support for the mangrove sites of the Îles Ehotilés National Park, also a Ramsar site.</li> <li>• Support to the process of inscription of the park to the World Heritage Site of Humanity.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                        |
| OUTSTANDING NATURAL AREAS | <p><b>Nganda Classified Forest</b></p> <ul style="list-style-type: none"> <li>• WDPA ID : 300964</li> </ul> <p><b>Ramsar Site of Nganda</b></p> <ul style="list-style-type: none"> <li>• HII ID : 1CI006 – 1585 / WDPA ID : 902800</li> <li>• Designation October 18, 2005 (27,274 ha)</li> <li>• The Ramsar site does not present a map in WDPA.</li> </ul> <p><b>Îles Ehotilés National Park (IUCN Cat II)</b></p> <ul style="list-style-type: none"> <li>• WDPA ID : 20174</li> <li>• Creation: 25 April 1974 (Decree 74/179)</li> <li>• Inscribed on UNESCO's Tentative List of World Heritage Sites since 2006 that Côte d'Ivoire intends to propose for inscription.</li> </ul> <p><b>Ramsar site of Ehotilé Islands – Essouman</b></p> <ul style="list-style-type: none"> <li>• ZHII ID : 1CI005 – 1584 / WDPA ID: 902799</li> </ul> <p><b>Proposed World Heritage Site of Ehotilé Islands</b></p> <ul style="list-style-type: none"> <li>• UNESCO WH ID : 2099</li> <li>• Designation October 18, 2005 (27,274 ha)</li> <li>• The Ramsar site does not present a map in WDPA.</li> </ul> |                        |
| HAZARDS                   | <p>Important sedimentary movements between the periods of weak and strong agitation at the level of the foreshore and frequent marine submersions :</p> <ul style="list-style-type: none"> <li>• Strong impacts of storm surges in 2016 and 2018.</li> <li>• Berm progradation in the order of <math>9.57 \pm 0.5</math> m or 1.9m/year for the period 2015–2020. Spectacular progradation of the foreshore east of the mouth of the Aby lagoon (near Assinie France)<sup>72</sup>.</li> </ul> <p>Disruption of rainfall patterns:</p> <ul style="list-style-type: none"> <li>• Rainfall decreased by 24.5% (2114 mm between 1951–1982 and 1596 mm after 1982);</li> <li>• Shortening of the rainy season before and after 1982 by an average of 16 days (23 March – 02 April to 18–14 August);</li> <li>• Average rainfall after 2016: 1620.5 mm, an increase of 1.5% compared to the average cumulative total from 1983–2017.</li> <li>• High risk of flooding in June (28% of year-to-date) and October (9% of year-to-date)<sup>73</sup>.</li> </ul>                                         |                        |
| RECOMMENDATIONS           | Include the evolution of the coastline and the risk of flooding in the management project of the territory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                        |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY HVery high |

<sup>71</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) analyse cinématique du trait de côte à partir des images Sentinel 1 fournies par l'ESA ; recoupement avec des observations terrains localisées. Rapport de suivi, Programme MARISCO, IGT, 12p.

<sup>72</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) analyse cinématique du trait de côte à partir des images Sentinel 1 fournies par l'ESA ; recoupement avec des observations terrains localisées. Rapport de suivi, Programme MARISCO, IGT, 12p.

<sup>73</sup> Sources: analysis of data from :

- NOAA (2018) et SODEXAM (2018),
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a: Détection de structures pluviométriques spatiotemporelles homogènes en Côte d'Ivoire sur la période 1951–2017. Revue de Géographie, d'Aménagement Régional et de développement des Suds (Regard Suds). Abidjan, Côte d'Ivoire, pp. 49–64.
- Coulibaly Kolotiloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Variations interannuelles récentes des paramètres climatiques majeurs en Côte d'Ivoire depuis 1951, Climat et Développement, N°26, pp 5–16.



| CI7-c                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 131 - EAST ABI LAGOON |     |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |     |
| DIAGNOSTIC                          | Terraces partially planted with coconut trees.<br>Sparsely populated area (compared to the adjacent Ghanaian part).<br>Landlocked area, except small track to Ghana.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |     |
| DYNAMICS                            | No observation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |     |
| STAKES                              | Area included in the Îles Ehotilés National Park, compatibility of this status with peasant activities on terraces and in the National Park.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |     |
| RECOMMENDATION                      | No recommendation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |     |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY           | Low |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |     |
| EVOLUTION OF STAKES                 | Not reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |     |
| HAZARDS                             | Severe impacts from storm surges in August 2011 and late May 2014.<br>Shoreline erosion in Assinie France (immediate east) between 2011 and 2015 due to the dynamics of the mouth of the Aby Lagoon.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |     |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY           | Low |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |     |
| EVOLUTION OF STAKES                 | Tourism development east of the mouth of the Aby lagoon / East Assinie France.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |     |
| CURRENT PROJECTS                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |     |
| OUTSTANDING NATURAL AREAS           | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |     |
| HAZARDS                             | Important sedimentary movements between the periods of weak and strong agitation at the level of the foreshore and frequent marine submersions : <ul style="list-style-type: none"><li>• Strong impacts of storm surges in 2016 and 2018.</li><li>• Berm progradation of 11.86±0.50m or 2.37m/year for the period 2015-2020<sup>74</sup>.</li></ul> Disruption of rainfall patterns: <ul style="list-style-type: none"><li>• Rainfall decreased by 24.5% (2114 mm between 1951-1982 and 1596 mm after 1982);</li><li>• Shortening of the rainy season before and after 1982 by an average of 16 days (23 March - 02 April to 18-14 August).</li><li>• Average rainfall after 2016: 1620.5 mm, an increase of 1.5% compared to the average cumulative total from 1983-2017.</li><li>• High risk of flooding in June (28% of year-to-date) and October (9% of year-to-date)<sup>75</sup>.</li></ul> |                       |     |
| RECOMMENDATIONS                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |     |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY           | Low |

<sup>74</sup> Sources: Hauhouot C., Bamba Y., Yao KS, Dangui N. (2020) analyse cinématique du trait de côte à partir des images Sentinel 1 fournies par l'ESA; recoupement avec des observations terrains localisées. Rapport de suivi, Programme MARISCO, IGT, 12p.

<sup>75</sup> Sources: analysis of data from :

- NOAA (2018) et SODEXAM (2018),
- Coulibaly K. A., Dibi-Kangah P. A., Djè K. B., Koli Bi Z., 2019a: Détection de structures pluviométriques spatiotemporelles homogènes en Côte d'Ivoire sur la période 1951–2017. Revue de Géographie, d'Aménagement Régional et de développement des Suds (Regard Suds). Abidjan, Côte d'Ivoire, pp. 49–64..
- Coulibaly Kolotioloma Alama, Dibi-Kangah Pauline Agoh, Koli Bi Zuéli, 2019b. Variations interannuelles récentes des paramètres climatiques majeurs en Côte d'Ivoire depuis 1951, Climat et Développement, N°26, pp 5–16.





## SUMMARY TABLE

| HABITAT |  Desert area                              |  Mangrove Wetland |  Camp Small village          |  Rural                           |  Rurban                               |  Urban                                    |                                                                                                                                       |                                                                                                           |                                                                                                                                   |                                                                                                                                                    |                                                                                                       |
|---------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| STAKES  |  Fishing<br>Fishing port<br>Fishing areas |  Rice-growing     |  Palm oil<br>Palm plantation |  Trade<br>Commercial port        |  Trade+<br>Commercial port<br>Airport |  Oil & Gas<br>Exploration<br>Exploitation |  Extrative ind.<br>Salt, metal-bearing sand,<br>gold |  Tourism                |  (Tourism)<br>Unexploited outstanding<br>areas |  Biodiversity<br>Outstanding areas<br>(biodiversity, landscape) |                                                                                                       |
| HAZARDS |  Soil erosion<br>Landslide                |  Coastal erosion  |  Marine submersion           |  Pluvial and or fluvial flooding |  Intrusion of saltwater               |  Pollution                                |  Anthropization                                      |  Sargasso proliferation |  Jellyfish proliferation                       |  Industrial risk                                                |  Nothing to report |

| N°                                                           | REF   | NAME                                         | HABITAT | STAKES                                                           | HAZARDS | CRITICALITY |      |           | MONITORING |           |                                                                       |
|--------------------------------------------------------------|-------|----------------------------------------------|---------|------------------------------------------------------------------|---------|-------------|------|-----------|------------|-----------|-----------------------------------------------------------------------|
|                                                              |       |                                              |         |                                                                  |         | 2011        | 2016 | 2020      | 2011       | 2016      | 2020                                                                  |
| <b>C1 LIBERIA - SAN PEDRO BORDER</b>                         |       |                                              |         |                                                                  |         |             |      |           |            |           |                                                                       |
| 105                                                          | C11-a | Cavally estuary - Liberia border             |         | (Tourism) (Biodiversity)                                         |         | Low         | →    | Low       | →          | Low       | Watch-keeping → Watch-keeping → Watch-keeping                         |
| 106                                                          | C11-b | West Tabou                                   |         | (Tourism)                                                        |         | Low         | →    | Low       | →          | Low       | No monitoring → No monitoring → Watch-keeping                         |
| 107                                                          | C11-c | Tabou                                        |         | Maltrise du foncier (Tourism)                                    |         | Low         | →    | Low       | →          | Low       | No monitoring → Watch-keeping → Watch-keeping                         |
| 108                                                          | C11-d | East Tabou                                   |         | Fishing Palm oil trees Agriculture (Tourism) Maltrise du foncier |         | Low         | →    | Low       | →          | Low       | Watch-keeping → Watch-keeping → Watch-keeping                         |
| 109                                                          | C11-e | Grand Bereby                                 |         | Fishing Agriculture (Tourism) (Biodiversity)                     |         | Low         | →    | Low       | →          | Low       | Watch-keeping → Watch-keeping → Watch-keeping                         |
| 110                                                          | C11-f | San Pedro West                               |         | Agriculture (Tourism)                                            |         | Low         | →    | Low       | →          | Medium    | No monitoring → No monitoring → Regular and light                     |
| 111                                                          | C11-g | San Pedro urban zone and West periphery      |         | Trade+ Tourism                                                   |         | High        | →    | Very High | →          | Very High | Regular and intensive → Regular and intensive → Regular and intensive |
| <b>C12 EAST SAN PEDRO - SASSANDRA - FRESCO</b>               |       |                                              |         |                                                                  |         |             |      |           |            |           |                                                                       |
| 112                                                          | C12-a | East San Pedro                               |         | Fishing (Tourism) Biodiversity                                   |         | Low         | →    | Low       | →          | Medium    | No monitoring → No monitoring → Regular and light                     |
| 113                                                          | C12-b | Sassandra right shore                        |         | Fishing Tourism (Biodiversity)                                   |         | Medium      | →    | Medium    | →          | Medium    | Watch-keeping → Watch-keeping → Watch-keeping                         |
| 114                                                          | C12-c | Sassandra left shore- Dagbebo                |         | Agro-forestry Tourism Biodiversity                               |         | Low         | →    | Low       | →          | Low       | Watch-keeping → Watch-keeping → Watch-keeping                         |
| 115                                                          | C12-d | Dagbebo - Fresco                             |         | Fishing Agro-forestry (Tourism) Biodiversity                     |         | Low         | →    | Low       | →          | Low       | Watch-keeping → Watch-keeping → Watch-keeping                         |
| <b>C13 FRESCO - ASSAGNY</b>                                  |       |                                              |         |                                                                  |         |             |      |           |            |           |                                                                       |
| 116                                                          | C13-a | Fresco                                       |         | Fishing coconut groves Biodiversity                              |         | Low         | →    | Low       | →          | High      | Watch-keeping → Watch-keeping → Regular and light                     |
| 117                                                          | C13-b | West Grand Lahou                             |         | Fishing coconut groves                                           |         | Low         | →    | Medium    | →          | Medium    | Watch-keeping → Watch-keeping → Watch-keeping                         |
| 118                                                          | C13-c | Grand Lahou, right shore and Bandama estuary |         | Fishing coconut groves Oil & Gas Tourism                         |         | Very High   | →    | Very High | →          | Very High | Regular and intensive → Regular and intensive → Regular and intensive |
| 119                                                          | C13-d | Bandama left shore                           |         | coconut groves Tourism Biodiversity                              |         | Medium      | →    | Medium    | →          | Medium    | No monitoring → Watch-keeping → Regular and light                     |
| <b>C14 RURAL SECTOR ASSAGNY - JACQUEVILLE - ABIDJAN WEST</b> |       |                                              |         |                                                                  |         |             |      |           |            |           |                                                                       |
| 120                                                          | C14-a | Assagny - Jacqueville                        |         | Fishing Agro-forestry Oil & Gas                                  |         | Medium      | →    | Medium    | →          | Medium    | No monitoring → No monitoring → Watch-keeping                         |
| 121                                                          | C14-b | Jacquerville                                 |         | Fishing Agriculture Oil & Gas (Tourism)                          |         | Low         | →    | Medium    | →          | Medium    | Watch-keeping → Regular and light → Regular and light                 |
| 122                                                          | C14-c | Jacquerville - West Abidjan                  |         | Fishing Agriculture Oil & Gas Biodiversity                       |         | Medium      | →    | Medium    | →          | Medium    | Watch-keeping → Regular and light → Regular and light                 |
| <b>C15 ABIDJAN - PORT BOUET</b>                              |       |                                              |         |                                                                  |         |             |      |           |            |           |                                                                       |
| 123                                                          | C15-a | Port Bouet                                   |         | Trade+ Tourism                                                   |         | Very High   | →    | Very High | →          | Very High | Regular and intensive → Regular and intensive → Regular and intensive |
| 124                                                          | C15-b | Port Bouet East                              |         | Tourism                                                          |         | Very High   | →    | Very High | →          | Very High | Regular and intensive → Regular and intensive → Regular and intensive |
| <b>C16 PERI-URBAN ZONE EAST ABIDJAN - GRAND BASSAM</b>       |       |                                              |         |                                                                  |         |             |      |           |            |           |                                                                       |
| 125                                                          | C16-a | Abidjan East peri-urban zone                 |         | coconut groves Tourism                                           |         | High        | →    | High      | →          | High      | Regular and intensive → Regular and intensive → Regular and intensive |
| 126                                                          | C16-b | Grand-Bassam West coastline                  |         | coconut groves Tourism Biodiversity                              |         | Very High   | →    | Very High | →          | Very High | Regular and intensive → Regular and intensive → Regular and intensive |
| 127                                                          | C16-c | Grand-Bassam                                 |         | Tourism Biodiversity                                             |         | High        | →    | High      | →          | High      | Regular and intensive → Regular and intensive → Regular and intensive |
| 128                                                          | C16-d | Estuary of Bassam left shore                 |         | coconut groves Tourism Biodiversity                              |         | High        | →    | High      | →          | High      | Regular and intensive → Regular and intensive → Regular and intensive |
| <b>C17 SANDY TERRACE AND COCONUT GROVE OF EAST IVORIAN</b>   |       |                                              |         |                                                                  |         |             |      |           |            |           |                                                                       |
| 129                                                          | C17-a | Grand-Bassam - Assinie                       |         | coconut groves                                                   |         | Low         | →    | Low       | →          | High      | Watch-keeping → Watch-keeping → Regular and intensive                 |
| 130                                                          | C17-b | Assinie and Abi lagoon mouth                 |         | Tourism Biodiversity                                             |         | Very High   | →    | Very High | →          | Very High | Regular and intensive → Regular and intensive → Regular and intensive |
| 131                                                          | C17-c | East Abi lagoon                              |         | coconut groves Biodiversity                                      |         | Low         | →    | Low       | →          | Low       | Watch-keeping → Watch-keeping → Watch-keeping                         |





# Ghana

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## GH – Ghana

"In West Africa, the effects of urbanization and the high concentration of industrial and commercial activities along the coasts have resulted in an unprecedented exploitation of coastal resources such as coastal sand, mangrove forests and estuaries (Mensah 1997). .

Key industries, major residential settlements, tourism and conservation sites, heritage and historical monuments are located within 200 m of Ghana's coastline with many of the most densely populated coastal communities located in lowlying coastal plains susceptible to coastal flooding (Boateng 2006). In the last couple of decades, many of these coastal communities have become threatened by sea waves (storm surges).

Several major sea defence projects have been undertaken by the central government along the most affected communities to protect infrastructure and assets of national interests. Other small-scale sea defence projects have also been carried out by property owners along many sections of the country's coast with the view to protect their investments (Jonah et al. 2015). Climate change, particularly accelerated sea-level rise, is expected to exacerbate erosion problems (IPCC 2014), requiring effective management strategies in dealing with the risks arising from coastal erosion (Appaning Addo, Walkden, and Mills 2008)." <sup>1</sup>

The main characteristics of the area are summarized as follows:

- Sandy rims – lidos frequently isolated by long lagoonal channels very close to the littoral area (around forty segments not all drawn at 1:500,000).
- Habitations in numerous large villages, served by roads and tracks on terraces stretching along the littoral area. Indirect connection to the main road. Little communication with Ivory Coast.
- Some villages installed right to the edge of the beach, some adjacent to the nearby lagoon.
- Alternating accretion/erosion of beaches related to the sediment wave. Straight – undulating littoral area (sediment «trains»).

Ghana is also one of the stakeholders involved in the project « Strengthening of the Enabling Environment, Ecosystem-based Management and Governance to support Implementation of the Strategic Action Programme of the Guinea Current Large Marine Ecosystem »<sup>2</sup> : GEF-6 (1991). The project goals to strengthen the regional governance and ecosystem-based management of the GCLME through assisting the counties to build capacity for SAP implementation measures related to transboundary fisheries, biodiversity conservation and pollution reduction.

In parallel, UNOPS and its partners will conduct a baseline study<sup>3</sup> on the impact of climate change on the development of the infrastructure sector in Ghana.

<sup>1</sup> Refer to « Fredrick Ekow Jonah, Emmanuel Abeashi Mensah, Regina Esi Edziyie, Nelson Winston Agbo & Daniel Adjei-Boateng (2016) Coastal Erosion in Ghana: Causes, Policies, and Management, Coastal Management, 44:2, 116-130, DOI: 10.1080/08920753.2016.1135273 ».

<sup>2</sup> <https://www.thegef.org/project/strengthening-enabling-environment-ecosystem-based-management-and-governance-support>

<sup>3</sup> <https://www.unops.org/fr/news-and-stories/news/building-climate-resilience-in-ghana>

GH – Ghana 

As part of a project to strengthen the resilience of national infrastructure systems, a study on the effects of climate change will be carried out in three sectors, energy, water and transport.

This project will be implemented jointly by UNOPS, the United Nations Environment Program, the Global Center for Adaptation, the Environmental Change Institute at the University of Oxford and the Ghanaian ministry of Environment, Sciences, Technologies and Innovation.

The long-term goal is to build the resilience of Ghana's infrastructure in the face of threats from climate change, including adopting solutions that draw on nature. The project will also help ensure integrated planning for infrastructure development across different sectors.

**It was not possible to detail the characteristics of the three sectors due to a lack of pictures of usable quality.**

**GH1****SANDY TERRACE AND COCONUT GROVES WEST  
GHANA – COTE D'IVOIRE**

| GH1-a                     |                                                                                                                                                                                                                       | 132 - COTE D'IVOIRE – BONYERE BORDER |        |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------|
| BASELINE - 2010           |                                                                                                                                                                                                                       |                                      |        |
| DIAGNOSTIC                | Wide sandy terrace and dense habitation behind vast complex of diversified wetlands.<br>Probable biological value, but strong human pressure on the periphery.<br>Numerous villages located on the edge of the shore. |                                      |        |
| DYNAMICS                  | Apparently stable littoral area apart from outlets and small estuaries.                                                                                                                                               |                                      |        |
| STAKES                    | No information.                                                                                                                                                                                                       |                                      |        |
| RECOMMANDATION            | No recommendations.                                                                                                                                                                                                   |                                      |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                         | CRITICALITY                          | Medium |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                       |                                      |        |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                          |                                      |        |
| HAZARDS                   | Not reported                                                                                                                                                                                                          |                                      |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                         | CRITICALITY                          | Medium |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                       |                                      |        |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                          |                                      |        |
| CURRENT PROJECTS          | None                                                                                                                                                                                                                  |                                      |        |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                    |                                      |        |
| HAZARDS                   | Sargassum pollution.                                                                                                                                                                                                  |                                      |        |
| RECOMMENDATIONS           | None                                                                                                                                                                                                                  |                                      |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                         | CRITICALITY                          | Medium |



| GH1-b                     |                                                                                                                                                                                                                                                          | 133 – BONYERE – EIKWE |        |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                          |                       |        |
| DIAGNOSTIC                | Narrow rims and lagoonal channels more or less parallel to the shore of type 3C <sup>4</sup> . Numerous villages located on the edge of the shore.                                                                                                       |                       |        |
| DYNAMICS                  | Apparently stable littoral area. Straight, slightly undulating littoral area. Lagoonal channels behind.                                                                                                                                                  |                       |        |
| STAKES                    | Numerous villages situated on the terrace between littoral area and channels, especially in the western part of the area.<br>Eikwe is also known to be one of the fishing communities in Nzemaland with fishing being the primary work of the indigents. |                       |        |
| RECOMMENDATION            | Anticipate tourist development as a prolongation of Axim.                                                                                                                                                                                                |                       |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                            | CRITICALITY           | Medium |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                                          |                       |        |
| EVOLUTION OF STAKES       | Atuabo gas plant.<br>Mad projects.<br>Port construction project.                                                                                                                                                                                         |                       |        |
| HAZARDS                   | Sand extraction for construction.                                                                                                                                                                                                                        |                       |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                        | CRITICALITY           | Medium |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                                          |                       |        |
| EVOLUTION OF STAKES       | Future expansion of Atuabo Plant and construction of free port.                                                                                                                                                                                          |                       |        |
| CURRENT PROJECTS          | None reported                                                                                                                                                                                                                                            |                       |        |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                       |                       |        |
| HAZARDS                   | Sand extraction for construction.<br>Sargassum pollution.                                                                                                                                                                                                |                       |        |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                        |                       |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                        | CRITICALITY           | Medium |

<sup>4</sup> Refer to « Typologie des façades » in UEMOA, 2010. Etude régionale de suivi du trait de côte et élaboration d'un Schéma Directeur du Littoral de l'Afrique de l'Ouest. Notice de la cartographie. 48p.



| GH1-c                     |                                                                               | 134 – EIKWE – KIKAM |        |
|---------------------------|-------------------------------------------------------------------------------|---------------------|--------|
| BASELINE – 2010           |                                                                               |                     |        |
| DIAGNOSTIC                | Wide terrace. Start of rocky Ghana coast on the east end of the sector.       |                     |        |
| DYNAMICS                  | Apparently stable littoral area. Straight, slightly undulating littoral area. |                     |        |
| STAKES                    | Fishing, Trading.                                                             |                     |        |
| RECOMMENDATION            | Anticipate tourist development as a prolongation of Axim.                     |                     |        |
| MONITORING                | Watch-keeping                                                                 | CRITICALITY         | Medium |
| EVOLUTION 2010-2016       |                                                                               |                     |        |
| EVOLUTION OF STAKES       | Protected bird habitat in Amanzuri near Essiama to be confirmed.              |                     |        |
| HAZARDS                   | Not reported                                                                  |                     |        |
| MONITORING                | Watch-keeping                                                                 | CRITICALITY         | Medium |
| EVOLUTION 2016-2020       |                                                                               |                     |        |
| EVOLUTION OF STAKES       | Not reported.                                                                 |                     |        |
| CURRENT PROJECTS          | None                                                                          |                     |        |
| OUTSTANDING NATURAL AREAS | No                                                                            |                     |        |
| HAZARDS                   | Sargassum pollution.                                                          |                     |        |
| RECOMMENDATIONS           | None                                                                          |                     |        |
| MONITORING                | Watch-keeping                                                                 | CRITICALITY         | Medium |





## GH2

## CAPE THREE POINTS

Area which has considerable potential in sites with a tourist vocation.

- Landscape of interest: landform and vegetation surrounding the sites with creeks and coves.
- Position sheltered from the prevailing ocean waves on numerous sites.
- For a large part, road connection by tracks connected in branches to the main road (with, however, maintenance constraints due to the nature of the soils and landform). The road network on hillsides could generate the start of erosion, to be controlled.

| GH2-a                     | 135 - THREE POINTS WEST                                                                                                                                                                                                                                                                                                                                                                                                       |                     |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| BASELINE - 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |
| DIAGNOSTIC                | Numerous sites with tourist potential, some with a lagoon behind the rim.<br>Connected by more or less permanent tracks, close to the littoral area for certain sections.<br>Start of a «panoramic track» leading to accommodation or lodges offering viewpoints.<br>Main center, the small town of Axim, landscape site with rocky islet.<br>Fishing point connected to the major coastal road, lagoon and estuarine system. |                     |
| DYNAMICS                  | Sandy beaches, fragile creeks and coves, in particular the rims and lidos on the edge of the lagoon which are attractive for tourist facilities.<br>Prevailing exposure to ocean swell.                                                                                                                                                                                                                                       |                     |
| STAKES                    | Same as East sector for controlled tourist development, roads, tracks and facilities on the edge of the beach respecting the natural areas and the surrounding landscape.                                                                                                                                                                                                                                                     |                     |
| RECOMMANDATION            | Anticipate tourist development as a prolongation of Axim. Organise tourist operators with a view to harmonising facilities with the landscape and the environment. Anticipation of tourist development.                                                                                                                                                                                                                       |                     |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                 | CRITICALITY    High |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |
| EVOLUTION OF STAKES       | Miami new port construction project.                                                                                                                                                                                                                                                                                                                                                                                          |                     |
| COASTAL PROTECTION        | Anti-erosion facilities in Axim, Princess town.                                                                                                                                                                                                                                                                                                                                                                               |                     |
| HAZARDS                   | Strong erosion reported in Axim.                                                                                                                                                                                                                                                                                                                                                                                              |                     |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY    High |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |
| EVOLUTION OF STAKES       | Development of Axim new Fishing Port Project ongoing (comprise of reclamation, breakwaters, quay walls, fishing market and net mending area, building facility).<br>Axim Sea defence project which comprise of armour rock revetment and groyne system.                                                                                                                                                                       |                     |
| CURRENT PROJECTS          | Ghana Coastal Fishing Port and Fish Landing Site Project for Axim mini fishing port<br>Axim 5 km coastal protection project (about 73% complete).                                                                                                                                                                                                                                                                             |                     |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                                                                                                                            |                     |
| HAZARDS                   | Sargassum pollution.                                                                                                                                                                                                                                                                                                                                                                                                          |                     |
| RECOMMENDATIONS           | None                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY    High |



| GH2-b                     |                                                                                                                                                                                                 | 136 - THREE POINTS CENTRE |      |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------|
| BASELINE - 2010           |                                                                                                                                                                                                 |                           |      |
| DIAGNOSTIC                | Main rocky coast site of the whole littoral area studied.<br>Still isolated.<br>Very hilly, wooded agricultural vegetation and slash-and-burn staple crops.                                     |                           |      |
| DYNAMICS                  | High energy ocean waves on the rocky headlands.<br>Narrow, fragile coves and sandy creeks with low sediment reserves.                                                                           |                           |      |
| STAKES                    | Status of protected area desirable, natural area of value in terms of landscape, aesthetics and leisure activities.<br>Restrict access of vehicles and equipment on rambling paths.             |                           |      |
| RECOMMANDATION            | Organise tourist operators with a view to harmonising facilities with the landscape and the environ-<br>ment.<br>Regulatory initiatives to be taken to strengthen the preservation of the area. |                           |      |
| MONITORING                | Watch-keeping                                                                                                                                                                                   | CRITICALITY               | High |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                 |                           |      |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                    |                           |      |
| HAZARDS                   | Not reported                                                                                                                                                                                    |                           |      |
| MONITORING                | Regular and light                                                                                                                                                                               | CRITICALITY               | High |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                 |                           |      |
| EVOLUTION OF STAKES       | Oil activities offshore.                                                                                                                                                                        |                           |      |
| CURRENT PROJECTS          | None reported                                                                                                                                                                                   |                           |      |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                              |                           |      |
| HAZARDS                   | Sargassum pollution.                                                                                                                                                                            |                           |      |
| RECOMMENDATIONS           | None                                                                                                                                                                                            |                           |      |
| MONITORING                | Regular and light                                                                                                                                                                               | CRITICALITY               | High |



| GH2-c                     |                                                                                                                                                                                                                                                                                         | 137 – THREE POINTS EAST |      |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                         |                         |      |
| DIAGNOSTIC                | Numerous sites exposed east – south-east and therefore quite sheltered.<br>Small villages on each sheltered cape.<br>Tourist lodges already present.                                                                                                                                    |                         |      |
| DYNAMICS                  | Beaches adjacent to narrow terraces, with low sediment reserves but systematically anchored on small headlands and points.                                                                                                                                                              |                         |      |
| STAKES                    | Tourist facilities will be developed in the future. Local impact to be assessed for installations on the sea edge and for the connecting road network.<br>Control of future installations in terms of both landscape and ecology, with the maintaining of green spaces to be protected. |                         |      |
| RECOMMENDATION            | Organize tourist operators with a view to harmonizing facilities with the landscape and the environment. Anticipation of tourist development.                                                                                                                                           |                         |      |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                           | CRITICALITY             | High |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                         |                         |      |
| EVOLUTION OF STAKES       | Headland / observatory (oil spill detection) (source MOLOA country branch of Ghana).                                                                                                                                                                                                    |                         |      |
| COASTAL PROTECTION        | Armouring/200m dyke at Dixcove.                                                                                                                                                                                                                                                         |                         |      |
| HAZARDS                   | Some sites affected by erosion.                                                                                                                                                                                                                                                         |                         |      |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                       | CRITICALITY             | High |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                         |                         |      |
| EVOLUTION OF STAKES       | Construction of Dixcove Fish Landing Site Project.                                                                                                                                                                                                                                      |                         |      |
| CURRENT PROJECTS          | Ghana Coastal Fishing Port and Fish Landing Site Project and coastal protection comprising armour rock revetment (2.4 km).                                                                                                                                                              |                         |      |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                      |                         |      |
| HAZARDS                   | Some sites affected by erosion.<br>Erosion at Lower Dixcoove.                                                                                                                                                                                                                           |                         |      |
| RECOMMENDATIONS           | None                                                                                                                                                                                                                                                                                    |                         |      |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                       | CRITICALITY             | High |



## GH3

URBAN SECTOR AND PERIURBAN EXTENSION OF  
SEKONDI – TAKORADI

Urban site with complex topography, numerous small breaks of wetlands. Predominantly rocky coast, two main ports and annexes with piers intended to improve the natural position of sheltered cape. Beaches of coves and creeks with low sand reserves, very sensitive to port developments.

| GH3-a                     |                                                                                                                                                                                                                                                                                       | 138 – APOWA – TAKORADI |        |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                       |                        |        |
| DIAGNOSTIC                | Clear green break in urbanization by estuarine wetlands.<br>Three traditional villages with dwellings on the edge of the beach.<br>Agriculture encroaching, residences in large huts.<br>Possibility of building on the area often limited by small wetlands.<br>Handsome cove beach. |                        |        |
| DYNAMICS                  | No remarks.                                                                                                                                                                                                                                                                           |                        |        |
| STAKES                    | Risks, mainly erosion due to strong tidal wave actions, for habitations in villages on the edge of the beach.                                                                                                                                                                         |                        |        |
| RECOMMANDATION            | Land ownership control, to avoid urban sprawl on the break in urbanization. Anticipate tourist deve-<br>lopment on Apowa – Takoradi Beach.                                                                                                                                            |                        |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                         | CRITICALITY            | Medium |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                       |                        |        |
| EVOLUTION OF STAKES       | Miami new port construction project.                                                                                                                                                                                                                                                  |                        |        |
| COASTAL PROTECTION        | Anti-erosion facilities in Axim, Princess town.                                                                                                                                                                                                                                       |                        |        |
| HAZARDS                   | Strong erosion reported in Axim.                                                                                                                                                                                                                                                      |                        |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                     | CRITICALITY            | Medium |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                       |                        |        |
| EVOLUTION OF STAKES       | 1.9 km of two adjacent breakwater arm at Adjoa – Funko cove                                                                                                                                                                                                                           |                        |        |
| CURRENT PROJECTS          | Construction of dikes (about 1.9 km) at the Adjoa – Funko cove.<br>Construction of the Amanful Kumah coastal protection scheme (about 2 km coastal stretch).<br>Reconstruction of the Takoradi-Agona road at a section around Apowa                                                   |                        |        |
| INVESTMENTS               | \$25 million (Government)                                                                                                                                                                                                                                                             |                        |        |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                    |                        |        |
| HAZARDS                   | Erosion                                                                                                                                                                                                                                                                               |                        |        |
| RECOMMENDATIONS           | None                                                                                                                                                                                                                                                                                  |                        |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                     | CRITICALITY            | High   |



| GH3-b                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 139 - TAKORADI |        |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------|
| BASELINE - 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                |        |
| DIAGNOSTIC                | Seaside road in the north of the sector on rock fill.<br>Residential districts at risk north of the port installations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                |        |
| DYNAMICS                  | The beach will very probably disappear, in a context of a littoral area with poor sediment reserves.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                |        |
| STAKES                    | Possible restoration of an urban beach.<br>The North Port road is flood-prone and unstable, fully exposed to ocean waves.<br>Deterioration of port installations (including underwater pipeline) following erosion and extraction of materials.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                |        |
| RECOMMANDATION            | Stop the extraction of materials in the littoral area.<br>Monitor the shoreline and the stability of port developments.<br>Anticipate the development of a tourist sea front south of the port.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY    | Medium |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                |        |
| EVOLUTION OF STAKES       | Oil infrastructure, arrival of the West African gas pipeline.<br>Extension of the port of Takoradi.<br>Construction of roads.<br>Tourist infrastructure development.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                |        |
| PORT INSTALLATIONS        | The Port of Takoradi is the country's first commercial port, opened in 1928 to facilitate the country's international trade. It is strategically located between Accra (225 km) at the west and Abidjan (300 km) <sup>5</sup> . An extension of the protection breakwater over 2 km eastward of the port was carried out between 2013 and 2015. A new dyke is being built north of the port since 2014. (US\$ 28 million).<br>In 2012, the port processed 31% of Ghana's maritime traffic, 66% of national exports and 19% of national imports. It is a mining and a container port. Major exports include manganese, bauxite, wood and cocoa beans.<br>The port is strategically located to accompany exploration and exploitation operations of the oil discovered in the Cape Three Points area in 2007. |                |        |
| COASTAL PROTECTION        | Construction of protective structures for Takoradi.<br>Proposition of works for Ngyiresia.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |        |
| HAZARDS                   | Strong localized erosion related to port and urban infrastructure.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | CRITICALITY    | Medium |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                |        |
| EVOLUTION OF STAKES       | Extension of the port of Takoradi: 2 wharves being finalized and one wharf under construction.<br>Extension of coastal protection works.<br>2.0 km New Takoradi coastal protection (Phase I completed at this location).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                |        |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                |        |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                |        |
| HAZARDS                   | Erosion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                |        |
| RECOMMENDATIONS           | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | CRITICALITY    | High   |

<sup>5</sup> <http://ghanaports.gov.gh>

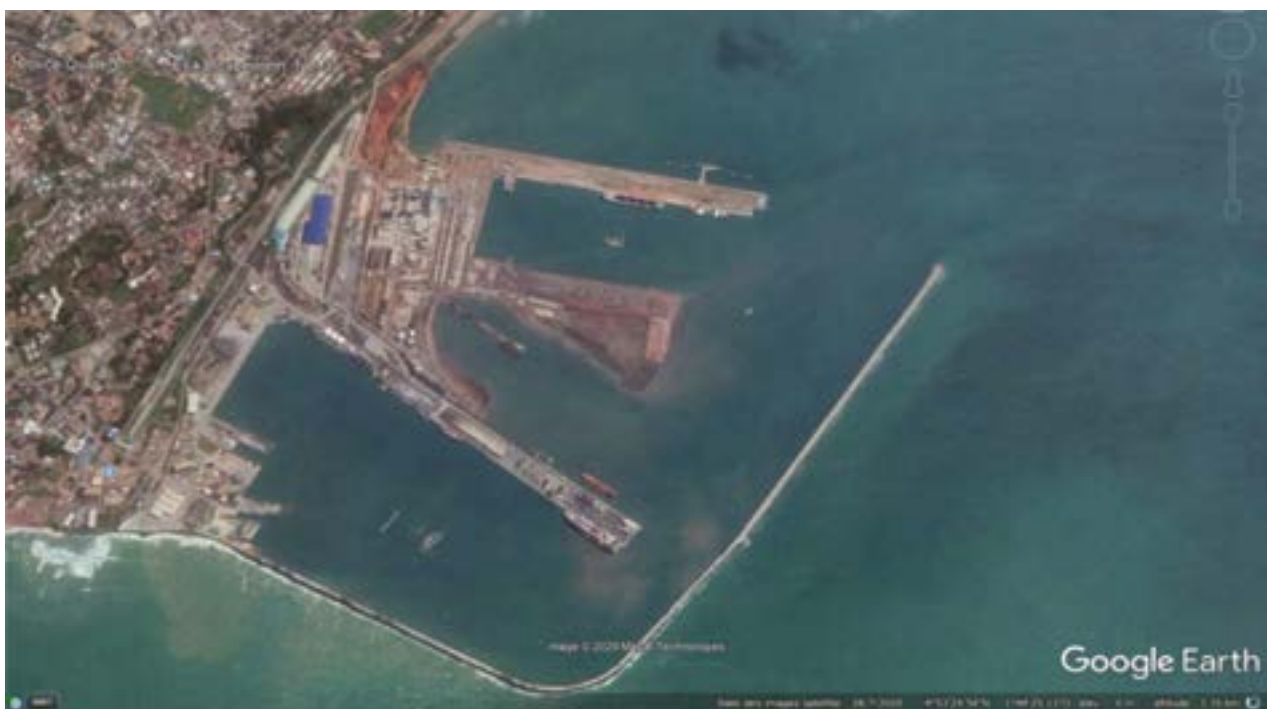


PORT OF TAKORADI

2013



2020





| GH3-c                                  |                                                                                                                                                                            | 140 – SEKONDI |        |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------|
| BASELINE – 2010                        |                                                                                                                                                                            |               |        |
| DIAGNOSTIC                             | Port and important fishing centre.<br>Complex site, improvements to natural headlands for shelter effect.<br>Impact on the beach probable, but extent difficult to assess. |               |        |
| DYNAMICS                               | The port developments have consequences for the stability of the beaches.<br>The extraction of building materials also seems to play a decisive role.                      |               |        |
| STAKES                                 | Segment of coastal road north of the harbour very close to the shore.<br>Development of an urban beach in the northern part of the sector.                                 |               |        |
| RECOMMENDATION                         | Restriction of extraction of materials.<br>Close monitoring of the stability of infrastructure.                                                                            |               |        |
| MONITORING                             | Regular and light                                                                                                                                                          | CRITICALITY   | Medium |
| EVOLUTION 2010–2016                    |                                                                                                                                                                            |               |        |
| EVOLUTION OF STAKES                    | Not reported                                                                                                                                                               |               |        |
| CHARACTERISATION OF PORT INSTALLATIONS | The port of Sekondi includes a small fishing port and a larger associated port. No recent changes have been made to the port.                                              |               |        |
| HAZARDS                                | Strong localized erosion related to port and urban infrastructure.                                                                                                         |               |        |
| MONITORING                             | Regular and light                                                                                                                                                          | CRITICALITY   | Medium |
| EVOLUTION 2016–2020                    |                                                                                                                                                                            |               |        |
| EVOLUTION OF STAKES                    | No modification of the port.<br>Construction of a breakwater north of the Port of Sekondi (under the quarry site).                                                         |               |        |
| CURRENT PROJECTS                       | -                                                                                                                                                                          |               |        |
| OUTSTANDING NATURAL AREAS              | No                                                                                                                                                                         |               |        |
| HAZARDS                                | Erosion.<br>Possible pollution (oil spill).                                                                                                                                |               |        |
| RECOMMENDATIONS                        | None                                                                                                                                                                       |               |        |
| MONITORING                             | Regular and light                                                                                                                                                          | CRITICALITY   | Medium |



| GH3-d                     |                                                                                                                                                                                                                                                                                                                                                     | 141 – SEKONDI – SHAMA |        |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                     |                       |        |
| DIAGNOSTIC                | «Rurban» prolongation of Sekondi with dense development of buildings at Aboadi, including on the edge of the shore. One part is a long cove, the remainder is short coves and creeks.<br>16th-century Portuguese Fort at Shama.                                                                                                                     |                       |        |
| DYNAMICS                  | Fragile littoral area, but free of impact of port developments.                                                                                                                                                                                                                                                                                     |                       |        |
| STAKES                    | Periurban development, sites suitable for tourism.                                                                                                                                                                                                                                                                                                  |                       |        |
| RECOMMENDATION            | Sector scheme should be considered if the tendency to building development is confirmed. Anticipate, with a view to preserving the green breaks in urbanization to avoid the development of a continuous conurbation which has already begun between Takoradi and Sekondi. Industrial activity areas should be located inland of the littoral area. |                       |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                       | CRITICALITY           | Medium |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                                                                                                                                     |                       |        |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                        |                       |        |
| COASTAL PROTECTION        | Damaged coastal protection facilities in Shama.<br>Settlement of armour rock between 2013 and 2015.<br>Protection road at the north of Ngyiresia.<br>Construction of a protective dyke and settlement of armour rock for Aboadze thermal power station.                                                                                             |                       |        |
| HAZARDS                   | Strong localized erosion related to port and urban infrastructure.                                                                                                                                                                                                                                                                                  |                       |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                   | CRITICALITY           | Medium |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                                                                                                                                     |                       |        |
| EVOLUTION OF STAKES       | Extension of the Aboadze power plant.<br>Construction of a new Power Plant (for power/energy generation) with coastal protection works (riprap) South Abuesi riprap (800 m).<br>Modification of the mouth at Shama level.                                                                                                                           |                       |        |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                                                                                                   |                       |        |
| OUTSTANDING NATURAL AREAS | Erosion.                                                                                                                                                                                                                                                                                                                                            |                       |        |
| HAZARDS                   | Possible pollution (oil spill).                                                                                                                                                                                                                                                                                                                     |                       |        |
| RECOMMENDATIONS           | None                                                                                                                                                                                                                                                                                                                                                |                       |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                   | CRITICALITY           | Medium |





EVOLUTION OF THE MOUTH OF SHANA BETWEEN 2014 AND 2020

2014



2020





## GH4

## SHAMA – ELMINA HINTERLAND

| GH4-a                     |                                                                                                                                                                                                                                                                                                               | 142 – SHAMA – ANKWANDA |        |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                               |                        |        |
| DIAGNOSTIC                | Littoral area away from the coastal road.<br>Some large villages.<br>Several wetlands sites including Yabiw Mangrove site which is very significant.<br>Some tourist facilities.                                                                                                                              |                        |        |
| DYNAMICS                  | Apparently stable littoral area.                                                                                                                                                                                                                                                                              |                        |        |
| STAKES                    | Possibilities of protecting the sector's complex of wetlands, mangrove lagoons and estuaries (5 to 10,000 hectares).<br>Important relay of the network of fluviomarine OUTSTANDING NATURAL AREAS between the Volta delta and the systems of wetlands and lagoons of western Ghana and West and Côte d'Ivoire. |                        |        |
| RECOMMENDATION            | Identify potential fluviomarine sites that could be subject to protective measures.                                                                                                                                                                                                                           |                        |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                 | CRITICALITY            | Medium |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                                               |                        |        |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                  |                        |        |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                  |                        |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                 | CRITICALITY            | Medium |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                                               |                        |        |
| EVOLUTION OF STAKES       | High risk coastal erosion areas undergoing Coastal protection works, along a coastal stretch of 3km.                                                                                                                                                                                                          |                        |        |
| CURRENT PROJECTS          | Komenda coastal protection work ongoing.                                                                                                                                                                                                                                                                      |                        |        |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                            |                        |        |
| HAZARDS                   | Erosion                                                                                                                                                                                                                                                                                                       |                        |        |
| RECOMMENDATIONS           | Proposition of the Komenda coastal protection works with a system of groynes and dredging of lagoon.                                                                                                                                                                                                          |                        |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                             | CRITICALITY            | Medium |



## GH5

## URBAN AREAS AND EXTENSIONS ELMINA – CAPE COAST – SALTPOND

| GH5-a                     |                                                                                                                                                                                                                                                                                                            | 143 – ELMINA |        |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------|
| BASELINE - 2010           |                                                                                                                                                                                                                                                                                                            |              |        |
| DIAGNOSTIC                | Fort and fishing centre, estuary and sheltered cove with north-easterly exposure.<br>Historical site largely disconnected from the coastal road.<br>Growth of luxury flats in the direction of Cape Coast.<br>Western wetlands equipped with ponds.                                                        |              |        |
| DYNAMICS                  | Discontinuous beaches, with frequent segments of type 4b rocky coast <sup>6</sup> .<br>Very attractive cove beach in the town of Elmina, supplied by river sediment, anchored at the cape, but equilibrium seems precarious towards the east (erosion?). Beyond this, discontinuous, very fragile beaches. |              |        |
| STAKES                    | Control current residential urbanization towards the beach.                                                                                                                                                                                                                                                |              |        |
| RECOMMANDATION            | Control and planning of residential habitation on the peripheries.<br>Planned withdrawal of at-risk buildings from the edge of the beach.                                                                                                                                                                  |              |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                              | CRITICALITY  | Medium |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                                            |              |        |
| EVOLUTION OF STAKES       | Relatively loose urban patterns.<br>Important gold mining site in Elmina.                                                                                                                                                                                                                                  |              |        |
| PORT INSTALLATIONS        | The port of Elmina is the main artisanal fishing port of Ghana located in a small river whose mouth has been equipped with two groynes/protection dykes.                                                                                                                                                   |              |        |
| HAZARDS                   | Moderate erosion                                                                                                                                                                                                                                                                                           |              |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                              | CRITICALITY  | Medium |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                                            |              |        |
| EVOLUTION OF STAKES       | West Elmina: tourism development and coastal protection (riprap).<br>Coastal protection south Elmina Rock fill and construction of a groyne.                                                                                                                                                               |              |        |
| CURRENT PROJECTS          | First phase of the Elmina protection is ongoing covering about 4 km with groynes and revetments.                                                                                                                                                                                                           |              |        |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                         |              |        |
| HAZARDS                   | Erosion                                                                                                                                                                                                                                                                                                    |              |        |
| RECOMMENDATIONS           | None                                                                                                                                                                                                                                                                                                       |              |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                          | CRITICALITY  | Medium |

<sup>6</sup> Refer to « Typologie des façades » in UEMOA, 2010. Etude régionale de suivi du trait de côte et élaboration d'un Schéma Directeur du Littoral de l'Afrique de l'Ouest. Notice de la cartographie. 48p.



PORT of ELMINA – Evolution of the port structure from 2007 to 2020

2007



2016



2020







PORT of ELMINA – Evolution of the port structure from 2007 to 2020

2007



2016



2020





| GH5-b                     |                                                                                                                                                                                                                                                   | 144 - WEST CAPE COAST |        |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------|
| BASELINE - 2010           |                                                                                                                                                                                                                                                   |                       |        |
| DIAGNOSTIC                | Narrow fluvial marine terrace, rim-lido isolating wetlands and several lagoons, one of which touches the town.<br>Main coastal road very close to the beach (50 m).                                                                               |                       |        |
| DYNAMICS                  | Straight littoral area/slightly undulated types 3b/3c therefore at risk <sup>7</sup> .                                                                                                                                                            |                       |        |
| STAKES                    | Respect the natural break in urbanization, but a point very close to the beach for the coastal road at risk.<br>Installations between the lagoon and the road seem to be on very low land, with risks of flooding by the lagoon and storm surges. |                       |        |
| RECOMMANDATION            | Preserve the green break of the wetlands between the peripheries of Elmina and Cape Coast.<br>Restrict urban development.<br>Monitor the shoreline and the stability of the road in places close to the shore.                                    |                       |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                     | CRITICALITY           | Medium |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                   |                       |        |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                      |                       |        |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                      |                       |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                     | CRITICALITY           | Medium |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                   |                       |        |
| EVOLUTION OF STAKES       | Coastal Protection works with Rock fill Revetment.                                                                                                                                                                                                |                       |        |
| CURRENT PROJECTS          | Second phase of the Elmina Coastal protection Project is ongoing covering about 5km stretch of coastline.                                                                                                                                         |                       |        |
| OUTSTANDING NATURAL AREAS | Government                                                                                                                                                                                                                                        |                       |        |
| HAZARDS                   | No                                                                                                                                                                                                                                                |                       |        |
| RECOMMENDATIONS           | Erosion                                                                                                                                                                                                                                           |                       |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                 | CRITICALITY           | Medium |

<sup>7</sup> Refer to « Typologie des façades » in UEMOA, 2010. Etude régionale de suivi du trait de côte et élaboration d'un Schéma Directeur du Littoral de l'Afrique de l'Ouest. Notice de la cartographie. 48p.



| GH5-c                     |                                                                                                                                                                                                                  | 145 - CAPE COAST |        |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------|
| BASELINE - 2010           |                                                                                                                                                                                                                  |                  |        |
| DIAGNOSTIC                | Bipolar urban area, older part to the east, more recent part to the west, but also historical centre and fort.<br>Partially urbanized coastal area, narrow, discontinuous beaches, rocky headland.               |                  |        |
| DYNAMICS                  | Beaches and rocky coasts more or less strongly exposed to the ocean waves; exposure varies greatly from one site to another.<br>Necessity for an approach at a level of local detail.                            |                  |        |
| STAKES                    | Fishermen's districts at risk to the east of the rocky breakwater.<br>Preservation of breaks in urbanization to the east and west, to avoid the development of a continuous conurbation all the way to Saltpond. |                  |        |
| RECOMMANDATION            | Preserve the green breaks to the west and east of the town.<br>In the long term, withdraw at risk settlements east of the cape.                                                                                  |                  |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                    | CRITICALITY      | Medium |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                  |                  |        |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                     |                  |        |
| HAZARDS                   | Not reported                                                                                                                                                                                                     |                  |        |
| MONITORING                | Regular and light                                                                                                                                                                                                | CRITICALITY      | Medium |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                  |                  |        |
| EVOLUTION OF STAKES       | Rip rap beach south of cape coast.<br>Coast Cape coastal protection works with rock fill revetment and groynes.                                                                                                  |                  |        |
| CURRENT PROJECTS          | Project ongoing.                                                                                                                                                                                                 |                  |        |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                               |                  |        |
| HAZARDS                   | Erosion                                                                                                                                                                                                          |                  |        |
| RECOMMENDATIONS           | None                                                                                                                                                                                                             |                  |        |
| MONITORING                | Regular and light                                                                                                                                                                                                | CRITICALITY      | Medium |



| GH5-d                     | 146 – EAST CAPE COAST                                                                                                   |             |        |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------|-------------|--------|
| BASELINE – 2010           |                                                                                                                         |             |        |
| DIAGNOSTIC                | Hilly area still only sparsely built on the eastern edge of the town.                                                   |             |        |
| DYNAMICS                  | No remarks                                                                                                              |             |        |
| STAKES                    | Break in urbanization to be preserved and strengthened.                                                                 |             |        |
| RECOMMENDATION            | Land control, to prevent urban sprawl across these natural areas.                                                       |             |        |
| MONITORING                | Watch-keeping                                                                                                           | CRITICALITY | Medium |
| EVOLUTION 2010–2016       |                                                                                                                         |             |        |
| EVOLUTION OF STAKES       | Not reported                                                                                                            |             |        |
| HAZARDS                   | Not reported                                                                                                            |             |        |
| MONITORING                | Watch-keeping                                                                                                           | CRITICALITY | Medium |
| EVOLUTION 2016–2020       |                                                                                                                         |             |        |
| EVOLUTION OF STAKES       | Construction of Moree Fishing landing site (Comprise of breakwater, fishing market/net mending area, other facilities). |             |        |
| CURRENT PROJECTS          | Ghana Coastal Fishing Port and Fish Landing Site Project for Moree project.                                             |             |        |
| OUTSTANDING NATURAL AREAS | No                                                                                                                      |             |        |
| HAZARDS                   | Erosion                                                                                                                 |             |        |
| RECOMMENDATIONS           | None                                                                                                                    |             |        |
| MONITORING                | Watch-keeping                                                                                                           | CRITICALITY | Medium |





| GH5-e                     |                                                                                                                                                                                                                                                                                                                          | 147 – PERI-URBAN SECTOR OF CAPE COAST – SALTPOND |        |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                          |                                                  |        |
| DIAGNOSTIC                | Sector very well connected by the main coastal road which approaches the coastal area. Small towns undergoing growth, like Saltpond, separated by an agriculture hinterland already colonised in places by residential settlements. Sites of small beaches oriented east/south-east. Human land use globally increasing. |                                                  |        |
| DYNAMICS                  | Mixed coastal area of type 4a and 4b, some segments of type 3 <sup>8</sup> . Sites highly individualised in places, often fragile, many beaches undergoing erosion.                                                                                                                                                      |                                                  |        |
| STAKES                    | Control of residential and leisure urbanization developing towards the beach.                                                                                                                                                                                                                                            |                                                  |        |
| RECOMMANDATION            | Anticipate development of buildings on the edge of the shore in agreed, equipped development zones. Select sites suitable for limited protective measures in order to secure sites of high value in terms of landscape and leisure activities. Sector scheme could be useful.                                            |                                                  |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                            | CRITICALITY                                      | Medium |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                                                                                                          |                                                  |        |
| EVOLUTION OF STAKES       | Infrastructure related to oil exploration.                                                                                                                                                                                                                                                                               |                                                  |        |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                             |                                                  |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                        | CRITICALITY                                      | Medium |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                                                                                                          |                                                  |        |
| EVOLUTION OF STAKES       | Rockfill revetment construction underway south of Egya and groyne system around Anomabo (protecting a coastal stretch of about 5km).                                                                                                                                                                                     |                                                  |        |
| CURRENT PROJECTS          | Anomabo Coastal Protection Project is ongoing.                                                                                                                                                                                                                                                                           |                                                  |        |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                       |                                                  |        |
| HAZARDS                   | Erosion                                                                                                                                                                                                                                                                                                                  |                                                  |        |
| RECOMMENDATIONS           | None                                                                                                                                                                                                                                                                                                                     |                                                  |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                        | CRITICALITY                                      | Medium |

<sup>8</sup> Refer to « Typologie des façades » in UEMOA, 2010. Etude régionale de suivi du trait de côte et élaboration d'un Schéma Directeur du Littoral de l'Afrique de l'Ouest. Notice de la cartographie. 48p.



## GH6

RURAL HINTERLAND OF URBAN AREAS OF CAPE  
COAST AND ACCRA

| GH6-a                     |                                                                                                                                                                                                                                              | 148 - SALTPOND – MFANTSIMAN |  |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|--|
| BASELINE - 2010           |                                                                                                                                                                                                                                              |                             |  |
| DIAGNOSTIC                | Villages located on the edge of the sea at high risk (5 important sites + huts in coconut groves) on estuarine sites.<br>Series of small agglomerations some distance back from the lagoon and channels.<br>Inland, vast system of wetlands. |                             |  |
| DYNAMICS                  | Rims-lidos of type 3c <sup>9</sup> , very fragile and unstable, outlets from wetlands system in places.                                                                                                                                      |                             |  |
| STAKES                    | Situation of villages on the edge of the beach, very exposed and no possibility of withdrawal to the lido.<br>Value of the wetland connected to the estuary with two water courses.                                                          |                             |  |
| RECOMMANDATION            | Planned withdrawal of the most exposed installations.<br>Sites to be preserved for biological value of the estuarine systems.                                                                                                                |                             |  |
| MONITORING                | Regular and light                                                                                                                                                                                                                            | CRITICALITY    High         |  |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                              |                             |  |
| EVOLUTION OF STAKES       | No observed significant evolution, reduced priority because of lack of important developments.<br>Nothing have been done regarding this recommendation done in 2010 " Sites to be preserved for biological value of the estuarine systems".  |                             |  |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                 |                             |  |
| MONITORING                | Regular and light                                                                                                                                                                                                                            | CRITICALITY    Medium       |  |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                              |                             |  |
| EVOLUTION OF STAKES       | None reported                                                                                                                                                                                                                                |                             |  |
| CURRENT PROJECTS          | None reported                                                                                                                                                                                                                                |                             |  |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                           |                             |  |
| HAZARDS                   | None reported                                                                                                                                                                                                                                |                             |  |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                            |                             |  |
| MONITORING                | Regular and light                                                                                                                                                                                                                            | CRITICALITY    Medium       |  |

<sup>9</sup> Refer to « Typologie des façades » in UEMOA, 2010. Etude régionale de suivi du trait de côte et élaboration d'un Schéma Directeur du Littoral de l'Afrique de l'Ouest. Notice de la cartographie. 48p



| GH6-b                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 149 – WINNEBA |        |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |        |
| DIAGNOSTIC                | Succession of large towns-villages on headland sites and fishing ports (Winneba, Apam, etc.). Possible sites with tourist potential, perhaps already partially occupied.<br>Road connection by north and south satellites 10-15 km from the main coastal road.<br>Portion of the coastal area isolated.<br>Large, successive breaks in urbanization to be preserved.<br>The major forms of pollution were identified as water, land, noise and air. Domestic, agricultural, industrial and construction were the sources of waste generated in the municipality. <sup>10</sup> |               |        |
| DYNAMICS                  | Rims-lidos of type 3c <sup>9</sup> , very fragile and unstable, outlets from wetlands system in places.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |        |
| STAKES                    | Mixed coastline with alternating type 4b <sup>11</sup> coast and 3 segments.<br>No remarks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |        |
| RECOMMANDATION            | Sector scheme anticipating probable residential developments.<br>Anticipate development of buildings on the edge of the shore in agreed, equipped development zones.<br>Select sites suitable for limited protective measures in order to secure sites of high value in terms of landscape and leisure activities.                                                                                                                                                                                                                                                             |               |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY   | Medium |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |        |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |        |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY   | Medium |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |        |
| EVOLUTION OF STAKES       | Construction of Fete Fishing landing site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |        |
| CURRENT PROJECTS          | Ghana Coastal Fishing Port and Fish Landing Site Project for Gomoah Fete project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |               |        |
| OUTSTANDING NATURAL AREAS | Muni Lagoon Ramsar site <ul style="list-style-type: none"><li>• WII ID: 1GH002 – 563 / WDPA ID: 67966</li><li>• Affected sector: GH-6B</li><li>• Designation on August 14, 992 (8670 square)</li></ul>                                                                                                                                                                                                                                                                                                                                                                         |               |        |
| HAZARDS                   | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |               |        |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |               |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY   | Medium |

<sup>10</sup> Refer to « Ameyaw, Y., Tachie, T. Y., Raheem, K., 2010. Environmental pollution in the Winneba Municipality of the Central Region, Ghana. In Research Journal of Pharmaceutical, Biological and Chemical Sciences. Vol.1 No.4 pp.219–230.

<sup>11</sup> Refer to « Typologie des façades » in UEMOA, 2010. Etude régionale de suivi du trait de côte et élaboration d'un Schéma Directeur du Littoral de l'Afrique de l'Ouest. Notice de la cartographie. 48p.



WINNEBA OUEST – EVOLUTION DU TRAIT DE CÔTE (2000 / 2013 / 2020 : APPARITION D'UNE BRÈCHE)

2000



2013



2020





WINNEBA EST – EVOLUTION DE L'OCCUPATION DES SOLS ENTRE 2000 ET 2013

2003



2019

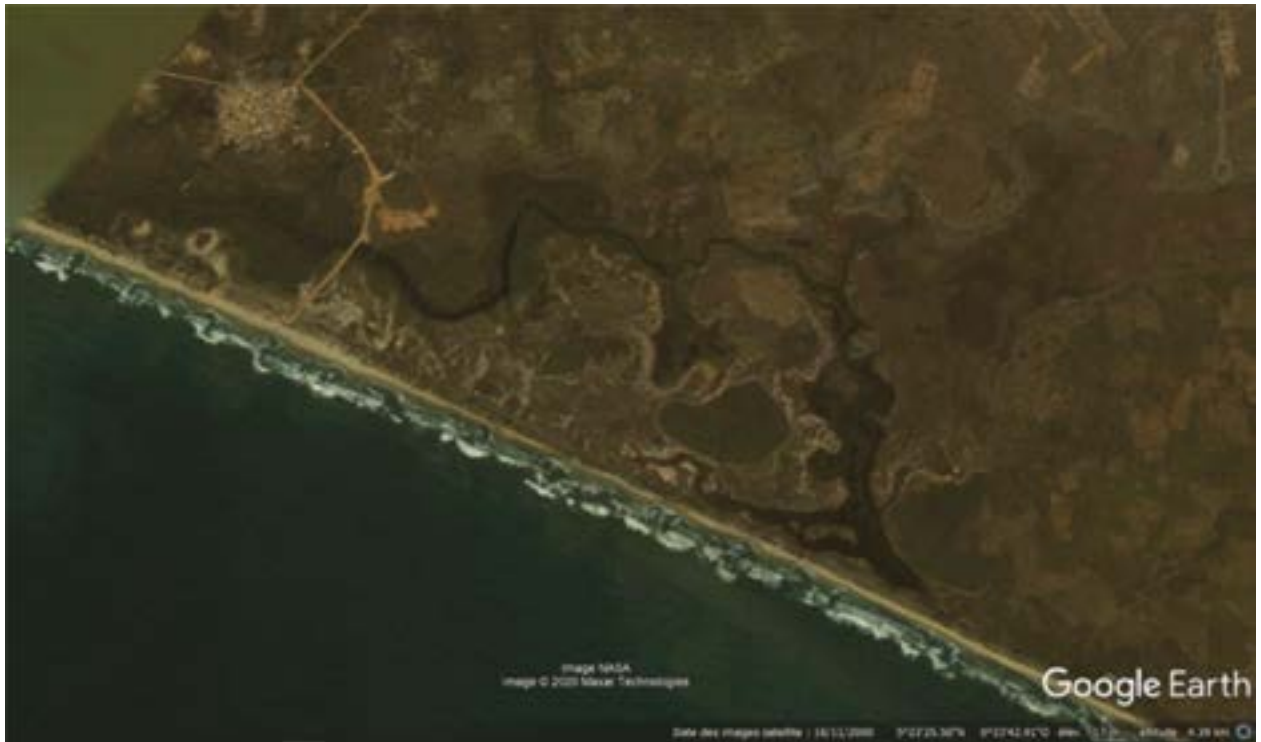






WINNEBA EST – EVOLUTION DE L'OCCUPATION DES SOLS ENTRE 2000 ET 2013

2000



2013





## GH7

## ACCRA WEST URBAN AREA

Urbanisation division near the shoreline clear enough between the two sectors of that area.

Shoreline alternating coast type of 4b, 4a, 3 a, 3b<sup>12</sup>, with small segments not all identifiable at 500 000eme<sup>th</sup>.

All these small towns are associated with capes sheltering the swell, small estuaries and traditional fishing.

| GH7-a                     |                                                                                                                                                                                                                                       | 150 – SENYA – NYANYANO |        |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------|
| BASELINE – 2010           |                                                                                                                                                                                                                                       |                        |        |
| DIAGNOSTIC                | Tendency to urban sprawl over rural areas from small agglomerations.<br>Relative isolation of the near shore zone connected by North-South satellites.                                                                                |                        |        |
| DYNAMICS                  | Alternating rocky coast 4b with creeks oriented South-east, segments not all marked off at 500,000.                                                                                                                                   |                        |        |
| STAKES                    | In the long term, urbanization will continue, under the impulse of improved road access towards Accra and its current extension.                                                                                                      |                        |        |
| RECOMMANDATION            | Land control and global scheme for the zone to prevent urban sprawl.<br>Enforce a littoral strip of at least 100 m in the developing of a sea front for tourism and residential purposes promoting the small, sheltered resort sites. |                        |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                         | CRITICALITY            | Medium |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                       |                        |        |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                          |                        |        |
| HAZARDS                   | Not reported                                                                                                                                                                                                                          |                        |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                         | CRITICALITY            | Medium |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                       |                        |        |
| EVOLUTION OF STAKES       | Construction of Mumford Fishing landing site (Comprise of breakwater, fishing market/ net mending area, other facilities)                                                                                                             |                        |        |
| CURRENT PROJECTS          | Ghana Coastal Fishing Port and Fish Landing Site Project for Mumford project.                                                                                                                                                         |                        |        |
| INVESTMENTS               | No                                                                                                                                                                                                                                    |                        |        |
| OUTSTANDING NATURAL AREAS | Erosion                                                                                                                                                                                                                               |                        |        |
| HAZARDS                   | -                                                                                                                                                                                                                                     |                        |        |
| RECOMMENDATIONS           | None                                                                                                                                                                                                                                  |                        |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                     | CRITICALITY            | Medium |

<sup>12</sup> Refer to « Typologie des façades » in UEMOA, 2010. Etude régionale de suivi du trait de côte et élaboration d'un Schéma Directeur du Littoral de l'Afrique de l'Ouest. Notice de la cartographie. 48p.



| GH7-b                     |                                                                                                                                                                                                     | 151 – NYANYANO – ACCRA WEST AREA PERI-URBAN |        |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|--------|
| BASELINE – 2010           |                                                                                                                                                                                                     |                                             |        |
| DIAGNOSTIC                | Despite the proximity of Accra, loose urbanization predominantly luxury flats, some hotels. Intra urban isolated areas of agriculture still present.                                                |                                             |        |
| DYNAMICS                  | Fragile area, tendency to erosion – smoothing of beaches in coves by dyke effect of headlands. Numerous, somewhat reflective beaches.                                                               |                                             |        |
| STAKES                    | Future of the agricultural plain facing urbanization, as a green enclave undergoing urban sprawl.                                                                                                   |                                             |        |
| RECOMMENDATION            | Land control and global sector scheme, preserving the large break in urbanization. Enforce a littoral strip of at least 100m in the developing of a sea front for tourism and residential purposes. |                                             |        |
| MONITORING                | Watch-keeping                                                                                                                                                                                       | CRITICALITY                                 | Medium |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                     |                                             |        |
| EVOLUTION OF STAKES       | High and fast expansion of built areas.                                                                                                                                                             |                                             |        |
| HAZARDS                   | Not reported                                                                                                                                                                                        |                                             |        |
| MONITORING                | Regular and light                                                                                                                                                                                   | CRITICALITY                                 | Medium |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                     |                                             |        |
| EVOLUTION OF STAKES       | Coastal rockfill revetment protection structure.                                                                                                                                                    |                                             |        |
| CURRENT PROJECTS          | -                                                                                                                                                                                                   |                                             |        |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                  |                                             |        |
| HAZARDS                   | Erosion                                                                                                                                                                                             |                                             |        |
| RECOMMENDATIONS           | -                                                                                                                                                                                                   |                                             |        |
| MONITORING                | Regular and light                                                                                                                                                                                   | CRITICALITY                                 | Medium |





## GH8 ACCRA, EAST URBAN AND OUTSKIRTS AREA

| GH8-a                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 152 – ACCRA WETLAND DENSU DELTA |      |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                 |      |
| DIAGNOSTIC                | Complex of wetlands locally reached by rising tide, the contours of which mark the current limits of urbanization.<br>Vast development of salt production fields.<br>Littoral rim in extremely narrow lido with no vegetation (sharp sand?), with precarious settlements and tourist camps in places.<br>Densu delta is a Ramsar site.                                                                                                                  |                                 |      |
| DYNAMICS                  | Extreme fragility of the very narrow rim-lido, hydrologic system stabilised by the Weija dam built in 1978.                                                                                                                                                                                                                                                                                                                                             |                                 |      |
| STAKES                    | Strong tendency to diffuse urbanization in wetland especially on right bank.<br>Urban pollution from various sources to be managed.<br>Over-exploitation of fishing resources and mangroves.<br>Very low elevation and impact in the event of storm surge on the lido.                                                                                                                                                                                  |                                 |      |
| RECOMMANDATION            | Imperative to maintain the break in urbanization with blockage of urban sprawl on the periphery of the wetland.<br>Restrict installations on the lido to temporary fishing and leisure facilities.<br>Possible restriction of tourist traffic on Bojo Beach, and in any case, of permanent installations.<br>Reinforce collective sanitation measures and restrict urban effluent.<br>Reinforce and apply the management provisions of the Ramsar site. |                                 |      |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY                     | High |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                 |      |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                 |      |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                 |      |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY                     | High |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                 |      |
| EVOLUTION OF STAKES       | Coastal protection works with rockfill revetment and groynes.                                                                                                                                                                                                                                                                                                                                                                                           |                                 |      |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                 |      |
| OUTSTANDING NATURAL AREAS | <b>Densu Delta Ramsar site</b> <ul style="list-style-type: none"><li>• WII ID: 1GH003 – 564 / WDPA ID: 67967</li><li>• Affected sector: GH8-a</li><li>• Designation on August 14, 1992 (4620 square)</li><li>• The delimitations of the area are not available in WDPA.</li></ul>                                                                                                                                                                       |                                 |      |
| HAZARDS                   | Erosion<br>Flooding                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                 |      |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                 |      |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITICALITY                     | High |



| GH8-b                     |                                                                                                                                                                                                                                         | 153 – ACCRA CENTRE WEST |           |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------|
| BASELINE – 2010           |                                                                                                                                                                                                                                         |                         |           |
| DIAGNOSTIC                | Coastline predominantly straight type 4a <sup>13</sup> undulating.<br>Very dense habitation right to the beach and precarious fishermen's settlements.<br>Narrow urban road, inland and at a distance from the coastline.               |                         |           |
| DYNAMICS                  | Coastline undulating in short periods, with sectors undergoing erosion probably related to the dam and the wetland.<br>Small zone undergoing accretion on the eastern part of the zone upstream of Jamestown (nearby the fishing port). |                         |           |
| STAKES                    | Very dense habitation at high risk in the event of surges.                                                                                                                                                                              |                         |           |
| RECOMMENDATION            | Requalification and withdrawal of dense settlements on the edge of the coastline to be examined strategically.<br>Implement preventive measures and prepare the population.                                                             |                         |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                                     | CRITICALITY             | Very high |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                         |                         |           |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                            |                         |           |
| COSTAL PROTECTION         | Works proposal for protection in Jamestown.<br>Existence of some rockfills for private protection.                                                                                                                                      |                         |           |
| HAZARDS                   | Not reported                                                                                                                                                                                                                            |                         |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                                     | CRITICALITY             | Very high |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                         |                         |           |
| EVOLUTION OF STAKES       | 2 km revetment at Dansoman ongoing (90% complete).                                                                                                                                                                                      |                         |           |
| CURRENT PROJECTS          | Dansoman Coastal protection works                                                                                                                                                                                                       |                         |           |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                      |                         |           |
| HAZARDS                   | Coastal erosion.                                                                                                                                                                                                                        |                         |           |
| RECOMMENDATIONS           | Consider land reclamation options.                                                                                                                                                                                                      |                         |           |
| MONITORING                | Regular and light                                                                                                                                                                                                                       | CRITICALITY             | High      |

<sup>13</sup> Refer to « Typologie des façades » in UEMOA, 2010. Etude régionale de suivi du trait de côte et élaboration d'un Schéma Directeur du Littoral de l'Afrique de l'Ouest. Notice de la cartographie. 48p.



| GH8-c                     |                                                                                                                                                                                                                                                                                                                                                                                   | 154 – ACCRA CENTRE       |  |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                   |                          |  |
| DIAGNOSTIC                | Undulating type 4b <sup>14</sup> coastline fully urbanized to the limit of (small) coastal cliffs or beaches, connected by an urban motorway which approaches the shore locally when passing the wetland (same as Tema West).<br>Eastern part occupied by public beaches and important residential and hotel area.<br>Narrow, compartmented beaches, given the high frequentation |                          |  |
| DYNAMICS                  | Tendency to erosion, beaches thinning at the foot of the cliffs, the small headland that is the boundary of the sector acting as a natural groyne, reinforced by a pier in rock fill (fishing port).<br>Tendency to erosion less marked to the east of the area.                                                                                                                  |                          |  |
| STAKES                    | The start of organized development of a sea front should be considered from Labadi Beach eastward.<br>Fragile sector where it crosses the wetland.<br>Complex restructuring, given the diversity of types of settlement.<br>Evolution of the fishing port in an increasingly restricted space.                                                                                    |                          |  |
| RECOMMANDATION            | Secure the heritage of very busy urban public beaches.<br>Monitor the quality of the waters.<br>Secure road segments a small distance from the coastline.<br>Preserve wetlands and breaks in urbanization and areas to the east of the zone.                                                                                                                                      |                          |  |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY    Very high |  |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                                                                                                                                                                   |                          |  |
| EVOLUTION OF STAKES       | Building of high standing residential complexes.                                                                                                                                                                                                                                                                                                                                  |                          |  |
| COSTAL PROTECTION         | Stage 2 of shoreline protection projects in Sakumono (40 million US dollars), a big jetty (industrial installation) in the South of Sakumono.                                                                                                                                                                                                                                     |                          |  |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                                                      |                          |  |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY    Very high |  |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                                                                                                                                                                   |                          |  |
| EVOLUTION OF STAKES       | Dredging of Korle Lagoon and the construction of the Marine Drive (covering about 240 acres of land from Christianburg castle to Arts Centre) incudes, hotels shopping mall, parks and office complex.                                                                                                                                                                            |                          |  |
| CURRENT PROJECTS          | Marine Drive Tourism Investment Project.                                                                                                                                                                                                                                                                                                                                          |                          |  |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                                                                                |                          |  |
| HAZARDS                   | Coastal erosion.                                                                                                                                                                                                                                                                                                                                                                  |                          |  |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                                 |                          |  |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY    Very high |  |

<sup>14</sup> Refer to « Typologie des façades » in UEMOA, 2010. Etude régionale de suivi du trait de côte et élaboration d'un Schéma Directeur du Littoral de l'Afrique de l'Ouest. Notice de la cartographie. 48p



| GH8-d                     |                                                                                                                                                                                                                                                                                     | 155 – WETLAND BREAK TEMA WEST SAKUMO |        |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                     |                                      |        |
| DIAGNOSTIC                | Wetland and artificialized lagoon.<br>System marked in the south by the passage of a main coastal road (dyke road). Linear rock fill for stabilization.<br>Tendency to reclamation of the wetland and development of building on reclaimed sites.<br>Sakumo is a Ramsar site.       |                                      |        |
| DYNAMICS                  | Risks concerning the stability of the dyke road if undercutting occurs at the foot of the protections.<br>Risks of marine intrusion in the event of surge.<br>Risks related to drainage capacity in periods of flooding.                                                            |                                      |        |
| STAKES                    | Preservation of a break in urbanization in an area with an industrial vocation: different ecological services and hydraulic regulation.                                                                                                                                             |                                      |        |
| RECOMMANDATION            | Preserve the area.<br>Monitor status of developments.<br>Restrict building on the banks of the lagoon.<br>Reinforce and apply the management provisions of the Ramsar site.                                                                                                         |                                      |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                   | CRITICALITY                          | High   |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                     |                                      |        |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                        |                                      |        |
| COSTAL PROTECTION         | Stage 2 of shoreline protection projects in Sakumono.                                                                                                                                                                                                                               |                                      |        |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                        |                                      |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                   | CRITICALITY                          | High   |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                     |                                      |        |
| EVOLUTION OF STAKES       | Dredging of Korle Lagoon and the construction of the Marine Drive (covering about 240 acres of land from Christianburg castle to Arts Centre) incudes, hotels shopping mall, parks and office complex.                                                                              |                                      |        |
| CURRENT PROJECTS          | Marine Drive Tourism Investment Project. This is a government initiative aimed at developing sections of the coastline of Ghana's capital city into a state of the art tourism and hospitality enclave.                                                                             |                                      |        |
| OUTSTANDING NATURAL AREAS | <b>Sakumo Lagoon Ramsar site</b> <ul style="list-style-type: none"><li>• WII ID: 1GH004 – 565 / WDPA ID: 67968</li><li>• Affected sector: GH8-d</li><li>• Designation on August 14, 1992 (1340 square)</li><li>• The delimitations of the area are not available in WDPA.</li></ul> |                                      |        |
| HAZARDS                   | Erosion                                                                                                                                                                                                                                                                             |                                      |        |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                   |                                      |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                   | CRITICALITY                          | Medium |



| GH8-e                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 156 – TEMA               |  |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |  |
| DIAGNOSTIC                | Eastern limit marked by a wetland partly equipped with ponds.<br>Fully urbanised site, complex urban fabric, average and substandard classes, industrial sites, developments and installations of the port.<br>Area of dense substandard habitation east of the port.<br>Tema is a commercial and fishing port.                                                                                                                                                                                                |                          |  |
| DYNAMICS                  | Rocky coastline, very thin beaches (units 4b <sup>15</sup> , limit 5).<br>Impact of the harbour pier accretion to the west and erosion to the east controlled by structural work and the characteristics of the shoreline structured on small cliffs.                                                                                                                                                                                                                                                          |                          |  |
| STAKES                    | Future evolution of the port, sufficient depth.<br>Erosion in the eastern part and habitation east of the port possibly threatened.<br>Absence of sea front development.                                                                                                                                                                                                                                                                                                                                       |                          |  |
| RECOMMANDATION            | Close monitoring of the shoreline east of the port.<br>Planned withdrawal (relocation) of habitations in immediate proximity to the east of the port.                                                                                                                                                                                                                                                                                                                                                          |                          |  |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY    Very high |  |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |  |
| EVOLUTION OF STAKES       | Extension of Tema Port. Upon arrival of West African gas pipeline and corresponding onshore infrastructure, thermal plant, master plan under way. High urban growth.                                                                                                                                                                                                                                                                                                                                           |                          |  |
| PORT INSTALLATIONS        | Tema port is the biggest in Ghana, located on the eastern coast of the country at 30 km from the capital, Accra. It is made up of two main jetties/ breakwater which constitute the berry of the main port, three smaller jetties connected to the main jetty in the north constitute the fishing port. It comprises one port with container, one oil terminal and one fishing port.<br>The concession of terminal containers of Tema port was granted to Bolloré Africa Logistics in 2007 for a 20-year term. |                          |  |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                          |  |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY    Very high |  |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |  |
| EVOLUTION OF STAKES       | Construction of a second container port at Tema. Construction of a 500m long spike to the east of the Port (old spike + to the east damaged)<br>Construction of a second cob at the power plant.                                                                                                                                                                                                                                                                                                               |                          |  |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                          |  |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                          |  |
| HAZARDS                   | Erosion<br>Plastic and water pollution                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                          |  |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                          |  |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY    Very high |  |

<sup>15</sup> Refer to « Typologie des façades » in UEMOA, 2010. Etude régionale de suivi du trait de côte et élaboration d'un Schéma Directeur du Littoral de l'Afrique de l'Ouest. Notice de la cartographie. 48p.



PORT DE TEMA

Localisation



2010



2016



2020





| GH8-f                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 157 - PRAMPRAM      |  |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--|
| BASELINE - 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |  |
| DIAGNOSTIC                | Tema cut-off by estuarine zone, no road passage. Served by a secondary road close to the coastline and connected to Accra by a satellite of the main inland road.<br>Large, growing town (Prampram, Old and New Ningo connected by a bridge).<br>Ponds in the wetland.<br>Material extraction area<br>In interurban spaces, residential type growth in agricultural milieu (large huts) with private tracks.<br>Human land use of the coastal strip still moderate but growing. |                     |  |
| DYNAMICS                  | Continuous, very narrow beaches.<br>Undulating shore subject to erosion, particularly in the east.<br>Lagoons isolated by extremely narrow rim lidos adjacent to harder formations of the sandstone type.                                                                                                                                                                                                                                                                       |                     |  |
| STAKES                    | Area intended for accelerated urbanization if a road across the estuary is built enabling direct access to Prampram and Tema.                                                                                                                                                                                                                                                                                                                                                   |                     |  |
| RECOMMANDATION            | The stakes do not really justify coastal defence structures given the relatively low rate of land use outside the urban centre.<br>Close monitoring of the effectiveness of the developments carried out, particularly in the east.                                                                                                                                                                                                                                             |                     |  |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY    High |  |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |  |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |  |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |  |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY    High |  |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |  |
| EVOLUTION OF STAKES       | Extension of coastal protection works to the area.                                                                                                                                                                                                                                                                                                                                                                                                                              |                     |  |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |  |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                     |  |
| HAZARDS                   | Coastal erosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |  |
| RECOMMENDATIONS           | Prohibition of sand mining in the area.                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |  |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CRITICALITY    High |  |



## GH9 VOLTA DELTA RIGHT BANK NINGO-ADAFOAH

Fluviomarine rim-terrace adjacent to a vast system of wetlands (Songaw Lagoon-Ramsar site) formerly subject, before the Akossoumbo dam was built, to Volta floods. Current watershed flowing into this system with limited surface area (unlike Keta Lagoon on the left bank). The control of floods of the Volta has led to profound alterations:

- Contraction of lagoon areas.
- Drying out and encroachment by agriculture or salt flats.
- Development of villages close to the coastline on the highest points (which remain at a relatively low elevation).
- Development of a track network and service road: North-South satellites connected to the coastal road. Secondary tracks more or less usable in the rainy season.
- Many points of fishing catch landing.

The eastward coastal drift is scarcely supplied upstream (Accra area). A coastal rim very narrow in places isolates lagoon channels and the distributaries of the delta system. The sediment supplies of the delta system are completely cut-off, the system is maintained by the sediment stocks of sediments of the terrace rims of the delta.

The coast is of very flat topography and at very low elevation. Habitation and road connections probably at risk, but with very variable degrees of risk in places; the situations should be analysed on a case-by-case basis.

«Support program for the preservation of biodiversity and fragile ecosystems, regional governance and climate change in West Africa – PAPBio» (ROC / FED / 039-269) officially launched on July 25, 2019. Within this program, several projects have been carried out including the "regional project for the strengthening of mangrove ecosystems" (EU, ECOWAS and UEMOA, 11th FED) which aims to strengthen the protection status of mangrove areas and to create generating activities income in 9 coastal countries of the West African sub-region. This project is currently in diagnostic phase.

Also note that the project to expand the drinking water supply capacity of the Volta region, located near Accra, the capital of Ghana, is entering its third phase. The European group Stragag has just launched work on this stage of the project, which aims to supply drinking water to 89,000 additional people in the region by July 2022.





| GH9-a                     |                                                                                                                                                                                                                          | 158 – NEW NINGO – LEKPOGUNO |           |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------|
| BASELINE – 2010           |                                                                                                                                                                                                                          |                             |           |
| DIAGNOSTIC                | A typical coastline, undulating but with very narrow rim-lido isolating lagoons and fields. Villages on high terraces set back from the channels-lagoon system/littoral lido. Situation practically peri urban at Accra. |                             |           |
| DYNAMICS                  | Thin and fragile lido.                                                                                                                                                                                                   |                             |           |
| STAKES                    | Sector with potential for densification in a context of a fragile coastline (nearby lagoons and narrow lido), including production infrastructure that also contributes to the fragility of the system.                  |                             |           |
| RECOMMANDATION            | Absolutely avoid any installation on the lido or in the areas in immediate proximity to the sea.<br>Monitor the shoreline and the status of the lido.<br>Maintain the break in urbanization east of New Ningo.           |                             |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                      | CRITICALITY                 | Very high |
| EVOLUTION 2010–2016       |                                                                                                                                                                                                                          |                             |           |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                             |                             |           |
| HAZARDS                   | Not reported                                                                                                                                                                                                             |                             |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                      | CRITICALITY                 | Very high |
| EVOLUTION 2016–2020       |                                                                                                                                                                                                                          |                             |           |
| EVOLUTION OF STAKES       | Construction of about 5 km coastal protection scheme comprising of a system of groynes and rockfill revetment westward of Old Ningo.                                                                                     |                             |           |
| CURRENT PROJECTS          | Coastal Protection (\$69 million for groynes, revetment and beach nourishment).                                                                                                                                          |                             |           |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                       |                             |           |
| HAZARDS                   | Coastal erosion.                                                                                                                                                                                                         |                             |           |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                        |                             |           |
| MONITORING                | Regular and light                                                                                                                                                                                                        | CRITICALITY                 | High      |



| GH9-b                     |                                                                                                                                                                                                                                                                                                                                                                         | 159 - LEKPOGUNO - AKPLABNYA |      |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------|
| BASELINE - 2010           |                                                                                                                                                                                                                                                                                                                                                                         |                             |      |
| DIAGNOSTIC                | Succession of large villages connected by a coastal road with North-South satellites. Width of the lido (rim terrace) very variable, but always adjacent to the wetland. Sensitivity very variable depending on the proximity of the coastline and elevation of the zones in use. Certain installations are extremely close to the shore. Wetlands typically developed. |                             |      |
| DYNAMICS                  | Straight to undulating coastline. Lido of variable width. Unstable zone subject to risk of surge and flooding by continental waters.                                                                                                                                                                                                                                    |                             |      |
| STAKES                    | To be analyzed on a case-by-case basis depending on the elevation of the sites and the distance from foreshore and from the channels and lagoons.                                                                                                                                                                                                                       |                             |      |
| RECOMMANDATION            | Maintain the break in land use and urbanization. Monitor the status of the lido in particular in the rainy season and/or during storm surges.                                                                                                                                                                                                                           |                             |      |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY                 | High |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                                                                                                         |                             |      |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                            |                             |      |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                                            |                             |      |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY                 | High |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                                                                                                         |                             |      |
| EVOLUTION OF STAKES       | None reported                                                                                                                                                                                                                                                                                                                                                           |                             |      |
| CURRENT PROJECTS          | None reported                                                                                                                                                                                                                                                                                                                                                           |                             |      |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                                                                      |                             |      |
| HAZARDS                   | Coastal erosion.                                                                                                                                                                                                                                                                                                                                                        |                             |      |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                       |                             |      |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY                 | High |



| GH9-c                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 160 - AKPLABNYA – TOTOPE |      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|------|
| BASELINE - 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                          |      |
| DIAGNOSTIC                | Extremely narrow littoral rim – lido (under 50 metres in places), no human land use. Interruption of the coastal road, track on the top of the beach.<br>Songaw Lagoon is a Ramsar site.                                                                                                                                                                                                                                                                                                                                                   |                          |      |
| DYNAMICS                  | Extremely unstable and fragile sector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                          |      |
| STAKES                    | Sector not used and not suitable to be equipped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                          |      |
| RECOMMANDATION            | Maintain the break in land use and urbanization.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                          |      |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY              | High |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                          |      |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          |      |
| HAZARDS                   | Serious possibilities of submersion and erosion of the lido, requirement to underline any new occupation.                                                                                                                                                                                                                                                                                                                                                                                                                                  |                          |      |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY              | High |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                          |      |
| EVOLUTION OF STAKES       | The fishing village of Totope is disappearing as the rising sea and worsening coastal erosion bury buildings in sand. The villagers say they were once three miles from the sea. Here women sweep sand towards the sea in a forlorn attempt to prevent their homes from being buried completely.                                                                                                                                                                                                                                           |                          |      |
| CURRENT PROJECTS          | Extension of coastal protection works close to Totope.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                          |      |
| OUTSTANDING NATURAL AREAS | <b>Songor Lagoon Ramsar site</b> <ul style="list-style-type: none"><li>• WII ID: 1GH005 – 566 / WDPA ID: 67969</li><li>• Affected sector: GH9-c, GH9-d</li><li>• Designation on August 14, 1992</li><li>• the delimitations of Ramsar site are not available in WDPA.</li></ul> <b>Songor Biosphere Reserve</b> <ul style="list-style-type: none"><li>• WDPA ID: 555547583</li><li>• Affected sector: GH9-c, GH9-d</li><li>• Designation on 2011</li><li>• the delimitations of the biosphere reserve are not available in WDPA.</li></ul> |                          |      |
| HAZARDS                   | Erosion<br>Flooding                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |      |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |      |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY              | High |



TOTOPE (2016)





| GH9-d                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 161 – ADA FOAH |           |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |           |
| DIAGNOSTIC                | Large agglomeration extending north (saturation of buildable land close to the coastline).<br>Situation very like Keta (GH10-b), with however the possibility of continuing the extension of urbanization landward (North direction), already exploited.<br>Hard surfaced road to the north, urban development corridor to the edge of the Volta, on alluviums of raised bank, but flooding excluded today. Even though the densest urbanization is away from the coastline, the tendency is for it to move closer at the level of the estuary mouth.<br>Islets of at-risk habitations. |                |           |
| DYNAMICS                  | Slightly undulated coastline (erosion/accretion).<br>Certain sites present a quite marked reduction in the beach in places.<br>Ada Foah and the surrounding villages are prone to flooding as a result of the low laying areas and in case of overtopping and flooding the result could be life threatening to the local residents in these areas.                                                                                                                                                                                                                                      |                |           |
| STAKES                    | Colonisation of the beach by random land use, leading to high risks for the installations (some located 30m from the foreshore).<br>The shortfall in revenue from the tourism, fishing and salt mining activities is a direct result of the on-going erosion in the Ada area.                                                                                                                                                                                                                                                                                                           |                |           |
| RECOMMENDATION            | Natural strip to be implemented.<br>Withdrawal of random installations on the beach desirable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY    | High      |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |           |
| EVOLUTION OF STAKES       | Demolition of shoreline infrastructure.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                |           |
| COSTAL PROTECTION         | 7 groynes have been built in the west of Volta mouthpiece in front of ADA village (183 million Euros).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |           |
| HAZARDS                   | High erosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY    | Very high |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |           |
| EVOLUTION OF STAKES       | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                |           |
| CURRENT PROJECTS          | Additional of 7 groynes-built West of previous ones.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                |           |
| OUTSTANDING NATURAL AREAS | <b>Songor Lagoon Ramsar site</b> <ul style="list-style-type: none"><li>• WII ID: 1GH005 – 566 / WDPA ID: 67969</li><li>• Affected sector: GH9-c, GH9-d</li><li>• Designation on August 14, 1992</li><li>• the delimitations of Ramsar site are not available in WDPA.</li></ul> <b>Songor Biosphere Reserve</b> <ul style="list-style-type: none"><li>• WDPA ID: 555547583</li><li>• Affected sector: GH9-c, GH9-d</li><li>• Designation on 2011</li><li>• the delimitations of the biosphere reserve are not available in WDPA.</li></ul>                                              |                |           |
| HAZARDS                   | Costal erosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |           |
| RECOMMENDATIONS           | Assess the effectiveness of the current intervention.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY    | Very high |



ADA FOAH



Constant growth of spit after 1963, reported erosion 6 m/year, assumed to be linked to the erosion of the ebb-tidal delta, in equilibrium in 1998.



## GH10

## CAPE THREE POINTS

Support program for the preservation of biodiversity and fragile ecosystems, regional governance and climate change in West Africa – PAPBio» (ROC / FED / 039-269) officially launched on July 25, 2019. Within this program, several projects have been carried out including the "regional project for the strengthening of mangrove ecosystems" (EU, ECOWAS and UEMOA, 11th FED) which aims to strengthen the protection status of mangrove areas and to create generating activities income in 9 coastal countries of the West African sub-region. This project is currently in diagnostic phase.

| GH10-a                    | 162 - DZITA – LEFT BANK OF VOLTA                                                                                                                                                                                                                                                                                                  |             |           |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------|
| BASELINE - 2010           |                                                                                                                                                                                                                                                                                                                                   |             |           |
| DIAGNOSTIC                | Very narrow fluvio-marine rim (sandy spit), with lagoonal channels adjacent to a zone flood-prone in places, islets of alluvial terraces with habitations.                                                                                                                                                                        |             |           |
| DYNAMICS                  | Very unstable, “thinned” mouth rim, partially composed of sharp sands, further inland than its opposite on the right bank.                                                                                                                                                                                                        |             |           |
| STAKES                    | Small villages in a situation of high exposure to very high risks in the event of storm surges or episodes of high rainfall.<br>No alternative for relocation or withdrawal.                                                                                                                                                      |             |           |
| RECOMMANDATION            | Radical restriction of the development of dwellings or infrastructure on the site.<br>Inform the population.                                                                                                                                                                                                                      |             |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                               | CRITICALITY | Very high |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                                                                   |             |           |
| EVOLUTION OF STAKES       | Aquaculture growing of prawns.                                                                                                                                                                                                                                                                                                    |             |           |
| COASTAL PROTECTION        | Protection building proposal.                                                                                                                                                                                                                                                                                                     |             |           |
| HAZARDS                   | High erosion and flooding.                                                                                                                                                                                                                                                                                                        |             |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                               | CRITICALITY | Very high |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                                                                   |             |           |
| EVOLUTION OF STAKES       | Oil exploration in the Keta basin.<br>Impacts of aquaculture on mangroves (mangrove destruction).                                                                                                                                                                                                                                 |             |           |
| CURRENT PROJECTS          | None reported                                                                                                                                                                                                                                                                                                                     |             |           |
| OUTSTANDING NATURAL AREAS | <b>Anlo-Keta Lagoon Complex Ramsar site</b> <ul style="list-style-type: none"><li>• WII ID: 1GH006 – 567 / WDPA ID: 67970</li><li>• Affected sectors: GH10-a / GH10-b / GH10-c / GH10-d</li><li>• Designation on August 14, 1992 (127 780 square)</li><li>• The delimitations of Ramsar site are not available in WDPA.</li></ul> |             |           |
| HAZARDS                   | Sargassum pollution.                                                                                                                                                                                                                                                                                                              |             |           |
| RECOMMENDATIONS           | High erosion and tidal waves (flooding).                                                                                                                                                                                                                                                                                          |             |           |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                 | CRITICALITY | High      |



| GH10-b                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 163 - KETA  |           |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------|
| BASELINE - 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |           |
| DIAGNOSTIC                | Slightly undulated terrace. Numerous micro-channels flowing into the lagoon in the north.<br>Average density of dwellings but building land saturated. Main road route outside the coastline, on the edge of the lagoon, connected to satellites.<br>Practically insular situation.<br>Important market-gardening zone on the edge of the lagoon.<br>The lagoon and its surroundings form a Ramsar site covering 53,000 hectares.                                                               |             |           |
| DYNAMICS                  | Shoreline with curved profile «atypical» for the region, of deltaic origin. Historical deposits by successive accretions isolating the channels.<br>Limited accretion still noted.<br>Current dynamic equilibrium fragile.                                                                                                                                                                                                                                                                      |             |           |
| STAKES                    | Dwellings saturate the area to the edge of buildable land that is not flood-prone (channels, lagoon edge).<br>High risk of flooding on the bank of the lido on the lagoon side.<br>The major risk in the current configuration is related to the extremely variable level of the Keta lagoon and to a conjugation of continental spate/storm surge. There is also a possibility of flooding due to the water table rising.<br>Preservation of the Ramsar site of Keta Lagoon.                   |             |           |
| RECOMMANDATION            | Restrict the development of dwellings on the site.<br>Adaptive management of installations with planned resettlements.<br>Monitor the impact of developments and of changes in the lagoon shore.<br>Preserve the natural shore vegetation on the lagoon side.<br>Implement preventive measures to face the risk of submersion (warning systems and prepare the population.)<br>Opportunity to assess the feasibility of architecture adapted to the risks of submersion (embankments, stilts?). |             |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY | Very high |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |           |
| EVOLUTION OF STAKES       | Oil exploration in the Keta basin.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |           |
| COASTAL PROTECTION        | Building of 6 groynes and a dyke to protect the road between Salo and Angola (2010-2013) on the East bank of the Volta.                                                                                                                                                                                                                                                                                                                                                                         |             |           |
| HAZARDS                   | Episodes of submersion-flooding, located accretion following the works implementation                                                                                                                                                                                                                                                                                                                                                                                                           |             |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY | Very high |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |           |
| EVOLUTION OF STAKES       | Oil exploration in the Keta basin.<br>Proposal to construct a harbour at Keta at far advanced stage-chief executive officer for the port has been appointed.                                                                                                                                                                                                                                                                                                                                    |             |           |
| CURRENT PROJECTS          | None reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |           |
| OUTSTANDING NATURAL AREAS | <b>Anlo-Keta Lagoon Complex Ramsar site</b> <ul style="list-style-type: none"><li>• WII ID: 1GH006 – 567 / WDPA ID: 67970</li><li>• Affected sectors: GH10-a / GH10-b / GH10-c / GH10-d</li><li>• Designation on August 14, 1992 (127 780 square)</li><li>• The delimitations of Ramsar site are not available in WDPA.</li></ul>                                                                                                                                                               |             |           |
| HAZARDS                   | Erosion and tidal waves (flooding).                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |           |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY | Very high |





| GH10-c                    |                                                                                                                                                                                                                                                                                                                                                            | 164 – KETA KEDZI |           |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                            |                  |           |
| DIAGNOSTIC                | Small sector of the dyke road.                                                                                                                                                                                                                                                                                                                             |                  |           |
| DYNAMICS                  | Extremely fragile sector in connected to the artificial outlet of the lagoon.                                                                                                                                                                                                                                                                              |                  |           |
| STAKES                    | Dyke road improves access to Keta. Very high risk for nearby dwellings. Plant coverage of bare sand. Installations at very high risk on the sandy spit separating the lagoon from the foreshore and on the extremity of the lido towards the east (habitations less than 20 m from the foreshore). Effectiveness of the drainage connection of the lagoon? |                  |           |
| RECOMMANDATION            | Plant coverage of bare sand.<br>Close monitoring of the status of the mechanism and of infrastructure.<br>Relocate installations from the sandy spit.                                                                                                                                                                                                      |                  |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                        | CRITICALITY      | Very high |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                                                                                            |                  |           |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                               |                  |           |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                               |                  |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                        | CRITICALITY      | Very high |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                                                                                            |                  |           |
| EVOLUTION OF STAKES       | Oil exploration in the Keta basin.                                                                                                                                                                                                                                                                                                                         |                  |           |
| CURRENT PROJECTS          | Construction of 7 additional groynes east of the 6 groynes and land reclamation (Blekusu-Adina coastal protection – 22 armour rock groynes stretching over 4.3 km).                                                                                                                                                                                        |                  |           |
| OUTSTANDING NATURAL AREAS | <b>Anlo-Keta Lagoon Complex Ramsar site</b> <ul style="list-style-type: none"><li>• WII ID: 1GH006 – 567 / WDPA ID: 67970</li><li>• Affected sectors: GH10-a / GH10-b / GH10-c / GH10-d</li><li>• Designation on August 14, 1992 (127 780 square)</li><li>• The delimitations of Ramsar site are not available in WDPA.</li></ul>                          |                  |           |
| HAZARDS                   | Erosion<br>Flooding                                                                                                                                                                                                                                                                                                                                        |                  |           |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                          |                  |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                        | CRITICALITY      | Very high |



| GH10-d                    |                                                                                                                                                                                                                                                                                                                                   | 165 - ADINA |           |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------|
| BASELINE - 2010           |                                                                                                                                                                                                                                                                                                                                   |             |           |
| DIAGNOSTIC                | Same as for the next sector (GH10-e), but rim and terraces extremely narrow.<br>Variable density of habitation in large huts and concessions of coconut palms.<br>Numerous canoes on the beaches.                                                                                                                                 |             |           |
| DYNAMICS                  | Formation in a narrow lido in the west (less than 150 m between the wetlands on the lagoon shore and the foreshore in places).                                                                                                                                                                                                    |             |           |
| STAKES                    | Area at risk in the event of surge.<br>Not possible to relocate the installations in places.                                                                                                                                                                                                                                      |             |           |
| RECOMMANDATION            | Total control of the densification of dwellings and installations.<br>Withdrawal of installations too close to the beach.<br>Monitor the shoreline and impacts of the anti-erosion mechanism at Keta.                                                                                                                             |             |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                               | CRITICALITY | Very high |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                                                                   |             |           |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                      |             |           |
| HAZARDS                   | High erosion                                                                                                                                                                                                                                                                                                                      |             |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                               | CRITICALITY | Very high |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                                                                   |             |           |
| EVOLUTION OF STAKES       | Oil exploration in the Keta basin.                                                                                                                                                                                                                                                                                                |             |           |
| CURRENT PROJECTS          | Construction of riprap and battery of groynes south of Adina.                                                                                                                                                                                                                                                                     |             |           |
| OUTSTANDING NATURAL AREAS | <b>Anlo-Keta Lagoon Complex Ramsar site</b> <ul style="list-style-type: none"><li>• WII ID: 1GH006 – 567 / WDPA ID: 67970</li><li>• Affected sectors: GH10-a / GH10-b / GH10-c / GH10-d</li><li>• Designation on August 14, 1992 (127 780 square)</li><li>• The delimitations of Ramsar site are not available in WDPA.</li></ul> |             |           |
| HAZARDS                   | Coastal erosion.<br>Flooding.                                                                                                                                                                                                                                                                                                     |             |           |
| RECOMMENDATIONS           | Proposition of coastal protection scheme of a groyne system eastward of Adina.                                                                                                                                                                                                                                                    |             |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                               | CRITICALITY | Very high |



| GH10-e                    |                                                                                                                                                                                                                                                                                                                                                                                             | 166 – EAST GHANA – TOGO BORDER |           |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                             |                                |           |
| DIAGNOSTIC                | Rurban sector in continuity with Lomé.<br>Homogeneous terrace adjacent to a lagoon and channel.<br>Agricultural land with small and medium-sized concessions of coconut palms.<br>Main road far inland from the shore, area undergoing densification on both sides of the road corridor.<br>Discontinuous beach edge track.<br>Encroachment through installations on the edge of the beach. |                                |           |
| DYNAMICS                  | No remarks                                                                                                                                                                                                                                                                                                                                                                                  |                                |           |
| STAKES                    | Colonization of the beach by random land use, leading to high risks for the installations (some located in immediate proximity to the foreshore).                                                                                                                                                                                                                                           |                                |           |
| RECOMMANDATION            | Total control of the densification of dwellings and installations.<br>Withdrawal of installations too close to the beach.<br>Monitor the shoreline and impacts of the anti-erosion mechanism at Keta.                                                                                                                                                                                       |                                |           |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                           | CRITICALITY                    | High      |
| EVOLUTION 2010-2016       |                                                                                                                                                                                                                                                                                                                                                                                             |                                |           |
| EVOLUTION OF STAKES       | Not reported                                                                                                                                                                                                                                                                                                                                                                                |                                |           |
| HAZARDS                   | Not reported                                                                                                                                                                                                                                                                                                                                                                                |                                |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY                    | High      |
| EVOLUTION 2016-2020       |                                                                                                                                                                                                                                                                                                                                                                                             |                                |           |
| EVOLUTION OF STAKES       | Oil exploration in the Keta basin.                                                                                                                                                                                                                                                                                                                                                          |                                |           |
| CURRENT PROJECTS          | -                                                                                                                                                                                                                                                                                                                                                                                           |                                |           |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                                                                                          |                                |           |
| HAZARDS                   | -                                                                                                                                                                                                                                                                                                                                                                                           |                                |           |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                                           |                                |           |
| MONITORING                | Regular and intense                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY                    | Very high |



## SUMMARY TABLE

| HABITAT |  |  |  |  |  |  |                                                                                    |                                                                                     |                                                                                     |                                                                                      |                                                                                     |
|---------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| STAKES  | <b>Fishing</b><br>Fishing port<br><small>Fishing areas</small>                    | <b>Rice-growing</b>                                                               | <b>Palm oil</b><br>Palm plantation                                                | <b>Trade</b><br>Commercial port                                                   | <b>Trade+</b><br>Commercial port<br>Airport                                       | <b>Oil &amp; Gas</b><br>Exploration<br>Exploitation                               | <b>Extractive ind.</b><br>Salt, metal-bearing sand,<br>gold                        | <b>Tourism</b>                                                                      | <b>(Tourism)</b><br>Unexploited outstanding<br>areas                                | <b>Biodiversity</b><br>Outstanding areas<br><small>(biodiversity, landscape)</small> |                                                                                     |
| HAZARDS | <b>h</b><br>Soil erosion                                                          | <b>h</b><br>Coastal erosion                                                       | <b>d</b><br>Marine submergence                                                    | <b>c</b><br>Pluvial and/or fluvial flooding                                       |  |  |  |  |  | <b>n</b><br>Industrial risk                                                          |  |

| N°                                                              | REF    | NAME                                    | HABITAT | STAKES      |                     |                                       | HAZARDS | CRITICALITY |      |           | MONITORING |           |                       |   |                       |   |                       |
|-----------------------------------------------------------------|--------|-----------------------------------------|---------|-------------|---------------------|---------------------------------------|---------|-------------|------|-----------|------------|-----------|-----------------------|---|-----------------------|---|-----------------------|
|                                                                 |        |                                         |         |             |                     |                                       |         | 2011        | 2016 | 2020      | 2011       | 2016      | 2020                  |   |                       |   |                       |
| GH1 SANDY TERRACE AND COCONUT GROVE WEST GHANA - IVOIRIAN SIDE  |        |                                         |         |             |                     |                                       |         |             |      |           |            |           |                       |   |                       |   |                       |
| 132                                                             | GH1-a  | Côte d'Ivoire - Bonyere border          |         | Fishing     |                     | (Biodiversity)                        |         | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | → | Watch-keeping         | → | Watch-keeping         |
| 133                                                             | GH1-b  | Bonyere - Ekwe                          |         | Fishing     |                     | Extractive Ind.s Tourism Oil & Gas    |         | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | ↗ | Regular and light     | → | Regular and light     |
| 134                                                             | GH1-c  | Ekwe - Kikam                            |         | Fishing     |                     | Tourism                               |         | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | → | Watch-keeping         | → | Watch-keeping         |
| GH2 CAP DES TROIS POINTES                                       |        |                                         |         |             |                     |                                       |         |             |      |           |            |           |                       |   |                       |   |                       |
| 135                                                             | GH2-a  | Trois Pointes West                      |         | Fishing     |                     | Tourism (Biodiversity)                |         | High        | →    | High      | →          | High      | Watch-keeping         | ↗ | Regular and light     | → | Regular and light     |
| 136                                                             | GH2-b  | Trois Pointes Center                    |         | Fishing     | Agriculture         | Oil & Gas Tourism (Biodiversity)      |         | High        | →    | High      | →          | High      | Watch-keeping         | ↗ | Regular and light     | → | Regular and light     |
| 137                                                             | GH2-c  | Trois Pointes East                      |         | Fishing     |                     | Tourism (Biodiversity)                |         | High        | →    | High      | →          | High      | Watch-keeping         | ↗ | Regular and light     | → | Regular and light     |
| GH3 URBAN SECTOR AND PERI-URBAN EXTENSION OF SEKONDI - TAKORADI |        |                                         |         |             |                     |                                       |         |             |      |           |            |           |                       |   |                       |   |                       |
| 138                                                             | GH3-a  | Apowa - Takoradi                        |         | Fishing     | Agriculture         | Tourism                               |         | Medium      | →    | Medium    | ↗          | High      | Watch-keeping         | → | Watch-keeping         | ↗ | Regular and light     |
| 139                                                             | GH3-b  | Takoradi                                |         | Fishing     | Trade               | Oil & Gas                             |         | Medium      | ↗    | High      | →          | High      | Regular and light     | → | Regular and light     | → | Regular and light     |
| 140                                                             | GH3-c  | Sekondi                                 |         | Fishing     |                     | (Tourism)                             |         | Medium      | →    | Medium    | →          | Medium    | Regular and light     | → | Regular and light     | → | Regular and light     |
| 141                                                             | GH3-d  | Sekondi - Shama                         |         | Fishing     | Thermal power plant | Tourism                               |         | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | ↗ | Regular and light     | ↗ | Regular and intensive |
| GH4 HINTERLAND SHAMA – ELMINA                                   |        |                                         |         |             |                     |                                       |         |             |      |           |            |           |                       |   |                       |   |                       |
| 142                                                             | GH4-a  | Shama - Ankwanda                        |         |             |                     | Tourism (Biodiversity)                |         | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | → | Watch-keeping         | ↗ | Regular and light     |
| GH5 ELMINA URBAN ZONES AND EXTENSIONS – CAPE COAST - SALTPOND   |        |                                         |         |             |                     |                                       |         |             |      |           |            |           |                       |   |                       |   |                       |
| 143                                                             | GH5-a  | Elmina                                  |         | Fishing     |                     | Extractive Ind.s (Tourism)            |         | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | → | Watch-keeping         | ↗ | Regular and light     |
| 144                                                             | GH5-b  | West Cape Coast                         |         | Fishing     |                     | (Tourism)                             |         | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | → | Watch-keeping         | ↗ | Regular and light     |
| 145                                                             | GH5-c  | Cape Coast                              |         | Fishing     |                     | (Tourism)                             |         | Medium      | →    | Medium    | →          | Medium    | Regular and light     | → | Regular and light     | → | Regular and light     |
| 146                                                             | GH5-d  | East Cape Coast                         |         | Fishing     |                     |                                       |         | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | → | Watch-keeping         | → | Watch-keeping         |
| 147                                                             | GH5-e  | Cape Coast Peri-Urban Sector - Saltpond |         | Fishing     |                     | (Tourism)                             |         | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | ↗ | Regular and light     | → | Regular and light     |
| GH6 RURAL HINTERLAND OF CAPE COAST AND ACCRA URBAN ZONES        |        |                                         |         |             |                     |                                       |         |             |      |           |            |           |                       |   |                       |   |                       |
| 148                                                             | GH6-a  | Saltpond - Mlantsiman                   |         | Fishing     |                     | (Biodiversity)                        |         | High        | ↘    | Medium    | →          | Medium    | Regular and light     | → | Regular and light     | → | Regular and light     |
| 149                                                             | GH6-b  | Winneba                                 |         | Fishing     |                     | Biodiversity                          |         | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | → | Watch-keeping         | → | Watch-keeping         |
| GH7 ACCRA WEST URBAN AREA                                       |        |                                         |         |             |                     |                                       |         |             |      |           |            |           |                       |   |                       |   |                       |
| 150                                                             | GH7-a  | Senya - Nyanyano                        |         | Fishing     |                     |                                       |         | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | → | Watch-keeping         | ↗ | Regular and light     |
| 151                                                             | GH7-b  | Nyanyano - Accra West urban zone        |         | Fishing     | Agriculture         | (Tourism)                             |         | Medium      | →    | Medium    | →          | Medium    | Watch-keeping         | ↗ | Regular and light     | → | Regular and light     |
| GH8 ACCRA, URBAN AREA AND EAST PERIPHERY                        |        |                                         |         |             |                     |                                       |         |             |      |           |            |           |                       |   |                       |   |                       |
| 152                                                             | GH8-a  | Accra Densu delta wetland               |         | Fishing     |                     | Extractive Ind.s Tourism Biodiversity |         | High        | →    | High      | →          | High      | Regular and light     | → | Regular and light     | → | Regular and light     |
| 153                                                             | GH8-b  | Accra, Center West                      |         | Fishing     |                     |                                       |         | Very High   | →    | Very High | ↘          | High      | Regular and intensive | → | Regular and intensive | ↘ | Regular and light     |
| 154                                                             | GH8-c  | Accra center                            |         | Fishing     |                     | Tourism                               |         | Very High   | →    | Very High | →          | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| 155                                                             | GH8-d  | Wetland break Tema Ouest - Sakumo       |         |             |                     | Industries Tourism Biodiversity       |         | High        | →    | High      | ↘          | Medium    | Regular and light     | → | Regular and light     | → | Regular and light     |
| 156                                                             | GH8-e  | Tema                                    |         | Fishing     | Trade               |                                       |         | Very High   | →    | Very High | →          | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| 157                                                             | GH8-f  | Prampam                                 |         | Fishing     |                     | Extractive Ind.s (Tourism)            |         | High        | →    | High      | →          | High      | Regular and light     | → | Regular and light     | → | Regular and light     |
| GH9 VOLTA DELTA RIGHT SHORE NINGO - ADAFOAH                     |        |                                         |         |             |                     |                                       |         |             |      |           |            |           |                       |   |                       |   |                       |
| 158                                                             | GH9-a  | New Ningo - Lekpoguno                   |         |             |                     | Extractive Ind.                       |         | Very High   | →    | Very High | ↘          | High      | Regular and intensive | → | Regular and intensive | ↘ | Regular and light     |
| 159                                                             | GH9-b  | Lekpoguno - Akplanbya                   |         |             |                     | Extractive Ind. (Biodiversity)        |         | High        | →    | High      | →          | High      | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| 160                                                             | GH9-c  | Akplanbya - Totopé                      |         |             |                     | Extractive Ind. Biodiversity          |         | Low         | ↗    | High      | →          | High      | Regular and intensive | → | Regular and intensive | ↘ | Regular and light     |
| 161                                                             | GH9-d  | Ada Foah                                |         | Fishing     |                     | Extractive Ind. Tourism Biodiversity  |         | High        | ↗    | Very High | →          | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| GH10 DELTA VOLTA LEFT SHORE                                     |        |                                         |         |             |                     |                                       |         |             |      |           |            |           |                       |   |                       |   |                       |
| 162                                                             | GH10-a | Dzeila - Volta left shore               |         | Aquaculture |                     | Oil & Gas Biodiversity                |         | Very High   | →    | Very High | →          | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| 163                                                             | GH10-b | Keta                                    |         |             |                     | Oil & Gas Biodiversity                |         | Very High   | →    | Very High | →          | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| 164                                                             | GH10-c | Keta - dike                             |         |             |                     | Oil & Gas Biodiversity                |         | Very High   | →    | Very High | →          | Very High | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| 165                                                             | GH10-d | Adina                                   |         |             |                     | Oil & Gas Biodiversity                |         | High        | →    | High      | →          | High      | Regular and intensive | → | Regular and intensive | → | Regular and intensive |
| 166                                                             | GH10-e | East Ghana - Togo border                |         | Fishing     | Agriculture         | Oil & Gas                             |         | High        | →    | High      | ↘          | Medium    | Regular and light     | ↗ | Regular and intensive | ↘ | Regular and light     |



# Togo

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## TG – Togo

«Togo has a total area of about 56,600 km of which nearly 60% is agricultural land (FAOSTAT), and has a population of more than 7.5 million people, 52% of whom live below the poverty line. The reduction in the incidence of poverty among vulnerable groups fell from 61.7% to 53.5% between 2006 and 2017.

Togo's coastline is the ecosystem most vulnerable to climate change and climate variability in the country (NAPA<sup>1</sup> 2009). It is an area that alone covers more than 11% (6,395 km) of the country's surface area. It is estimated that 42% (2010) of the Togolese population lives on the coast, corresponding to the Maritime region, with an estimated population density of 406 people per km<sup>2</sup>. This area is home to the country's main economic infrastructure (industrial zone, port, airport, tourist sites and hotels); resource-based activities, such as coastal fisheries, aquaculture, forestry and agriculture, coexist with transport and industrial activities.

The Maritime Region provides a number of ecosystem goods and services. It is characterized by the presence of ecosystems including mangroves, grasslands and/or river banks, lakes, ponds and lagoons as well as gallery forests. There are also community forests including, among others, local «sacred» forests. These ecosystems provide a wide range of services in Togo, for food resources, coastal protection, tourism and biodiversity. They also provide important natural habitats essential to the maintenance of Togo's coastal zone.

The majority of the coastal communities live mainly from sea fishing, sand and gravel extraction, market gardening, animal husbandry and the collection of firewood and non-timber products (medicinal plants, straw). There is strong pressure for access to fertile land and the size of the average farm unit is less than 2 ha. This leads to overexploitation and degradation of soils and natural habitats, particularly with the impact of climate change leading to more irregular weather events (droughts and floods).

Scenarios predict a substantial loss of land in the coastal zone as well as more frequent flooding and stronger winds, contributing to further destruction of mangroves, increased salinization of waters and land, increased storminess in fishing areas, decreased freshwater supply and a change in composition in nearshore coastal waters (NAPA, 2009). In addition, coastal erosion continues to seriously compromise the country's development.<sup>2</sup>»

The risk of submersion and/or coastal erosion is as follows:

- The entire Togolese coastline is at high risk of submersion. These are linked to the conjunctions of storm surges, heavy rainfall and in the east of Lomé, also continental floods.
- A large part of the Togolese coast is undergoing pronounced erosion east of the port of Lomé. The causes are partly ancient: the Akossombo dam on the Volta and disturbance of the corresponding sediment supply, and the installation of the port infrastructures of Lomé which thwarted the circulation of sediments as a result of the West-East coastal drift.
- West of the port, the east coast is accreting for the same reasons.

There are currently projects focusing on the Togolese coastline and financed by the French Facility for Global Environment (FFEM), the Global Environment Facility (GEF), the Food and Agriculture Organization of the United Nations (FAO), the World Bank, the African Development Bank (AfDB), the Islamic Development Bank (IsDB) and the West African Development Bank (WADB). This is the:

- «Coastal risk monitoring and soft solutions in Benin, Senegal and Togo» project<sup>3</sup> (FFEM)  
This project is structured into four components:

<sup>1</sup> NAPA : National Adaptation Programme of Action.

<sup>2</sup> Excerpt from GEF, 2019. Strengthening resilience to climate change of coastal communities in Togo. 48p.



- ✓ Support to the functioning of MOLOA, its partners and reinforcement of its means;
  - ✓ Production of data related to the understanding of coastal risks and capacity building of MOLOA, its partners and governance bodies ;
  - ✓ Pilot actions for adaptation and reduction of coastal risks (soft methods) ;
  - ✓ Communication, capitalization and scientific exchanges.
- Benin-Togo Multinational Project for the Rehabilitation of the Lomé-Cotonou Road, Transport Facilitation (Phase 2) and Coastal Protection

The objective of this project is to contribute to the strengthening of regional integration and the growth of national and international trade through the improvement of road traffic fluidity and the living conditions of the populations. The aim is also to strengthen the resilience of infrastructure in coastal areas.

The components of this project are:

- ✓ Road works
  - ✓ Coastal protection works
  - ✓ Related facilities and activities in favor of women/young people
  - ✓ Facilitation of transport and transit
  - ✓ Institutional Support and Road Studies
- West Africa Coastal Areas Resilience Investment Project (WACA ResIP)
- The Resilience Investment Project (WACA-ResIP) is carried out within the framework of the West Africa Coastal Areas Management Program (WACA) and led by the six beneficiary countries (Benin, Côte d'Ivoire, Mauritania, Sao Tome and Principe, Senegal and Togo). It is a collective response by these countries to the urgent need to combat the degradation of their coastlines through a regional and integrated approach, with the aim of promoting various measures to combat coastal erosion: dune fixation, restoration of wetlands and mangroves, beach nourishment and the construction of protective structures and dykes.
- The objective of the project is to strengthen the resilience of communities and target areas in coastal zones in six West African countries.
- The components of the project are:
- ✓ Component 1: Regional Integration
  - ✓ Component 2: Policies, Institutions and Support Systems
  - ✓ Component 3: Physical and social investments
  - ✓ Component 4: National Coordination
- Project «Strengthening the Resilience to Climate Change of Coastal Communities in Togo» <sup>4 et 5</sup> (GEF-7, GEF Project ID 10165) for which FAO is the implementing agency<sup>6</sup>.

There are four main objectives for this project under consideration:

- ✓ Integration of climate change adaptation into sectoral policies and programs and capacity building at national and sub-national levels for climate impact and adaptation assessment, monitoring and planning;
- ✓ Integrated coastal management planning to restore degraded ecosystems and improve the livelihoods of coastal communities ;
- ✓ Improvement of production systems through the deployment of adaptation technologies and innovative practices in vulnerable ecosystems ;
- ✓ Monitoring of projects and dissemination of results.

<sup>3</sup> <https://www.ffem.fr/fr/carte-des-projets/suivi-des-risques-cotiers-et-solutions-douces-au-benin-senegal-et-togo>

<sup>4</sup> <https://www.thegef.org/project/strengthening-resilience-climate-change-coastal-communities-togo-0>

<sup>5</sup> [https://www.thegef.org/sites/default/files/web-documents/10165\\_LDCF\\_Togo\\_PIF.pdf](https://www.thegef.org/sites/default/files/web-documents/10165_LDCF_Togo_PIF.pdf)

<sup>6</sup> <http://www.fao.org/3/ca4065fr/CA4065FR.pdf>



| TG1-a                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 167-GHANA BORDER-WEST LOME |        |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |        |
| DIAGNOSTIC                          | Large homogeneous sandy terrace.<br>Dense and diversified urban habitat (residential eastern part) separated by a coastal road very close to the beach (about 100 m and less).<br>The road-beach strip has been the object of a beginning of waterfront development, but this strip is the object of an urban conquest near the border.                                                                                                                                                                                                                                                                                                                                                                                        |                            |        |
| DYNAMICS                            | Numerous signs of sewage outlets on the beach.<br>Probable transfer of pollution to the East via coastal drift.<br>Central and Eastern Lomé Affected sectors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |        |
| STAKES                              | Developments on the upper beach in the vicinity of the border post affecting the accretion which should a priori benefit this sector. Locally stable, erosion observed towards the west in the developed areas on the beach.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |        |
| RECOMMANDATION                      | Control of urbanization on the beach beyond the coastal road.<br>Numerous installations and dwellings threatened in case of storm surge.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY                | Medium |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |        |
| EVOLUTION OF STAKES                 | New buildings near the Ghana border: Togolese customs, Bank of Africa.<br>Beginning of the circular boulevard and the two-lane waterfront boulevard.<br>Presence of rainwater drainage gutters on the boulevard.<br>Presence of two channels to evacuate the overflow of water from the West Lake (Lake Nyekonakpoé).                                                                                                                                                                                                                                                                                                                                                                                                          |                            |        |
| COASTAL PROTECTION                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                            |        |
| HAZARDS                             | Accretion area west of the port.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY                | Medium |
| EVOLUTION OVER THE 2016-2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |        |
| EVOLUTION OF STAKES                 | No major developments to report.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |        |
| CURRENT PROJECTS                    | West Africa Coastal Areas Resilience Investment Project (WACA ResIP). <ul style="list-style-type: none"><li>Component 3: Physical and social investments. Sub-component 3.2: Social climate adaptation and community development projects.<sup>7</sup> Category 4: Pollution control, waste management and the planned relocation process. This category supports household waste collection (with Aného City Council), beach sanitation in Lomé (with ANASAP), wastewater management and all the activities of the planned resettlement process.</li></ul>                                                                                                                                                                    |                            |        |
| OUTSTANDING NATURAL AREAS           | <b>Ramsar Site of the Coastal Wetlands of Togo</b> <ul style="list-style-type: none"><li>ZHII ID : 1TG004-1722 / WDPA ID: 903069</li><li>Affected sectors: TG1</li><li>Designation on 02 April 2008 (591,000 ha - It covers the entire coastline of Togo).</li><li>No map in WDPA.</li></ul> <b>Pipeline Cross-Border Marine Area (proposed)</b> <ul style="list-style-type: none"><li>WDPA ID: nonexistent</li><li>Affected sectors: TG1 / BJ1 and BJ2</li><li>Rules for the management of a buffer zone around the gas pipeline, particularly with regard to navigation and fishing are currently in force in Togo and Benin; a reflection on the advisability of creating an MPA in this zone has been initiated.</li></ul> |                            |        |
| HAZARDS                             | Transfer of the sedimentary transit segment in Ghana to the first two kilometers of the coast of Togo. The coastline dynamics show a slight downward trend. Indeed, 18 groynes were built in Blekusu (locality located between Kéta and Lomé) which created a new segment of erosion whose effects are slightly observed on this sector.                                                                                                                                                                                                                                                                                                                                                                                       |                            |        |
| RECOMMENDATIONS                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                            |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY                | Medium |

<sup>7</sup> <https://vert-togo.com/wp-content/uploads/2020/09/Guide-de-s%C3%A9lection-des-sous-projet-WACA-ResIP.pdf>





| TG1-b                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 168 – CENTRAL LOME |        |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |        |
| DIAGNOSTIC                          | Recent sandy inflow zone isolating an old coastal wetland.<br>Dense urban Habitat.<br>Urban effluent outfalls on the beach (discharge on the beach to be related to the accretion of the area and the burial of the outfall discharging the effluent to the sea).<br>Large market gardening area between the road and the beach.<br>Important subdivision under construction at the top of the beach.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |        |
| DYNAMICS                            | Sector in accretion following the setting up of the installations of the port of Lomé.<br>Beach width from 100 to 300 m.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |        |
| STAKES                              | Future of waterfront urban development.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |        |
| RECOMMANDATION                      | Sanitation and impact of the subdivision under construction on the beach.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY        | Medium |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |        |
| EVOLUTION OF STAKES                 | Two-lane seaside boulevard.<br>Presence of gutters discharging waste water from the embryonic system of all to the sewer of the lower town of Lomé (07 points on the beach of Lomé).<br>Presence of rainwater drainage gutters on the boulevard (9 points)<br>Presence of the East Lake overflow drain (1 point).<br>Construction works: Onomo Hotel, Residence of Coconut Trees, maritime parking, road parking, and housing (in front of ETI's headquarters (ECOBANK group)<br>Works of development/extension of the port have been undertaken by : <ul style="list-style-type: none"><li>Lomé Container Terminal (LCT) from March 2011 to October 2014: creation of the LCT dock, extension of the South Pier, construction of a sand stop dike, 18 m deep and a container terminal.</li><li>Togo Terminal, a subsidiary of Bolloré Africa Logistics: construction of a third quay (450 m long, 15 m deep and 38 ha of storage).</li></ul> Closure of a sand extraction quarry.<br>Gas Pipeline. |                    |        |
| HAZARDS                             | Accretion area west of the port.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |        |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY        | Medium |



## EVOLUTION OVER THE 2016–2020 PERIOD

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |        |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------|
| EVOLUTION OF STAKES       | Finalization of the extension works of the Port of Lomé and commissioning of a container terminal and dock (Lomé Container Terminal – LCT), the third quay and the container terminal (Togo Terminal). Construction and commissioning of the gourmet restaurant (BLUE TURTLE BAY) west of the LCT facilities.<br>Extension of market gardening areas.<br>Development of a recreation area on the beach in front of the former hotel «La Paix».                                                                                                                                                                                                                                                                   |             |        |
| CURRENT PROJECTS          | West Africa Coastal Areas Resilience Investment Project (WACA ResIP). <ul style="list-style-type: none"><li>Component 3: Physical and social investments. Sub-component 3.2: Social climate adaptation and community development projects.<sup>8</sup> Category 4: Pollution control, waste management and the planned relocation process. This category supports household waste collection (with Aného City Council), beach sanitation in Lomé (with ANASAP), wastewater management and all the activities of the planned resettlement process.</li></ul>                                                                                                                                                      |             |        |
| OUTSTANDING NATURAL AREAS | Ramsar Site of the Coastal Wetlands of Togo <ul style="list-style-type: none"><li>ZHII ID : 1TG004-1722 / WDPA ID: 903069</li><li>Affected sectors: TG1</li><li>Designation on 02 April 2008 (591,000 ha – It covers the entire coastline of Togo).</li><li>No map in WDPA.</li></ul> Pipeline Cross-Border Marine Area (proposed) <ul style="list-style-type: none"><li>WDPA ID: nonexistent</li><li>Affected sectors: TG1 / BJ1 and BJ2</li><li>Rules for the management of a buffer zone around the gas pipeline, particularly with regard to navigation and fishing are currently in force in Togo and Benin; a reflection on the advisability of creating an MPA in this zone has been initiated.</li></ul> |             |        |
| HAZARDS                   | Sector in accretion, West of the port ➡. The construction of the 300m sand stop dike as part of the extension of the port consolidates the sedimentation in this sector, which has favoured the installation of the gourmet restaurant (BLUE TURTLE BAY).                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |        |
| RECOMMENDATIONS           | Safeguarding the sea turtle nesting site on the LCT beach.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |        |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY | Medium |

<sup>8</sup> <https://vert-togo.com/wp-content/uploads/2020/09/Guide-de-s%C3%A9lection-des-sous-projet-WACA-ResIP.pdf>



PROTECTION OF THE COAST NEAR THE PORT OF LOMÉ

2009



2019





| TG1-c                               |                                                                                                                                                                                                                                                                                                                                                                                                      | 169 - URBAN LOME EAST PORT |           |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                      |                            |           |
| DIAGNOSTIC                          | Habitat of average standing rather dense until the beach.<br>Diversified urban network: warehouses, residences.<br>Main service off the coast.                                                                                                                                                                                                                                                       |                            |           |
| DYNAMICS                            | Strong erosion weighted, however, by the beachrock released by erosion                                                                                                                                                                                                                                                                                                                               |                            |           |
| STAKES                              | Future control of new installations in the space between the road and the shoreline, with a view to the likely future densification of residential housing.                                                                                                                                                                                                                                          |                            |           |
| RECOMMANDATION                      | Monitoring of the coastline and the state of the beachrock.<br>Anticipation of the current installations in the face of this coastal erosion.<br>Beachrock preservation measures and search for alternatives to the collection of materials.<br>Recommended sector scheme.                                                                                                                           |                            |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY                | Very high |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                      |                            |           |
| EVOLUTION OF STAKES                 | Works of development / extension of the port (LCT dock, third quay and dredging, extension of the South pier), sand stop dike. The Port of Lomé has existed since 1967.<br>Artisanal fishing station.<br>2-lane Boulevard Port-Baguida-Avepozo.<br>National 2 Avepozo-Aneho.<br>New sport and leisure beach site (pure beach and Moevi residence) in Avépozo.<br>Hotel Novela Star.<br>Gas Pipeline. |                            |           |
| HAZARDS                             | Eroding sector East of the port, removal of sand and gravel (alteration of the beachrock).<br>Erosion: 35m setback between February 2014 and March 2015.<br>Beachrock line break.<br>Beach erosion of hotels.<br>Coastal erosion (deposition of building and road rubble on the upper beach at Gbétsogbé).                                                                                           |                            |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY                | Very high |



## EVOLUTION OVER THE 2016–2020 PERIOD

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EVOLUTION OF STAKES       | <p>Construction and commissioning of a fishing port (2017 - 2019).</p> <p>Construction of a rockfill groyne for the protection of the hotel structure (Marcelo Beach).</p> <p>Construction of a 4th Lake in the Lomé lagoon area with an outlet for the discharge of the overflow into the sea.</p> <p>Construction of a groyne for the protection of the 4th lake outlet</p> <p>Construction of 2 groynes and an individual protection wall at PK 15 -16.</p> <p>Construction of an individual protection wall in front of the hotel MABIDA at PK 17.</p> <p>Construction of an Islamic center on the waterfront at PK 22.</p> <p>Construction of a hotel in Agbavi at PK 23 in front of the sea.</p>                                                                 |
| CURRENT PROJECTS          | <p>Lomé-Cotonou Road Rehabilitation (Phase 2) and Coastal Protection (Benin-Togo)<sup>9</sup> Project (African Development Bank Group).</p> <p>The project also includes :</p> <ul style="list-style-type: none"> <li>• Coastal protection works including the construction of 31 groynes and sand nourishment as well as coastal protection studies in Togo and Benin ;</li> <li>• related facilities and activities for youth and women,</li> <li>• transport and transit facilitation measures ;</li> <li>• equipment of the juxtaposed checkpoint, training/awareness of border services and users ;</li> <li>• Implementation of a marine weather early warning system ;</li> <li>• Elaboration of a master plan for the development of the coastline.</li> </ul> |
| OUTSTANDING NATURAL AREAS | <p><b>Ramsar Site of the Coastal Wetlands of Togo</b></p> <ul style="list-style-type: none"> <li>• ZHII ID : 1TG004-1722 / WDPA ID: 903069</li> <li>• Affected sectors: TG1</li> <li>• Designation on 02 April 2008 (591,000 ha - It covers the entire coastline of Togo).</li> <li>• No map in WDPA.</li> </ul> <p><b>Pipeline Cross-Border Marine Area (proposed)</b></p> <ul style="list-style-type: none"> <li>• WDPA ID: nonexistent</li> <li>• Affected sectors: TG1 / BJ1 and BJ2</li> <li>• Rules for the management of a buffer zone around the gas pipeline, particularly with regard to navigation and fishing are currently in force in Togo and Benin; a reflection on the advisability of creating an MPA in this zone has been initiated.</li> </ul>    |
| HAZARDS                   | <p>Very intensive erosion at PK 15 Baguida Beach (12m /year).</p> <p>Erosion and destruction of houses in Agbavi at KP 23 (5m /year).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| RECOMMENDATIONS           | Construction of coastal protection structures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| MONITORING                | <p><b>Regular and intensive</b></p> <p><b>CRITICALITY Very high</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

<sup>9</sup> <https://vert-togo.com/wp-content/uploads/2020/09/Guide-de-s%C3%A9lection-des-sous-projet-WACA-ResIP.pdf>



| TG1-d                               |                                                                                                                                                                                                                                                                                                                                                                                                        | 170-EAST LOME            |  |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                        |                          |  |
| DIAGNOSTIC                          | Homogeneous terrace, habitat in variable densities, very heterogeneous standing, seaside residences, hotels, relics of pending agricultural concessions.<br>Road service away from the coast.                                                                                                                                                                                                          |                          |  |
| DYNAMICS                            | Rectilinear coastline with a very unstable «wavy» tendency, locally subject to strong erosion (East cell of the port of Lomé). The clearing, by erosion of the beachrock, made it possible to relatively stabilize the shoreline.                                                                                                                                                                      |                          |  |
| STAKES                              | In the long term: urban coherence of the green waterfront type avoiding coastal roads too close to the shore.<br>High risk of continental flooding.                                                                                                                                                                                                                                                    |                          |  |
| RECOMMANDATION                      | Avoid the construction of residences and hotels too close to the beaches.<br>Preservation of the remaining agricultural green cuts.<br>Monitoring of the coastline and the state of the beachrock.<br>Beachrock preservation measures and search for alternative activities to the collection of materials.<br>Setting up of a sector plan framing the peri-urban residential and tourist development. |                          |  |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY    High      |  |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                        |                          |  |
| EVOLUTION OF STAKES                 | Gas Pipeline.                                                                                                                                                                                                                                                                                                                                                                                          |                          |  |
| HAZARDS                             | Eroding sector East of the port, removal of sand and gravel (alteration of the beachrock).<br>Coastal erosion between Afiagégɲigba-Gbodjomé-Agbodrafo (destruction of houses and recreation sites, loss of rural land).                                                                                                                                                                                |                          |  |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY    Very high |  |





| EVOLUTION OVER THE 2016–2020 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| EVOLUTION OF STAKES                 | <p>Openings of some leisure places in front of the sea.</p> <p>Construction of 13m long walls and a protective groyne (approx. 30m long) consisting of sand-filled nozzles in Kpaglipouta (Gbodjomé) at PK 25–26.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
| CURRENT PROJECTS                    | <p>Lomé–Cotonou Road Rehabilitation (Phase 2) and Coastal Protection (Benin-Togo)<sup>10</sup> Project (African Development Bank Group).</p> <p>The project also includes :</p> <ul style="list-style-type: none"> <li>• Coastal protection works including the construction of 31 groynes and sand nourishment as well as coastal protection studies in Togo and Benin,</li> <li>• related facilities and activities for youth and women,</li> <li>• transport and transit facilitation measures,</li> <li>• Equipment of the juxtaposed checkpoint, training/awareness of border services and users,</li> <li>• Implementation of a marine weather early warning system</li> <li>• Development of a master plan for coastal development</li> </ul> <p>West Africa Coastal Areas Resilience Investment Project (WACA ResIP).</p> <ul style="list-style-type: none"> <li>• Feasibility study for the protection of the cross-border coastal segment Gbodjomé to Grand popo<sup>11</sup></li> <li>• Scaling up of nozzle technology on the Gbodjomé sector in Agbodrafo</li> </ul> <p>West Africa Coastal Areas Resilience Investment Project for Adaptation to Climate Change (WACA ResIP-CCA) under development for submission to the Green Climate Fund</p> <ul style="list-style-type: none"> <li>• Conducted pre-feasibility study of climate change resilience of the Gbodjomé sector in Agbodrafo</li> </ul> <p>«Coastal risk monitoring and soft solutions in Benin, Senegal and Togo» project (FFEM). This project is structured into four components:</p> <ul style="list-style-type: none"> <li>• Support to the functioning of MOLOA, its partners and reinforcement of its means;</li> <li>• Production of data related to the understanding of coastal risks and capacity building of MOLOA, its partners and governance bodies ;</li> <li>• Pilot actions for adaptation and reduction of coastal risks (soft methods) ;</li> <li>• Communication, capitalization and scientific exchanges.</li> </ul> <p>Marine aquaculture project being formulated for cage culture.</p> |                       |
| OUTSTANDING NATURAL AREAS           | <p>Ramsar Site of the Coastal Wetlands of Togo</p> <ul style="list-style-type: none"> <li>• ZHII ID : 1TG004-1722 / WDPA ID: 903069</li> <li>• Affected sectors: TG1</li> <li>• Designation on 02 April 2008 (591,000 ha – It covers the entire coastline of Togo).</li> <li>• No map in WDPA.</li> </ul> <p>Pipeline Cross-Border Marine Area (proposed)</p> <ul style="list-style-type: none"> <li>• WDPA ID: nonexistent</li> <li>• Affected sectors: TG1 / BJ1 and BJ2</li> <li>• Rules for the management of a buffer zone around the gas pipeline, particularly with regard to navigation and fishing are currently in force in Togo and Benin; a reflection on the advisability of creating an MPA in this zone has been initiated.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
| HAZARDS                             | Intense and continuous erosion (3 to 5 m / year).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
| RECOMMENDATIONS                     | Construction of coastal protection structures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY Very high |

<sup>10</sup> <https://projectsportal.afdb.org/dataportal/VProject/show/P-Z1-DB0-174?lang=fr>

<sup>11</sup> <https://www.republiquetogolaise.com/gouvernance-economique/0110-2325-lutte-contre-lerosion-cotiere-le-togo-et-le-benin-ont-signé-un-protocole-daccord>



PORT OF LOMÉ EAST

2016



2020







| TG1-e                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 171-TOGOVILLE-AGBODRAFO-ANEHO |           |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                               |           |
| DIAGNOSTIC                          | Sandy shoreline limited to the East by the mouth of the Lake Togo outlet and to the North by the channel outlet of the lake. Low elevation. This sector is located within the morphodynamic cell of erosion, which extends from the east of the port of Lomé.<br>Housing in varying densities from rural areas to the urban center of Aného.<br>The whole complex is subject to heavy metal pollution linked to mining waste from the Kpémé phosphate mining operation.                                       |                               |           |
| DYNAMICS                            | Very high instability at the Aného lagoon outlet. Strong erosion has been observed throughout the sector since the 1980s (shoreline retreat of 6 to 8m/year). Improvements have been made, which for the time being allow to stabilize the situation. However, these groynes are rapidly deteriorating.<br>Between the two protection systems of Kpémé-Gumukopé and Aného, there is a small cell in rapid erosion, with an estimated retreat between 1988 and 2008 of about 100m by 600m, on average 5m/year. |                               |           |
| STAKES                              | High risks of destabilization of the wharf unit and the infrastructures of the Société Nationale des Phosphates plant with significant economic impacts. Environmental impacts of this phosphate concentration plant (Kpémé).<br>Strong threats for the few populations settled on the sandy spit east of Aného. High risk of continental flooding.                                                                                                                                                           |                               |           |
| RECOMMANDATION                      | Follow-up and possible reinforcement of the Kpémé and Aného developments.<br>Proactive limitation of constructions within 200 m of the shoreline.<br>Preservation, or even restoration, of the natural vegetal formations of the banks of the mouth and relics of mangroves.                                                                                                                                                                                                                                  |                               |           |
| MONITORING                          | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY                   | Medium    |
| EVOLUTION OVER THE 2010-2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                               |           |
| EVOLUTION OF STAKES                 | New urban road in Aného.<br>New bridge.<br>Gas Pipeline.<br>Kpémé wharf.<br>Maritime parking defined by the French Navy.                                                                                                                                                                                                                                                                                                                                                                                      |                               |           |
| PORT INFRASTRUCTURE                 | The Kpémé Terminal belongs to the state-owned company Société Nouvelle des Phosphates du Togo (SNPT) which was created following the dissolution in 2007 of the Togolese Phosphates Bureau and International Fertilizers Group-TOGO (IFG-TG). It is directly related to the phosphate mines of Hahotoe (Dagbati) and Kpogame.<br>A phosphate processing plant and the administrative services of the SNPT are in Kpémé.                                                                                       |                               |           |
| COASTAL PROTECTIONS                 | 6 groynes to the east of the Kpémé terminal and 1 to the west built before 2010.<br>9 new groyne00s in front of the village of Gumukopé.<br>Installation of protective structures (5 groynes) at Aného, 1,500m west of the old structures built in 1985. The start of coastal protection work in the immediate vicinity has prompted a reaction from the Beninese government, and a consultation and coordination mechanism has been put in place.                                                            |                               |           |
| HAZARDS                             | Sector in strong erosion with retreat speeds varying over the 2010-2014 period between 5 and 20 m / year.<br>Displacement of the baymouth bar, erosion, sediment transport to Benin.<br>Breach of the baymouth bar (sandy barrier, lamination and lowering of the topographic level).                                                                                                                                                                                                                         |                               |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY                   | Very high |



## EVOLUTION OVER THE 2016–2020 PERIOD

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EVOLUTION OF STAKES       | <p>Stabilization of the coastline in the right-of-way of the 9 new groynes in 2013 (Pk 40) up to the last groyne at the mouth of the lagoon (Pk 48).</p> <p>Experimentation of sea salt exploitation in Aného (on a very small scale).</p> <p>Development of the juxtaposed border post (Togo-Benin) 400m north of the coastline (Pk48).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| CURRENT PROJECTS          | <p>«Support Program for the Preservation of Biodiversity and Fragile Ecosystems, Regional Governance and Climate Change in West Africa – PAPBio» (ROC/FED/039-269) officially launched on July 25, 2019. Within the framework of this program, several projects are being implemented including the «Regional Project for the Strengthening of Mangrove Ecosystems» (EU, ECOWAS and WAEMU, 11th EDF)<sup>12</sup> which aims at enhancing the protection status of mangrove areas and creating income-generating activities in 9 coastal countries of the West African sub-region. This project is currently in the diagnostic phase. Benin-Togo Multinational Project for the Rehabilitation of the Lomé-Cotonou Road, Transport Facilitation (Phase 1) which, in this sector, provides for</p> <ul style="list-style-type: none"> <li>• The construction of the juxtaposed control station</li> </ul> <p>Benin-Togo Multinational Project for the Rehabilitation of the Lomé-Cotonou Road, Transport Facilitation (Phase 2) and Coastal Protection</p> <p>West Africa Coastal Areas Resilience Investment Project – WACA ResIP<sup>13</sup> (World Bank Group) :</p> <ul style="list-style-type: none"> <li>• Reduction of coastal risks in the transboundary zone between Benin and Togo.</li> <li>• Rehabilitation of the Gbaga Channel – Dredging.</li> <li>• Rehabilitation of the Gbaga Channel – Rehabilitation of the banks.</li> <li>• Flood control – Lake Togo / Aného Lagoon.</li> <li>• Implementation of watershed co-management plans.</li> </ul> <p>The « "Soft Solutions and Coastal Risk Monitoring in Benin, Senegal and Togo" project »<sup>14</sup> – Implementation of a panel of soft solutions between the villages of Agbodrafo and Gbodjomé (FFEM). Mangrove restoration and management.</p> |
| OUTSTANDING NATURAL AREAS | <p>Ramsar Site of the Coastal Wetlands of Togo</p> <ul style="list-style-type: none"> <li>• ZHII ID : 1TG004-1722 / WDPA ID: 903069</li> <li>• Affected sectors: TG1</li> <li>• Designation on 02 April 2008 (591,000 ha – It covers the entire coastline of Togo).</li> <li>• No map in WDPA.</li> </ul> <p>Pipeline Cross-Border Marine Area (proposed)</p> <ul style="list-style-type: none"> <li>• WDPA ID: nonexistent</li> <li>• Affected sectors: TG1 / BJ1 and BJ2</li> <li>• Rules for the management of a buffer zone around the gas pipeline, particularly with regard to navigation and fishing are currently in force in Togo and Benin; a reflection on the advisability of creating an MPA in this zone has been initiated.</li> </ul> <p>Mono Delta Transboundary Biosphere Reserve (proposed)</p> <ul style="list-style-type: none"> <li>• WDPA ID: nonexistent</li> <li>• Affected sectors: TG1-e / BJ1-a / BJ1-b</li> <li>• A project supported by the GIZ is currently enabling Togo and Benin to consider including the Mono Delta in the UNESCO World Network of Biosphere Reserves before 2019. It has a simplified management plan drawn up in September 2016.</li> </ul> <p>Gbaga Channel Transboundary Ramsar Site (proposed)</p> <ul style="list-style-type: none"> <li>• WDPA ID: nonexistent</li> <li>• Affected sectors: TG1-e / BJ1-a</li> <li>• An initiative to include the Gbaga Channel in the network of Wetlands of International Importance was initiated in 2014 with the elaboration of the first version of Ramsar information sheets for the Togolese and Beninese parts of the site.</li> </ul>                                                                                                                                                                              |
| HAZARDS                   | <p>Displacement of the baymouth bar: very strong erosion, sediment transport to Benin.</p> <p>Breach of the baymouth bar (sandy barrier, lamination and lowering of the topographic level).</p> <p>Exhumation of a beachrock line.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| RECOMMENDATIONS           | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| MONITORING                | <p><b>Regular and intensive</b></p> <p><b>CRITICALITY Very high</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

<sup>12</sup> <https://www.iucn.org/fr/news/afrique-centrale-et-occidentale/201910/un-projet-regional-pour-le-renforcement-des-ecosystemes-de-mangroves>

<sup>13</sup> <https://www.wacaprogram.org/>

<sup>14</sup> <https://www.ffem.fr/fr/carte-des-projets/suivi-des-risques-cotiers-et-solutions-douces-au-benin-senegal-et-togo>



EVOLUTION OF THE COASTLINE WEST OF THE KPÉMÉ TERMINAL BETWEEN 2002 AND 2020

2002



2015



2018



2020





## SUMMARY TABLE

| HABITAT |  |  |  |  |  |  |                                                                                    |                                                                                     |                                                                                       |                                            |                                                                                     |
|---------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
| STAKES  | <b>Fishing</b><br><small>Fishing port<br/>(Lagoon areas)</small>                  | <b>Rice-growing</b>                                                               | <b>Palm oil</b><br><small>Palm plantation</small>                                 | <b>Trade</b><br><small>Commercial port</small>                                    | <b>Trade+</b><br><small>Commercial port<br/>Airport</small>                       | <b>Oil &amp; Gas</b><br><small>Exploration<br/>Exploitation</small>               | <b>Extractive ind.</b><br><small>Salt, metal-bearing sand,<br/>gold</small>        | <b>Tourism</b><br><small>(Tourism)<br/>Unexploited outstanding<br/>areas</small>    | <b>Biodiversity</b><br><small>Outstanding areas<br/>(biodiversity, landscape)</small> |                                            |                                                                                     |
| HAZARDS | <b>h</b><br><small>Soil erosion</small>                                           | <b>h</b><br><small>Coastal erosion</small>                                        | <b>d</b><br><small>Marine submersion</small>                                      | <b>c</b><br><small>Pluvial and/or fluvial flooding</small>                        |  |  |  |  |    | <b>n</b><br><small>Industrial risk</small> |  |

| N°       | REF   | NAME                          | HABITAT | STAKES                   |           |                           |       | HAZARDS                         | CRITICALITY                                                      |                                                                              |                                                                  | MONITORING |      |      |
|----------|-------|-------------------------------|---------|--------------------------|-----------|---------------------------|-------|---------------------------------|------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------|------------|------|------|
|          |       |                               |         |                          |           |                           |       |                                 | 2011                                                             | 2016                                                                         | 2020                                                             | 2011       | 2016 | 2020 |
| TG1 TOGO |       |                               |         |                          |           |                           |       |                                 |                                                                  |                                                                              |                                                                  |            |      |      |
| 167      | TG1-a | Ghana - Lomé West Border      |         | Fishing                  | Oil & Gas | Biodiversity              | h<br> | Medium → Medium → <b>Medium</b> | Regular and light → Regular and light → <b>Regular and light</b> |                                                                              |                                                                  |            |      |      |
| 168      | TG1-b | Lomé center                   |         | Fishing Market-Gardening | Trade     | Oil & Gas                 |       | Tourism                         | Biodiversity                                                     | Medium → Medium → <b>Medium</b>                                              | Regular and light → Regular and light → <b>Regular and light</b> |            |      |      |
| 169      | TG1-c | urban Lomé - East port        |         | Fishing                  | Oil & Gas | Tourism                   |       | Biodiversity                    | Very High → Very High → <b>Very High</b>                         | Regular and intensive → Regular and intensive → <b>Regular and intensive</b> |                                                                  |            |      |      |
| 170      | TG1-d | East Lomé                     |         | Fishing                  | Oil & Gas | (Tourism)                 |       | Biodiversity                    | High →  Very High → <b>Very High</b>                             | Regular and intensive → Regular and intensive → <b>Regular and intensive</b> |                                                                  |            |      |      |
| 171      | TG1-e | Togoville - Agbodrafo - Aného |         | Fishing                  | Trade     | Extractive Ind. Oil & Gas |       | Biodiversity                    | Very High → Very High → <b>Very High</b>                         | Regular and intensive → Regular and intensive → <b>Regular and intensive</b> |                                                                  |            |      |      |



# Benin

## CONTRIBUTORS

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## BJ – Benin

The coastal zone consists of gently sloping sandy beaches with mudflats and shallow lagoons. The areas to the west include the Grand Popo lagoon, separated by a few dozen meters from the ocean, and thus one of the hot spots of erosion. The coastal area around Cotonou reflects the dominant movement of sand from west to east, visibly creating a sand accumulation west of the port and erosion to the east. The city of Cotonou itself is very prone to flooding due to poor drainage and land subsidence. The loss of natural habitats on the coast leads to a loss of biodiversity and natural services such as wetlands for flood control, recreation and tourism or, in the case of mangroves, protection against coastal erosion.

Benin's coastal waters are crossed by the West African Gas Pipeline from Nigeria to Takoradi in Ghana. The issue of transboundary management of coastline dynamics between Togo and Benin is also an important topic, given the extreme sensitivity of the coastal systems from Aného in Togo to Grand Popo in Benin, and the implications of coastline mobility that need to be assessed in a concerted manner.

Harmonization is under way with regard to the zoning and sectorization of the Beninese coastline. The boundaries of the sectors will remain identical, but the large zones defined in the SDLAO will be harmonized with the nomenclature used in Benin and derived from the Coastal Area Development Master Plan: West Zone (BJ1-a and BJ1-b), Central-West Zone (BJ1c and BJ2a), Central-East Zone (BJ2-b, BJ2-c and BJ2-d) and East Zone (BJ2-e).



## BJ1

## WEST ZONE

| BJ1-a                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 172 - TOGO BORDER - GRAND POPO |           |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                |           |
| DIAGNOSTIC                          | Narrow terraces in an almost insular position bordered by continuous lagoons and channels.<br>Densely occupied Coconut Grove in small islands separated by strips of less dense habitat.<br>Asphalt road axially away from the beach, but locally too close.                                                                                                                                                                                                                                                                                                                                                   |                                |           |
| DYNAMICS                            | Very unstable and dynamic sandy beaches and formations<br>Formation of bars on the foreshore and splitting of the cord.<br>Up to Grand Popo: This dynamically balanced zone is subject to average seasonal fluctuations of about 25 meters. This value can reach 60 meters in case of an exceptional storm. Real erosion trends are being felt in some areas.<br>From Grand Popo to the border: this portion of the coastline has experienced strong erosion in the past, then a trend towards fattening between 1985 and 1990 and then a trend towards a dynamic equilibrium since this period <sup>1</sup> . |                                |           |
| STAKES                              | Safety of the populations almost settled on the beach.<br>Densification of predictable occupancy with corresponding stakes.<br>Buildings, infrastructure and populations of the Grand Popo site exposed in the long term.<br>Some road sections too close to the beaches.                                                                                                                                                                                                                                                                                                                                      |                                |           |
| RECOMMANDATION                      | Monitoring the evolution of the coastal system.<br>Location set back from the beach of new constructions to be limited.<br>Flood/marine submersion risk prevention plan to be established.<br>Preservation of natural areas behind the channels parallel to the coast.                                                                                                                                                                                                                                                                                                                                         |                                |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY                    | Very high |
| EVOLUTION OVER THE PERIOD 2010-2016 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                |           |
| EVOLUTION OF STAKES                 | Rehabilitation of the Cotonou - Hillacondji inter-state national road.<br>Construction of a parking lot on the beach.<br>Millennium Popo Beach Hotel (4), from GANNA High standing hotel in Grand Popo.<br>Gas pipeline.<br>Important development of market gardening.                                                                                                                                                                                                                                                                                                                                         |                                |           |
| COASTAL PROTECTION                  | Start-up phase of a coast protection with flexible options.<br>Environmental and social impact studies are underway so that the Agbodrafo (Togo) and Grand Popo (Benin) areas can be protected simultaneously and in an integrated manner.                                                                                                                                                                                                                                                                                                                                                                     |                                |           |
| HAZARDS                             | Intensification of the erosion phenomenon affecting Hillacondji and Agoué (10 to 14m per year), in a zone considered as a strip of land between the sea and the border of Togo and threatening the road infrastructure and then the phenomenon of dynamic equilibrium between Agoué and Grand-Popo.                                                                                                                                                                                                                                                                                                            |                                |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY                    | Very high |

<sup>1</sup> NUEMOA, IUCN, 2010. Coastal Monitoring Study and West Africa Coastal Areas Master Plan. National diagnosis in Benin. 77 p.





## EVOLUTION OVER THE PERIOD 2016–2020

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EVOLUTION OF STAKES       | <p>Construction of a parking lot on the beach.</p> <p>Important development of market gardening.</p> <p>Construction of the checkpoint juxtaposed at the Hillacondji – Sanvee-Codji border.</p> <p>WACA-Benin carried out the emergency works for the beach stabilization in Gbèkon.</p> <p>Realization of the works to open the mouth of the Mono River (la bouche du Roy) by WACA-Benin.</p> <p>Construction of tourist and unauthorized fishing camps (anarchic installations of the populations).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| CURRENT PROJECTS          | <p>West Africa Coastal Areas Resilience Investment Project – WACA ResIP<sup>2</sup> (World Bank Group).</p> <ul style="list-style-type: none"> <li>• Reduction of coastal risks in the cross-border zone between Benin and Togo ;</li> <li>• Reduction of coastal risks on the Gbèkon site;</li> <li>• Participatory management of the mouth of the Mono River (la Bouche du Roy) ;</li> <li>• Technical investments in the Mono Biosphere Reserve for the reduction of coastal risks: Restoration, rehabilitation and development of the Gbaga channel, Restoration and development of specific sites, Management of invasive plants, Vegetation of riverbanks and restoration of degraded mangrove formations ;</li> <li>• Implementation of the ACCB management plans: of (i) Vodountô, (ii) Togbin-Adounko, (iii) Chenal Gbaga, (iv) Djègbadji-Avlékété, (v) Bouche du Roy, (vi) Lac Toho, (vii) Naglanou Forest, and (viii) Adjamé.</li> </ul> <p>«Support Program for the Preservation of Biodiversity and Fragile Ecosystems, Environmental Governance and Climate Change in West Africa – PAPBio» (ROC/FED/039-269) officially launched on July 25, 2019. Within the framework of this program, several projects have been carried out, including the «regional project for the strengthening of mangrove ecosystems» (EU, ECOWAS and WAEMU, 11th EDF)<sup>3</sup> which is in the diagnostic phase. This project aims at strengthening the protection status of mangrove areas and creating income-generating activities in 9 coastal countries of the West African sub-region.</p> |
| OUTSTANDING NATURAL AREAS | <p><b>Lower Couffo Valley Ramsar Site, Coastal Lagoon, Chenal Aho, Lac Ahémé</b></p> <ul style="list-style-type: none"> <li>• ZHII ID : 1BJ001 – 1017 / WDPA ID : 220056</li> <li>• RSIS : 1017</li> <li>• Area extending over sectors BJ1-a, BJ1-b, BJ2-a and BJ2-b</li> <li>• Designation on January 20, 2001 (47,500 ha)</li> <li>• Boundaries are not available in WDPA.</li> </ul> <p><b>Mono Delta Transboundary Biosphere Reserve (TBR) (proposed)</b></p> <ul style="list-style-type: none"> <li>• WDPA ID: non-existent</li> <li>• Area extending over the TG1-e, BJ1-a and BJ1-b sectors</li> <li>• A project supported by the GIZ is currently enabling Togo and Benin to consider including the Mono Delta in the UNESCO World Network of Biosphere Reserves before 2019.</li> <li>• It has a simplified management plan drawn up in September 2016.</li> </ul> <p><b>Gbaga Channel Transboundary Ramsar Site (proposed)</b></p> <ul style="list-style-type: none"> <li>• WDPA ID: non-existent</li> <li>• Area extending over the TG1-e and BJ1-a sectors</li> <li>• An initiative to include the Gbaga Channel in the network of Wetlands of International Importance was initiated in 2014 with the elaboration of the first version of Ramsar Information Sheets for the Togolese and Beninese parts of the site.</li> </ul>                                                                                                                                                                                                                                                 |
| HAZARDS                   | <p>Intensification of the erosion phenomenon affecting the coastal subsector Hillacondji and Agoué (10 to 15 m/year), migration of the mouth of la Bouche du Roy (13 m/year), threaten the road infrastructure then the phenomenon of dynamic balance between Agoué and Grand-Popo.</p> <p>Threat of erosion of the 23 km strip of land stuck between the river and the ocean</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| RECOMMENDATIONS           | <p>Monitoring the dynamics of the coastline and raising public awareness.</p> <p>Construction of coastal protection infrastructure and stabilization of the southern bank of the Mono River at Gbèkon and the migration from the mouth to Avlo-plage (historical position).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| MONITORING                | <p><b>Regular and intensive</b></p> <p><b>CRITICALITY Very high</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

<sup>2</sup> <https://www.wacaprogram.org/>

<sup>3</sup> <https://www.iucn.org/fr/news/afrique-centrale-et-occidentale/201910/un-projet-regional-pour-le-renforcement-des-ecosystemes-de-mangroves>



AGOUE<sup>4</sup>

Century-old filao trees fallen after a rainy night



A well now exposed to the waves because the house in which it used to be is destroyed.



One of the four sides of the walls of one of the houses ravaged by the sea



Wall sections of houses ravaged by the sea

<sup>4</sup> Photographs taken from <https://amevi.mondoblog.org/2017/06/13/agoue-disparition-programmee/>



| BJ1-b                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 173 – ESTUARINE LAGOONS OF MONO AND COUFFO |           |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-----------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                            |           |
| DIAGNOSTIC                          | Vast complex of channels, lagoons, wetlands, freshwater and brackish water environments.<br>Connected water systems during the Mono and Couffo flood season.<br>Locally very narrow coastline, interrupted at two points, final outlet of the Couffo and its lagoons.<br>Locally high-risk rural habitat.<br>The dynamics of the mouth known as the «Bouche du Roy» was strongly affected by the construction of the Nangbeto dam on the Mono in 1987.                                                                                                                                                                                             |                                            |           |
| DYNAMICS                            | Sector quite unstable in fluvio-marine dynamics:<br>At the mouth of the Mono River called «La Bouche du Roy», the river's outlet to the sea has undergone complex morphological changes and moves over more than ten kilometers between Avlo and Djondji.<br>The situation has greatly deteriorated since 1990 with the operation of the Nangbeto dam and strong erosions have developed during the flood period; they have swept away several houses and installations. In August 1999, the village of Djondji was hit after the sinking of the village of Docloboé in previous years. This deterioration has continued since 2000 <sup>5</sup> . |                                            |           |
| STAKES                              | High risks (flood-submersion) for the few small villages. Important node of the coastal fluvio-marine system of undeniable biological interest.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                            |           |
| RECOMMANDATION                      | Monitoring the evolution of the river-marine coastal system.<br>Securing populations and habitats at risk (risk of submersion / flooding of continental waters and storm surges – conjunction of both) and absolute limitation of any installation in dynamic areas.<br>Measures for the preservation and conservation of this unique set of wetlands.                                                                                                                                                                                                                                                                                             |                                            |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY                                | Very high |
| EVOLUTION OVER THE 2010–2016 PERIOD |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                            |           |
| EVOLUTION OF STAKES                 | Rehabilitation of National Road 1 Hillacondji – Cotonou.<br>Gas Pipeline.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                            |           |
| COASTAL PROTECTION                  | Periodic opening of the mouth of the Bouche du Roy on the Mono River by the government.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                            |           |
| HAZARDS                             | Continuation of the morphodynamic evolution due to the mobility of the mouth (Bouche du Roy).<br>Periodic flooding due to the combination of marine submersion and rising water levels in the coastal lagoon of Grand Popo.                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY                                | Very high |

<sup>5</sup> WAEMU, 2010. Coastal Monitoring Study and West Africa Coastal Areas Master Plan. Case Study in Benin: Benin's Beaches in the Gulf of Guinea: Socio-Economic Developments and Consequences. 57p.



## EVOLUTION OVER THE 2016–2020 PERIOD

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| EVOLUTION OF STAKES       | <p>Closure of the mouth of the Mono River: risk of flooding due to the hydrological modifications of the lagoon system and the morphology of the mouth of the Mono River.</p> <p>Realization of the works to open the mouth of the Bouche du Roy of the Mono River by the WACA-Benin project.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |
| CURRENT PROJECTS          | <p>West Africa Coastal Areas Resilience Investment Project – WACA ResIP<sup>6</sup> (World Bank Group).</p> <ul style="list-style-type: none"> <li>• Avlo Zone – Management of the mouth of the Mono River "Bouche du Roy".</li> <li>• Implementation of the ACCB management plans: of (i) Vodountô, (ii) Togbin-Adounko, (iii) Chenal Gbaga, (iv) Djègbadji-Avlékété, (v) Bouche du Roy, (vi) Lac Toho, (vii) Naglanou Forest, and (viii) Adjamé.</li> <li>• Avlo Zone – Reduction of exposure and CRITICITY of the populations of the villages of Hokoué and Docloboé.</li> </ul> <p>Coastal risk monitoring and soft solutions in Benin, Senegal and Togo<sup>7</sup> (FFEM) – Soft solutions for development and adaptation to coastal risks in the Mono River mouth sector.</p> <p>Income-generating activities for the conservation of natural resources at Ramsar site 1017</p>                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |
| OUTSTANDING NATURAL AREAS | <p><b>Lower Couffo Valley Ramsar Site, Coastal Lagoon, Chenal Aho, Lac Ahémé</b></p> <ul style="list-style-type: none"> <li>• ZHII ID : 1BJ001 – 1017 / WDPA ID : 220056</li> <li>• RSIS : 1017</li> <li>• Area extending over sectors BJ1-a, BJ1-b, BJ2-a and BJ2-b</li> <li>• Designation on January 20, 2001 (47,500 ha)</li> <li>• Boundaries are not available in WDPA.</li> </ul> <p><b>Mono Delta Transboundary Biosphere Reserve (TBR) (proposed)</b></p> <ul style="list-style-type: none"> <li>• WDPA ID: non-existent</li> <li>• Affected sectors: TG1-e, BJ1-a and BJ1-b</li> <li>• A project supported by the GIZ is currently enabling Togo and Benin to consider including the Mono Delta in the UNESCO World Network of Biosphere Reserves before 2019.</li> <li>• It has a simplified management plan drawn up in September 2016.</li> </ul> <p><b>Gbaga Channel Transboundary Ramsar Site (proposed)</b></p> <ul style="list-style-type: none"> <li>• WDPA ID: non-existent</li> <li>• Affected sectors: TG1-e, BJ1-a</li> <li>• An initiative to include the Gbaga Channel in the network of Wetlands of International Importance was initiated in 2014 with the elaboration of the first version of Ramsar Information Sheets for the Togolese and Beninese parts of the site.</li> </ul> |                       |
| HAZARDS                   | <p>Erosion pockets.</p> <p>Periodic flooding due to the combination of marine submersion and rising water levels in the coastal lagoon of Grand Popo.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
| RECOMMENDATIONS           | <p>Monitoring of the hydrological evolution of the lagoon system, to warn decision makers through an early warning system (control of the opening levels of the lagoon mouth and the elevation of the lagoon waters).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CRITICALITY Very high |

<sup>6</sup> <https://www.wacaprogram.org/>

<sup>7</sup> <https://www.ffem.fr/fr/carte-des-projets/suivi-des-risques-cotiers-et-solutions-douces-au-benin-senegal-et-togo>



MONO AND KOUFFO ESTUARINE LAGOONS

2006



2015



2016



2020





## BJ2

## CENTRAL WEST ZONE

| BJ2-a           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 174-WEST OUIDAH-COTONOU |  |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--|
| BASELINE - 2010 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                         |  |
| DIAGNOSTIC      | Relatively homogeneous sector.<br>Sandy terrace bordered on the mainland side by a network of lagoons and channels almost connected, but with few intermediate channels between this network and the coastline.<br>Land use dominated by coconut palms, interspersed food crops type small/medium properties with «large huts».<br>Residential housing on the seafront on the approach to Cotonou. Suitable land. Registered plots?<br>Coastal track whose route approaches the beach (sometimes about 100 m).<br>Precarious habitats in segments or even plots that are interspersed between the track and the beach.<br>Ouidah wetlands to be preserved in association with the classified historical site.                                                                                                                                                                                                                                                                                                          |                         |  |
| DYNAMICS        | Homogeneous coastline, longitudinal, rectilinear profile, tendency to slight undulations near Cotonou reflecting the presence of waves of «sedimentary trains» along the coastal line.<br>Alternating areas of low erosion and progradation. Presence of foreshore bars.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                         |  |
| STAKES          | In the medium term, support and supervision of the development of a residential and tourist area West Cotonou which will require : <ul style="list-style-type: none"><li>• The definition and delimitation of an unsafe and inequitable coastal strip (road and habitat).</li><li>• The decline in the most exposed road segments.</li><li>• Removal of beachfront habitat at greater depth.</li></ul> The probable densification of the western peri-urban area of Cotonou into a residential area should be accompanied.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                         |  |
| RECOMMANDATION  | Area of concerted development, and implementation of a sector plan that can carry structured development parties by the establishment of a new and secure road or track more than 500 m from the beach equipped with antennas to the beach, which will be a powerful engine of densification. In this scenario, the old track would be abandoned.<br>This device can propose a natural waterfront (mainly coconut plantations?), leaving space for a possible evolution of the coastline. The supervision of the preservation of the Ouidah wetlands should allow a better valorization of these spaces inseparable from the historic site.<br>Such an operation would require expropriations and land consolidation for the removal of existing beach facilities to the mainland side of the road. This operation will result in a strong land impact (winners and losers in terms of property and land values).<br>Supervision and formalization of the preservation of the wetlands and maritime marshes of Ouidah. |                         |  |
| MONITORING      | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CRITICALITY High        |  |

**EVOLUTION OVER THE PERIOD 2010–2016**

|                     |                                                                                                                                                                                                                                                                                     |                         |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| EVOLUTION OF STAKES | Ouidah – Cotonou Highway.<br>West African Gas Pipeline entry Point.<br>Start of the Fishing Road project.<br>Rehabilitation of the RNIE1 Cotonou-Hillacondji road.                                                                                                                  |                         |
| HAZARDS             | Disruptions in the relative balance of the coastline :<br><ul style="list-style-type: none"> <li>• Changing the amplitudes of the beach cusps;</li> <li>• Possibility of the appearance of erosion pockets east of Avlékété (part located downstream of the breakwater).</li> </ul> |                         |
| MONITORING          | <b>Regular and low</b>                                                                                                                                                                                                                                                              | <b>CRITICALITY High</b> |

**EVOLUTION OVER THE PERIOD 2016–2020**

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                         |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| EVOLUTION OF STAKES       | Rehabilitation of coastal road.<br>Gas Pipeline.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                         |
| CURRENT PROJECTS          | Project for the construction of the four (04) kilometer long submerged dike and beach nourishment in Avlékété.<br>Project for the valorization of the Fishing Road.<br>Project set up of the golf course.<br>Route des Esclaves Project.<br>Cotonou-Ouidah coastal road construction project with penetrations in Togbin and Djègbadji.<br>West Africa Coastal Areas Resilience Investment Project – WACA ResIP <sup>8</sup> (World Bank Group): Avlékété Zone – Implementation of the Avlékété ACCB development plans.<br>Income-generating activities for the conservation of natural resources at Ramsar site 1017.                                                                                                                                                                                                                                                                                                   |                         |
| OUTSTANDING NATURAL AREAS | <b>Lower Couffo Valley Ramsar Site, Coastal Lagoon, Chenal Aho, Lac Ahémé</b> <ul style="list-style-type: none"> <li>• ZHII ID : 1BJ001 – 1017 / WDPA ID : 220056</li> <li>• RSIS : 1017</li> <li>• Area extending over sectors BJ1-a, BJ1-b, BJ2-a and BJ2-b</li> <li>• Designation on January 20, 2001 (47,500 ha)</li> <li>• Boundaries are not available in WDPA.</li> </ul> <b>Vodountô community conservation area</b> <ul style="list-style-type: none"> <li>• WDPA ID: non-existent</li> <li>• Affected sectors: BJ2-a</li> <li>• Created: 2014</li> <li>• Simplified development and management plan developed in March 2014</li> </ul> <b>Togbin-Adouanko community conservation area</b> <ul style="list-style-type: none"> <li>• WDPA ID: non-existent</li> <li>• Sector concerned: BJ2-a</li> <li>• Created: 2014</li> <li>• Simplified development and management plan developed in April 2014.</li> </ul> |                         |
| HAZARDS                   | Disruptions in the relative balance of the coastline :<br><ul style="list-style-type: none"> <li>• Changing the amplitudes of the beach cusps;</li> <li>• Possibility of erosion pockets east of Avlékété.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                         |
| RECOMMENDATIONS           | Monitoring the dynamics of the coastline and raising public awareness.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                         |
| MONITORING                | <b>Regular and low</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>CRITICALITY High</b> |

<sup>8</sup> <https://www.wacaprogram.org/>



| BJ2-b                               |                                                                                                                                                                                                                                                                                                                                                                            | 175-WEST AIRPORT |        |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                            |                  |        |
| DIAGNOSTIC                          | Dense urbanization near the airport, followed to the west by a luxury residential housing. Precarious housing and «informal» near-shore occupation throughout the extension. Beachfront dining and leisure facilities throughout the entire upper beach area served by a coastal path in the immediate vicinity of the beach.                                              |                  |        |
| DYNAMICS                            | Slightly undulating longitudinal profile, fairly developed foreshore in the eastern part, but restricted (about 100 meters) in the west.<br>Area under accretion (in relation to the port facilities of Cotonou).<br>Low topography and exposure to storm hazards.                                                                                                         |                  |        |
| STAKES                              | In the medium term, support for the development of buildings, which will be in high densification in this coveted and serviced area.<br>Management of precarious facilities at the top of the beach.                                                                                                                                                                       |                  |        |
| RECOMMANDATION                      | Limitation of new construction in near-shore areas, planned removal of at-risk beachfront habitats. Close monitoring of the evolution of the coastline over the entire area. Anticipation of the equipment and development through a sector plan.                                                                                                                          |                  |        |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY      | Medium |
| EVOLUTION OVER THE PERIOD 2010–2016 |                                                                                                                                                                                                                                                                                                                                                                            |                  |        |
| EVOLUTION OF STAKES                 | Construction of residential (on 100 ha?) and hotel infrastructure (3 hotels) of high standing. Gas Pipeline. Optical fiber.                                                                                                                                                                                                                                                |                  |        |
| HAZARDS                             | Progression of the accretion west of the port.                                                                                                                                                                                                                                                                                                                             |                  |        |
| MONITORING                          | Regular and low                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY      | Medium |
| EVOLUTION OVER THE PERIOD 2016–2020 |                                                                                                                                                                                                                                                                                                                                                                            |                  |        |
| EVOLUTION OF STAKES                 | Rehabilitation of coastal road. Implementation of a residential zone (CEN-SAD housing <sup>9</sup> ). Gas Pipeline.                                                                                                                                                                                                                                                        |                  |        |
| CURRENT PROJECTS                    | Coastal road construction project.                                                                                                                                                                                                                                                                                                                                         |                  |        |
| OUTSTANDING NATURAL AREAS           | <b>Lower Couffo Valley Ramsar Site, Coastal Lagoon, Chenal Aho, Lac Ahémé</b> <ul style="list-style-type: none"><li>• ZHII ID : 1BJ001 – 1017 / WDPa ID : 220056</li><li>• RSIS : 1017</li><li>• Area extending over sectors BJ1-a, BJ1-b, BJ2-a and BJ2-b</li><li>• Designation on January 20, 2001 (47,500 ha)</li><li>• Boundaries are not available in WDPa.</li></ul> |                  |        |
| HAZARDS                             | Urban pollution: modification of air quality, sanitation. Increased anthropogenic pressure in the area. Flooding linked, on the one hand, to marine submersion and, on the other hand, to rising water levels due to rainfall.                                                                                                                                             |                  |        |
| RECOMMENDATIONS                     | Monitoring the dynamics of the coastline and raising public awareness. Flood management through periodic opening of the trench behind the airport.                                                                                                                                                                                                                         |                  |        |
| MONITORING                          | Regular and low                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY      | Medium |

<sup>9</sup> CEN-SAD: Community of Sahelo-Saharan States (an international organization of 28 African states whose purpose is to facilitate economic, social and cultural links between member states and to enshrine the principle of non-aggression and non-interference in the internal affairs of member states).



## BJ3

## CENTRAL-EAST ZONE

| BJ3-a                               |                                                                                                                                                                                                                                                                                                                                                                                                                | 176 – AIRPORT TO PORT |      |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                |                       |      |
| DIAGNOSTIC                          | Very diversified and dense urbanization, in addition to the airport. Residential housing at various levels of standing (swimming pools), large hotel infrastructure, undeveloped land, but in project closer and closer to the shore or conquest in spontaneous precarious building.<br>Vegetable production area.<br>Urban effluent outlets on the beach at the airport.<br>Many solid waste.                 |                       |      |
| DYNAMICS                            | Slightly undulating longitudinal profile, highly developed foreshore and beach (accretion favored by the port facilities). Exposed area in case of storm surge.<br>This zone located to the immediate West of the port is in constant accretion under the influence of the port works. The retreat of the sea in this zone is estimated at 20 to 25 meters per year (Benin National Diagnosis <sup>10</sup> ). |                       |      |
| STAKES                              | In the medium term, implementation of a coherent project to enhance the waterfront and control the extension of the buildings.                                                                                                                                                                                                                                                                                 |                       |      |
| RECOMMANDATION                      | Limitation of new construction in near-shore areas.<br>Close monitoring of the evolution of the coastline throughout the sector.<br>Anticipation of the equipment and development through a sector plan.                                                                                                                                                                                                       |                       |      |
| MONITORING                          | Regular and low                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY           | High |
| EVOLUTION OVER THE PERIOD 2010–2016 |                                                                                                                                                                                                                                                                                                                                                                                                                |                       |      |
| EVOLUTION OF STAKES                 | Construction of the commercial zone of Ganhi.<br>Gas Pipeline.<br>Port development works (Extension of the south pier, dredging of the port basin).<br>Optical fiber.                                                                                                                                                                                                                                          |                       |      |
| HAZARDS                             | Progression of the accretion west of the port.                                                                                                                                                                                                                                                                                                                                                                 |                       |      |
| MONITORING                          | Regular and low                                                                                                                                                                                                                                                                                                                                                                                                | CRITICALITY           | High |

<sup>10</sup> UEMOA, IUCN, 2010. Coastal Monitoring Study and West Africa Coastal Areas Master Plan. National diagnosis in Benin. 77 p.





## EVOLUTION OVER THE PERIOD 2016–2020

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| EVOLUTION OF STAKES       | Rehabilitation of coastal road.<br>Implementation of a residential zone (CEN-SAD housing).<br>Rehabilitation of the congress center, hotel area.<br>Gas Pipeline.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |
| CURRENT PROJECTS          | Coastal road construction project.<br>Project for the construction of the ministerial city.<br>Rehabilitation of coastal road.<br>Implementation of a residential zone (CEN-SAD housing).<br>Gas Pipeline.<br>Rehabilitation of coastal road.<br>Enlargement of the Autonomous Port of Cotonou.                                                                                                                                                                                                                                                                                                                        |                  |
| OUTSTANDING NATURAL AREAS | Lake Nokoué Protected Area (proposed) <ul style="list-style-type: none"> <li>• WDPA ID: non-existent</li> <li>• Affected sectors: BJ3-a</li> <li>• A first study on marine areas to be protected was carried out in 2007 and led to the initiation in 2009-2010 of a process to raise the awareness of local communities and populations, participatory mapping and the definition of management measures. 4 areas to be protected have been identified, among them the protected area of Lake Nokoué includes the western part of the lake.</li> <li>• This proposed protected area is not listed in WDPA.</li> </ul> |                  |
| HAZARDS                   | Urban pollution: modification of air quality, sanitation.<br>Increased anthropogenic pressure in the area.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |
| RECOMMENDATIONS           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |
| MONITORING                | Regular and low                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CRITICALITY High |



| BJ3-b                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 177 – PORT SECTOR AND COTONOU CHANNEL |  |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--|
| BASELINE – 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                       |  |
| DIAGNOSTIC                          | Complex sector, highly urbanized.<br>Housing and port equipment.<br>Spontaneous» habitat at risk of flooding on the left bank of the lagoon outlet.<br>Right bank equipped with rockfill ending with a pier in the sea.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                       |  |
| DYNAMICS                            | Right bank beach in complex situation: a western part in strong accretion, eastern part possibly in tendency erosion or stabilized (anchoring at the two piers limiting the beach).<br>Coastline located between the lagoon outlet and a second protective structure built at the same time as the port: this area is in dynamic equilibrium under the influence of the protective groyne commonly known as the «East groyne» or «Siafato groyne». Coastline located between the port and the outlet of the Cotonou Channel. This area is protected by a rockfill groyne (commonly known as the West Groyne). The area is currently in dynamic equilibrium.<br>The lagoon outlet is an area of variable morphology that has undergone major changes since the construction of the Port of Cotonou (Benin National Diagnosis <sup>11</sup> ). |                                       |  |
| STAKES                              | In the medium term, preservation of buildings and infrastructure close to the shoreline.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                       |  |
| RECOMMANDATION                      | Limitation of new construction in near-shore areas.<br>Urban requalification accompanied by a withdrawal of the habitats located on the end of the left bank of the Cotonou channel.<br>Complements of possible anti-erosion facilities.<br>Close monitoring of the evolution of the coastline over the entire area.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                       |  |
| MONITORING                          | Regular and low                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY High                      |  |
| EVOLUTION OVER THE PERIOD 2010–2016 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                       |  |
| EVOLUTION OF STAKES                 | Port development works (Extension of the South Pier in 2014, dredging of the port basin).<br>Launching of the "Epine Dorsale" project composed of a deep water, oil, mineral and commercial port in Sèmè-Podji (Benin), an operational railway infrastructure from Cotonou to Parakou with a planned extension from Parakou to Dosso and Niamey (Niger), as many dry ports as needed, in particular the dry ports of Parakou and Dosso and an international airport in Kraké, on the border between Benin and Nigeria.<br>Project for the development and exploitation of the banks of the lagoon of Cotonou / Optical fiber passage zone.<br>Gas Pipeline.<br>Rehabilitation of the Cotonou – Sèmè-Kraké road.<br>Renovation and extension of protective groynes to the east of the Cotonou channel.                                        |                                       |  |
| PORT INFRASTRUCTURE                 | The port of Cotonou has existed since 1962. The Port of Cotonou concession contract has been granted to Bolloré Africa Logistics since 2009 for a period of 25 years within the framework of a public-private partnership with the Port Authority.<br>The reception of a 540 m wharf marked the beginning of the terminal's development work.<br>90% of foreign trade / more than 60% of the country's GDP / 8 million tons. It is through this port that Areva exports the Uranium extracted in Northern Niger.                                                                                                                                                                                                                                                                                                                             |                                       |  |
| HAZARDS                             | Pollution.<br>Increased anthropogenic pressure in the area.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                       |  |
| MONITORING                          | Regular and low                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CRITICALITY High                      |  |

<sup>11</sup> UEMOA, IUCN, 2010. Coastal Monitoring Study and West Africa Coastal Areas Master Plan. National diagnosis in Benin. 77 p.



## EVOLUTION OVER THE PERIOD 2016–2020

|                           |                                                                                                                                                                                                                                                                                                                                                           |                  |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| EVOLUTION OF STAKES       | Extension of the port on the beach gained.                                                                                                                                                                                                                                                                                                                |                  |
| CURRENT PROJECTS          | Project for the development and enhancement of the banks of the Cotonou lagoon.<br>Integrated Marine and Coastal Area Management (GIZMaC) Project - Identification of a Marine Area of Ecological or Biological Significance in Donat with a view to establishing the site as a Marine Protected Area.<br>Cotonou East Coast Protection Project Phase II. |                  |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                                                        |                  |
| HAZARDS                   | Pollution.<br>Increased anthropogenic pressure in the area.                                                                                                                                                                                                                                                                                               |                  |
| RECOMMENDATIONS           | Monitoring the dynamics of the coastline and raising public awareness.                                                                                                                                                                                                                                                                                    |                  |
| MONITORING                | Regular and low                                                                                                                                                                                                                                                                                                                                           | CRITICALITY High |

## COTONOU CHANNEL

2017



2020





| BJ3-c                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 178-AMBASSADORS SECTOR |           |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                        |           |
| DIAGNOSTIC                          | Largely urbanized, eastern part structured in quadrats. High density up to the limit of the beach.<br>No waterfront development.<br>Note the appearance since the 1980s, in the western part of the sector, affected by erosion, the appearance of beachrocks released by erosion.                                                                                                                                                                                                                                                                                        |                        |           |
| DYNAMICS                            | Sector subject to strong erosion downstream of the Cotonou channel and port, despite several old developments (groynes + stabiplage technology).<br>This zone is currently undergoing strong erosion at a rate of about 20 meters per year to the immediate east of the Sifato Groyne. This decreasing rate towards the East remains above one meter per year towards Kraké on the border with Nigeria. It is also on this part of the coastline that the most important sand quarries were installed. More than 800,000 m3 of sand is extracted annually <sup>12</sup> . |                        |           |
| STAKES                              | In the short term, sharp decline in the coastline threatening dense urban neighborhoods.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                        |           |
| RECOMMANDATION                      | Absolute limitation of constructions in near-shore areas. Project of defense by a groyne device in progress. Close monitoring of the impact of the developments.                                                                                                                                                                                                                                                                                                                                                                                                          |                        |           |
| CASE STUDY                          | Benin's beaches in the Gulf of Guinea in West Africa: socio-economic developments and consequences.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                        |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY            | Very high |
| EVOLUTION OVER THE PERIOD 2010-2016 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                        |           |
| EVOLUTION OF STAKES                 | Rehabilitation of old SAGA Petroleum infrastructure for the exploitation of the residual oil reserve of the Sèmè field by SAPETRO.<br>Gas Pipeline.<br>Continued exploration of the entire Beninese offshore.                                                                                                                                                                                                                                                                                                                                                             |                        |           |
| COASTAL PROTECTION                  | Construction of 7 protective groynes between 2012 and 2013 and of a pavement over a distance of 7.5 km from the Sifato groyne to the east.                                                                                                                                                                                                                                                                                                                                                                                                                                |                        |           |
| HAZARDS                             | Consequent morphodynamic change following the installation of groynes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                        |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY            | Very high |
| EVOLUTION OVER THE PERIOD 2016-2020 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                        |           |
| EVOLUTION OF STAKES                 | Construction of 2 groynes and massive reloading + displacement of population.<br>Construction of a breakwater east of the Safiato groyne.<br>Construction of intermediate groynes.                                                                                                                                                                                                                                                                                                                                                                                        |                        |           |
| CURRENT PROJECTS                    | Asphalting project of some secondary roads.<br>Coastal Protection Project East of Cotonou, Phase II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                        |           |
| OUTSTANDING NATURAL AREAS           | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                        |           |
| HAZARDS                             | Erosion east of the last of the 7 groynes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                        |           |
| RECOMMENDATIONS                     | Monitoring the dynamics of the coastline and raising public awareness.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                        |           |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITICALITY            | High      |

<sup>12</sup> UEMOA, IUCN, 2010. Coastal Monitoring Study and West Africa Coastal Areas Master Plan. National diagnosis in Benin. 77 p.



## BJ4

## EAST ZONE

| BJ4-a                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 179-EAST COTONOU    |  |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--|
| BASELINE - 2010                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |  |
| DIAGNOSTIC                          | A sparsely inhabited coastal area, despite its proximity to urban centers. Coastal road between 1.2 and 1.6 km from the shore.<br>Large plantations (coconut palms).<br>Land reserves for future use on land near Nigeria. Equitable zone (well-drained high terraces).                                                                                                                                                                                                                  |                     |  |
| DYNAMICS                            | Retreat of the coastline to be anticipated according to the developments planned in the ambassadors' zone.                                                                                                                                                                                                                                                                                                                                                                               |                     |  |
| STAKES                              | Urbanization respecting the unbuilt and developed waterfront, anticipation of developments and occupation/urbanization of the sector                                                                                                                                                                                                                                                                                                                                                     |                     |  |
| RECOMMANDATION                      | Anticipation of equipment and layout.<br>Close monitoring of the coastline evolution.                                                                                                                                                                                                                                                                                                                                                                                                    |                     |  |
| MONITORING                          | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CRITICALITY    High |  |
| EVOLUTION OVER THE PERIOD 2010-2016 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |  |
| EVOLUTION OF STAKES                 | Construction of Cotonou-Nigeria road infrastructure.<br>Gas Pipeline.<br>Construction of a juxtaposed customs checkpoint in Sèmè- Kraké.<br>Semè-Podji deep-water port construction project.                                                                                                                                                                                                                                                                                             |                     |  |
| HAZARDS                             | Need to rigorously monitor the impacts of the implementation of the groyne system east of the port of Cotonou, which has already resulted in a significant retreat of the coastline east of the groyne system.                                                                                                                                                                                                                                                                           |                     |  |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY    High |  |
| EVOLUTION OVER THE PERIOD 2016-2020 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |  |
| EVOLUTION OF STAKES                 | Asphalting project of some secondary roads.<br>Future project for the creation of a deep-water port.<br>Construction of the residential city (CEN-SAD Zone).<br>Urbanization of the area.<br>Installation of car sales fleets.<br>Construction of commercial department store.<br>Presence of the industrial free zone.                                                                                                                                                                  |                     |  |
| CURRENT PROJECTS                    | Coastal Protection Project East of Cotonou, Phase II.                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |  |
| OUTSTANDING NATURAL AREAS           | <b>Lower Ouémé Valley Ramsar Site, Porto-Novo Lagoon, Lake Nokoué</b> <ul style="list-style-type: none"><li>• ZHII ID : 1BJ002 – 1018 / WDPA ID : 220055</li><li>• Affected sectors: BJ2-b / BJ2-c / BJ2-d / BJ2-e</li><li>• Designation on January 24, 2000 (91,600 ha)</li><li>• No map in WDPA</li></ul> <b>Bymins community conservation area</b> <ul style="list-style-type: none"><li>• WDPA ID: non-existent</li><li>• Sector concerned: BJ1-c</li><li>• Created: 2014.</li></ul> |                     |  |
| HAZARDS                             | Coastal erosion and pollution linked to the arrival of sewage sludge.                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |  |
| RECOMMENDATIONS                     | Monitoring the dynamics of the coastline and raising public awareness.<br>Management of sewage sludge.                                                                                                                                                                                                                                                                                                                                                                                   |                     |  |
| MONITORING                          | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY    High |  |



ROCKFALLS EAST OF COTONOU

2017



2020





## SUMMARY TABLE

| HABITAT |  Desert area                                                  |  Mangrove<br>Wetland         |  Camp<br>Small village              |  Rural                                       |  Rurban                                                                            |  Urban                                                                             |                                                                                                                                                                     |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                   |                                                                                                                                                                         |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| STAKES  |  <b>Fishing</b><br>Fishing port<br><i>(aquaculture areas)</i> |  <b>Rice-growing</b>         |  <b>Palm oil</b><br>Palm plantation |  <b>Trade</b><br>Commercial port             |  <b>Trade+</b><br>Commercial port<br>Airport                                       |  <b>Oil &amp; Gas</b><br>Exploration<br>Exploitation                               |  <b>Extrative ind.</b><br>Salt, metal-bearing sand,<br>gold                        |  <b>Tourism</b>                                                                      |  <b>(Tourism)</b><br>Unexploited outstanding<br>areas                                |  <b>Biodiversity</b><br>Outstanding areas<br><i>(biodiversity, landscapes)</i> |                                                                                                                                                                         |
| HAZARDS |  <b>h</b><br>Soil erosion<br>Landslide                        |  <b>h</b><br>Coastal erosion |  <b>d</b><br>Marine submersion      |  <b>c</b><br>Pluvial and/or fluvial flooding |   |   |   |   |   |  <b>n</b><br>Industrial risk                                                   |   |

| N°                                   | REF   | NAME                                 | HABITAT                                                                            | STAKES                                                  | HAZARDS                                                                            | CRITICALITY |             |                    | MONITORING            |                         |                                |
|--------------------------------------|-------|--------------------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------------------------------------|-------------|-------------|--------------------|-----------------------|-------------------------|--------------------------------|
|                                      |       |                                      |                                                                                    |                                                         |                                                                                    | 2011        | 2016        | 2020               | 2011                  | 2016                    | 2020                           |
| <b>BJ1 GRAND POPO - WEST COTONOU</b> |       |                                      |                                                                                    |                                                         |                                                                                    |             |             |                    |                       |                         |                                |
| 172                                  | BJ1-a | Togo Border - Grand Popo             |   | Fishing Market-Gardening Oil & Gas Tourism Biodiversity |   | Very High   | → Very High | → <b>Very High</b> | Regular and intensive | → Regular and intensive | → <b>Regular and intensive</b> |
| 173                                  | BJ1-b | Estuarine lagoons of Mono and Kouffo |   | Fishing Oil & Gas Biodiversity                          |   | Very High   | → Very High | → <b>Very High</b> | Regular and intensive | → Regular and intensive | → <b>Regular and intensive</b> |
| <b>BJ2 CENTER-WEST AREA</b>          |       |                                      |                                                                                    |                                                         |                                                                                    |             |             |                    |                       |                         |                                |
| 174                                  | BJ2-a | West Ouidah - Cotonou                |   | Fishing Oil & Gas Tourism Biodiversity                  |   | High        | → High      | → <b>High</b>      | Watch-keeping         | ↗ Regular and light     | → <b>Regular and light</b>     |
| 175                                  | BJ2-b | Cotonou - West airport               |   | Oil & Gas Tourism                                       |   | Medium      | → Medium    | → <b>Medium</b>    | Watch-keeping         | ↗ Regular and light     | → <b>Regular and light</b>     |
| <b>BJ3 CENTER-EAST AREA</b>          |       |                                      |                                                                                    |                                                         |                                                                                    |             |             |                    |                       |                         |                                |
| 176                                  | BJ3-a | Cotonou - Airport to Port            |   | Oil & Gas (Tourism) Biodiversity                        |   | High        | → High      | → <b>High</b>      | Regular and light     | → Regular and light     | → <b>Regular and light</b>     |
| 177                                  | BJ3-b | Cotonou Port sector and channel      |   | Fishing Trade + Oil & Gas Biodiversity                  |   | High        | → High      | → <b>High</b>      | Regular and light     | → Regular and light     | → <b>Regular and light</b>     |
| 178                                  | BJ3-c | Ambassadors sector                   |   | Oil & Gas (Tourism) Biodiversity                        |   | Very High   | → Very High | → <b>High</b>      | Regular and intensive | → Regular and intensive | → <b>Regular and intensive</b> |
| <b>BJ4 EAST AREA</b>                 |       |                                      |                                                                                    |                                                         |                                                                                    |             |             |                    |                       |                         |                                |
| 179                                  | BJ4-a | East Cotonou                         |  | Fishing Oil & Gas Biodiversity                          |  | High        | → High      | → <b>High</b>      | Watch-keeping         | ↗ Regular and intensive | → <b>Regular and intensive</b> |







# SÃO TOMÉ & PRÍNCIPE

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## STP–São Tomé & Príncipe

São Tomé & Príncipe (STP) is one of the smallest states in Africa, located in the Gulf of Guinea, with an area of approximately 1001 km<sup>2</sup> and an estimated total population of 200,000 inhabitants. It has a 260 km long seafront. Indeed, STP is an archipelago composed of the island of São Tomé, 50 km long and 30 km wide, and the island of Príncipe, 30 km long and 6 km wide. São Tomé & Príncipe is directly threatened by the slightest climate change. As a volcanic island, the country has very few areas suitable for housing and economic activities, so the population and infrastructure are concentrated on the coast.

The vast majority of the population of São Tomé & Príncipe is concentrated in the district of Agua Grande and Mé-Zóchi. However, there is a predominance of concentration along coastal communities such as Ribeira Afonso, Vila Malanza, Praia Gambôa-Cruz-Loxinga, Praia Melão, Vila de Santa Catarina, Benga, Neves, Santana and Lentapia, whose sea fronts are already potentially occupied and partially artificialized. This situation could be explained by the fact that most of the administrative structures and economic infrastructure are concentrated in the coastal cities, resulting in a massive exodus of the rural population to the urban centers. Outside urban areas, São Tomé & Príncipe's coastline includes natural ecosystems marked by high biodiversity, with the presence of conservation forest reserves, mangrove areas, rocky reefs, rhodolitic areas, beaches and bays, Ilheus and turtle nesting and feeding areas. Fishing is a relatively important sector for the country's economy, a source of employment and foreign exchange that contributes about 3.7% of the national GDP and accounts for 22% to 35% of the non-fat tax revenues of the State budget (INE, 2017).

The Antoniomean coastal strip concentrates very important economic sectors such as fishing, tourism, agriculture, energy, maritime transport, etc., which are threatened by coastal erosion, marine submersion, rainfall flooding, landslides, pollution, urbanization and sea-level rise, among others. This sensitivity of the coastline is materialized by the mobility of the coastline, the destruction of natural habitats, etc.

«A multisectoral investment plan<sup>1</sup> has been developed for the country, which emphasizes the need for policy reforms for more sustainable and adaptive coastal zone management, a new institutional framework for disaster risk management, and strong community commitment to coastal protection. »

WACA, through the West African Coastal Resilience Investment Project (WACA ResIP), operates in twelve coastal communities in São Tomé & Príncipe (Santa Catarina, Micoló, raia Gamboa-Cruz-Loxinga, Pantufo, Praia Melão, Ribeira Afonso, Lô Grande, Malanza Praia Abade and Praia Burra). «Ongoing activities focus on natural solutions through community-based approaches and hybrid solutions, where hard solutions are required, beach nourishment, drainage, breakwaters and shoreline and coastal revetments. Regarding political interventions, a new law on sand extraction is supported. Community-based adaptation is central to São Tomé & Príncipe's approach, including support for routine maintenance programs for coastal protection infrastructure in collaboration with district governments.»<sup>2</sup>

<sup>1</sup> The World Bank and GFDRR, 2017. Plano multi-setorial de investimentos para integrar a resiliência às alterações climáticas e o risco de desastres na gestão da zona costeira de São Tomé e Príncipe. 150 p.

<sup>2</sup> Excerpt from <https://www.wacaprogram.org/fr/country/sao-tome-et-principe>



## STP1

## ISLAND OF PRÍNCIPE

| STP1-a                    | SUNDY – TENREIRO VELHO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| BASELINE - 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |
| DIAGNOSTIC                | In this northern region of Príncipe, the population density is moderate.<br>The urban network is compact at the level of the regional capital.<br>This area is marked by the presence of industrial infrastructure (small processing and production plants for chocolate and coconut oil).<br>We also note the presence of infrastructure and tourist sites (Hotel Bombom Príncipe island, Roça Belo Monte and Roça Sundry), a port and an airport.<br>Agroforestry is highly developed in this part of the region, where there is also an activity of protection and conservation of terrestrial and marine species.<br>Hydrologically, there are permanent watercourses and strategic areas for rainwater infiltration.<br>The entire northern coast of Príncipe is predominantly rocky, with some small portions of sandy bays. |                    |
| DYNAMICS                  | These areas have experienced strong coastal erosion, mainly at the coast of Abade Beach and Burras Beach. The communities around this northern part of Príncipe have been particularly affected by extreme meteorological phenomena over the last 10 years, such as increased river flows, floods, heavy rains and marine turbulence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |
| STAKES                    | High density of dwellings and/or infrastructure located within 150 m of the coastline or near the banks of a major watercourse. High risk of flooding of continental origin, or marine submersion during the passage of an extreme meteorological phenomenon.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |
| CURRENT PROJECTS          | West African coastal resilience investment project - WACA ResIP (World Bank Group). São Tomé and Príncipe.<br>Project «Creation of a network of marine protected areas in São Tomé and Príncipe through a co-management approach» - Turst Príncipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |
| OUTSTANDING NATURAL AREAS | Biosphere Reserve of the island of Príncipe<br>Bombom Island                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |
| HAZARDS                   | Coastal erosion.<br>Marine Submersion.<br>Rain and river flooding.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |
| RECOMMANDATION            | Regular monitoring of the coastline.<br>Construction of protective structures and reinforcement of existing structures to slow the retreat of the coastline and to predict extreme weather events.<br>Raising awareness among the population to change their behaviour with regard to the construction of houses on the coastline.<br>Safeguard and conserving biodiversity<br>Safeguard and conservation of marine ecosystems                                                                                                                                                                                                                                                                                                                                                                                                     |                    |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CRITICALITY Medium |

**2000 – 2015**



## 2009 – 2015





| STP1-a                    | SUNDY – TENREIRO VELHO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |
| DIAGNOSTIC                | The southern part of the independent region of Príncipe is a natural region made up of a land and sea area of high ecological and fishing value, justifying its classification as a natural park of international importance. This is the Obo do Príncipe Natural Park and its buffer zones; it has a high conservation value of terrestrial and marine species and ecosystems.<br>Among the natural potentialities of this region south of Príncipe are the Tinhosas Islands, which are listed as Wetlands of International Importance and classified as a Ramsar site. Sector crossed by major rivers that originate at the top of Mount Príncipe which culminates at 948m.<br>The coastline is mostly rocky. |                 |
| DYNAMICS                  | Very uneven area marked by strong slope instability in some places.<br>Strong soil water erosion is also noted in almost all of this sector.<br>Some areas are also threatened by flooding, especially downstream of permanent watercourses.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |
| STAKES                    | Tourist valorization to be developed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |
| CURRENT PROJECTS          | Project «Creation of a network of marine protected areas in São Tomé & Príncipe through a co-management approach».                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |
| OUTSTANDING NATURAL AREAS | <b>Obo do Príncipe National Park</b> <ul style="list-style-type: none"><li>• WDPA ID : 555592842</li><li>• Creation by the lei N°7-2006 Criação do Parque Natural Obo do Príncipe.</li></ul> <b>Biosphere Reserve of the island of Príncipe</b> <ul style="list-style-type: none"><li>• WDPA ID: non-existent</li></ul> <b>Ramsar Site Tinhosas Islands</b> <ul style="list-style-type: none"><li>• ZHII ID : 1ST001 – 1632 / WDPA ID : 902976</li><li>• Designation August 21, 2006</li></ul>                                                                                                                                                                                                                  |                 |
| HAZARDS                   | Rain and river erosion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                 |
| RECOMMANDATION            | Safeguard and conservation of the biodiversity of the island of Príncipe.<br>Safeguard and conservation of the marine ecosystems of the island of Príncipe.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY Low |



## STP2 SÃO TOMÉ Island – NORTH AND EASTERN ZONE

| STP2-a                    | RIO LEMBÁ – DIOGO NUNES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |               |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |               |
| DIAGNOSTIC                | <p>This sector is characterized by an average population density in relation to the relatively weak urban network and a few sparsely occupied rural areas.</p> <p>It also hosts a port, in Neves, some tourist infrastructure, fishing centers and a road development adjacent to the coast.</p> <p>The industrial sector is characterized by the Rosema Brewery, ENCO-National Fuel and Oil Company, the main supplier of the whole country, and is considered the industrial city of STP.</p> <p>This area is also home to some sea turtle nesting areas. In terms of biodiversity, this sector is dominated by a large activity of protection and conservation of terrestrial and marine species.</p> <p>Agroforestry is relatively undeveloped in this sector.</p> <p>Hydrologically, the sector is traversed by temporary watercourses; there are also lakes and ponds and a few strategic infiltration zones.</p> |                    |               |
| DYNAMICS                  | <p>A strong erosion of the coasts around the city of Santa Catarina, city of Neves, and Diogo Nunes.</p> <p>Weak accretion to the north of the port of Neves and erosion to the south.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |               |
| STAKES                    | <p>The development of a road more than a hundred kilometers long at less than 50m in some places.</p> <p>The future of the Micolo city inhabitants housed in a flood-prone area.</p> <p>Presence of permanent watercourses next to dwellings.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |               |
| CURRENT PROJECTS          | <p>West African coastal resilience investment project - WACA ResIP<sup>4</sup> (World Bank Group). São Tomé &amp; Príncipe.</p> <p>Tato program in São Tome &amp; Principe. – National Marine Turtle Conservation Program – Marapa NGO</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |               |
| OUTSTANDING NATURAL AREAS | <p><b>Obo do São Tomé National Park</b></p> <ul style="list-style-type: none"><li>• WDPA ID : 124355</li><li>• Classification: lei N°6-2006</li></ul> <p><b>Islet of goats</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |               |
| HAZARDS                   | <p>Coastal erosion.</p> <p>Marine Submersion.</p> <p>Erosion.</p> <p>Rain flood.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |               |
| RECOMMANDATION            | <p>Safeguard sea turtle nesting and feeding areas.</p> <p>Safeguard and conserving biodiversity</p> <p>Safeguard and conservation of marine ecosystems</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |               |
| MONITORING                | <b>Regular and light</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>CRITICALITY</b> | <b>Medium</b> |

<sup>4</sup> <https://www.wacaprogram.org/fr/country/sao-tome-et-principe>

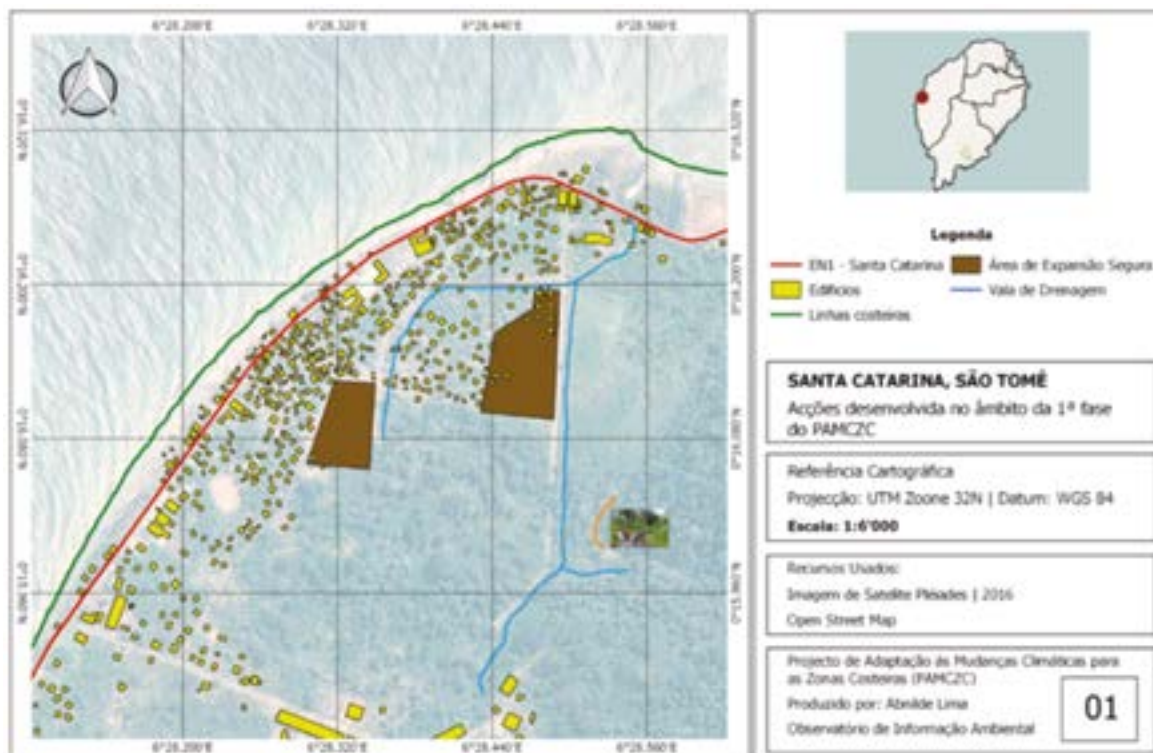




# ACTIONS IMPLEMENTED IN THE DESIGN OF THE PROJECT ADAPTED TO CLIMATE CHANGE IN COASTAL AREAS

## Community of Santa Catarina – 2017

2000 – 2015



## HISTORICAL AND PROJECTED COMPARISON OF COASTLINE AND EXPOSURE CHANGES FOR VULNERABLE COASTAL COMMUNITIES IN SAO TOME AND PRINCIPE

### EVOLUTION OF THE COASTLINE AT PRAIA GAMBOA (2016 - PROJECTION IN 2050)



### EVOLUTION OF THE COASTLINE AT PRAIA GAMBOA (2016 - PROJECTION IN 2050)







| STP2-b                    | DIOGO NUNES - PRAIA MELÃO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                  |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| BASELINE - 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                  |
| DIAGNOSTIC                | <p>This sector is characterized by a high population and housing density, with a strong development of the tourist, industrial and fishing sectors.</p> <p>It also hosts the country's main port and airport.</p> <p>The road network is very dense and diversified on this part.</p> <p>The agricultural sector is highly developed on the limits of the urban area of São Tomé.</p> <p>The city has a number of green corridors, which the 2020 land use plan suggests should be safeguarded and enhanced.</p> <p>Marine turtle nesting and breeding areas. This sector also has temporary streams, lakes and ponds and a few strategic pockets for rainwater infiltration.</p> <p>The coast is highly artificial with the presence of coastal structures and development on almost the entire coastline.</p> <p>This sector has more protective works (retaining wall, coastal dyke, groyne and breakwater) than the rest of the country.</p>                                                                                                  |                  |
| DYNAMICS                  | <p>Todo sector afetado pela forte erosão costeira, ver Diogo Nunes, Praia Gambôa- Cruz- Loxinga, Av.Mar-ginal 12 de Julho, Pantufo e Praia Melão.</p> <p>The south of the sector is experiencing strong coastal erosion, towards Praia Melao.</p> <p>Destruction of sea turtle breeding grounds.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |
| STAKES                    | <p>Development of human habitat and road developments within 50m of the seafront.</p> <p>Uncontrolled exploitation of beach sand.</p> <p>Threats to sea turtle predilection areas in the face of galloping urbanization and the uncontrolled exploitation of beach sand.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |
| CURRENT PROJECTS          | <p>West African coastal resilience investment project - WACA ResIP<sup>5</sup> (World Bank Group). São Tomé &amp; Príncipe.</p> <p>Tato program in São Tome &amp; Principe. - National Marine Turtle Conservation Program - Marapa NGO</p> <p>Project for the establishment of a network of marine protected areas in São Tomé and Príncipe, financed by Blue Action Fund - NGO OIKOS.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |
| HAZARDS                   | <p>Marine Submersion.</p> <p>Coastal Erosion.</p> <p>Rain and river flooding.</p> <p>Extraction of sand from beaches.</p> <p>Fishing practices</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |
| RECOMMANDATION            | <p>Safeguarding sea turtle nesting and feeding areas.</p> <p>The group of experts, having carried out a vulnerability/adaptation assessment of the coastal zone of the archipelago<sup>6</sup>, recommends the following alternative measures:</p> <ul style="list-style-type: none"><li>• Standardization of mining operations.</li><li>• Reinforcement of the coastal protection system through reforestation operations and the laying of stone barriers, especially in the south of the sector which is more vulnerable to erosion and marine submersion episodes.</li><li>• The identification of areas suitable for mining without detrimental effects on the stability of the coast. Consider underwater sand extraction.</li><li>• The development of beach rehabilitation strategies.</li><li>• The establishment of a coastal observatory and sea level monitoring.</li><li>• The promotion of sustainable fishing practices.</li><li>• The implementation of a project for the protection and support of coastal management.</li></ul> |                  |
| MONITORING                | Regular and intensive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CRITICALITY High |

<sup>5</sup> <https://www.wacaprogram.org/fr/country/sao-tome-et-principe>

<sup>6</sup> MRNE, 2004. First National Communication on Climate Change. 94p.



## STP – São Tomé &amp; Príncipe

| STP2-c                    | PRAIA MELÃO – RIBEIRA AFONSO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BASELINE - 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
| DIAGNOSTIC                | In this sector, the population and housing density is moderate.<br>It lacks industrial, port and airport infrastructure.<br>Tourism is not very developed on this portion as well.<br>The road network is not very dense.<br>However, there is a strong development of fishing activities in some portions of this sector which also includes turtle nesting and feeding areas.<br>Agroforestry is also highly developed and dominates almost all along this sector.<br>Permanent watercourses and areas conducive to infiltration exist in this sector. The coast is mostly rocky.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |
| DYNAMICS                  | Strong erosion was noted in the community of Praia Melão in the town of Ribeira Afonso, located to the south of this sector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |
| STAKES                    | Development of the urban network around the bays of Ribeira Afonso, Agua Izé, Santana, near the seafront.<br>Threats to sea turtle nesting and feeding areas.<br>Threat to the Fish Concentration Zone at the Sept Pierres island.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| CURRENT PROJECTS          | West African coastal resilience investment project – WACA ResIP <sup>7</sup> (World Bank Group). São Tomé & Príncipe.<br>Project for the sustainable co-management of fisheries in the south of São Tomé Island, financed by the European Union and Instituto Camões – NGO OIKOS.<br>Project for the establishment of a network of marine protected areas in São Tomé and Príncipe, financed by Blue Action Fund – NGO OIKOS.<br>Tato program in São Tome & Principe. – National program for the conservation of marine turtles – NGO Marapa.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| OUTSTANDING NATURAL AREAS | Sept Pierres Island                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |
| HAZARDS                   | Coastal erosion.<br>Marine Submersion.<br>Extraction of sand from beaches.<br>Rain and river flooding mainly in Santa Catarina.<br>Fishing practices                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |
| RECOMMANDATION            | Safeguarding sea turtle nesting and feeding areas.<br>The group of experts, having carried out a vulnerability/adaptation assessment of the coastal zone of the archipelago <sup>8</sup> , recommends the following alternative measures: <ul style="list-style-type: none"><li>• Standardization of mining operations.</li><li>• Intensification of awareness campaigns to reduce housing construction on the coast.</li><li>• Reinforcement of the coastal protection system through reforestation operations and the laying of stone barriers, especially in the south of the sector which is more vulnerable to erosion and marine submersion episodes.</li><li>• The identification of areas suitable for mining without detrimental effects on the stability of the coast. Consider underwater sand extraction.</li><li>• The development of beach rehabilitation strategies.</li><li>• The establishment of a coastal observing and sea level monitoring system.</li><li>• The implementation of a project for the protection and support of coastal management.</li><li>• Promoting sustainable fishing practices</li></ul> |                       |
| MONITORING                | Regular and light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CRITICALITY    Medium |

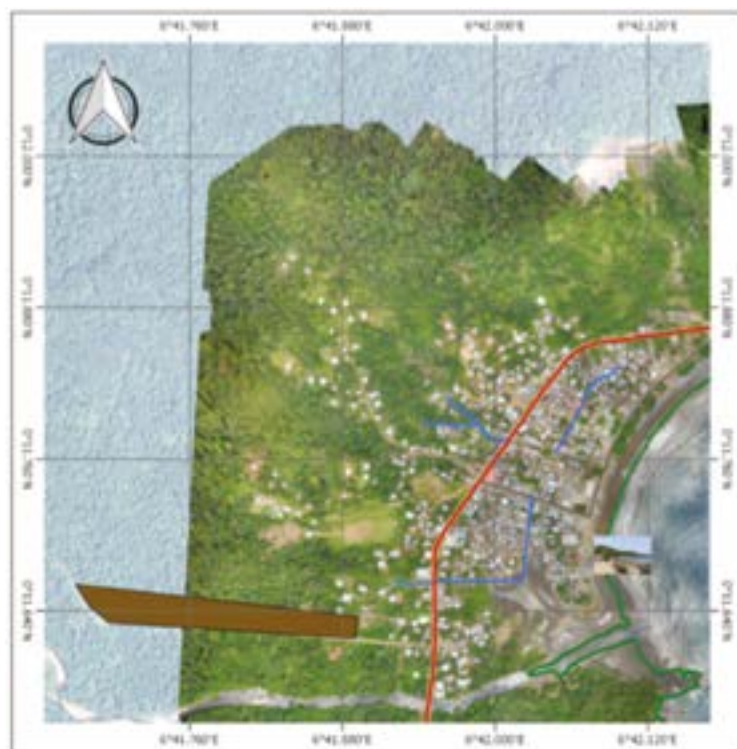
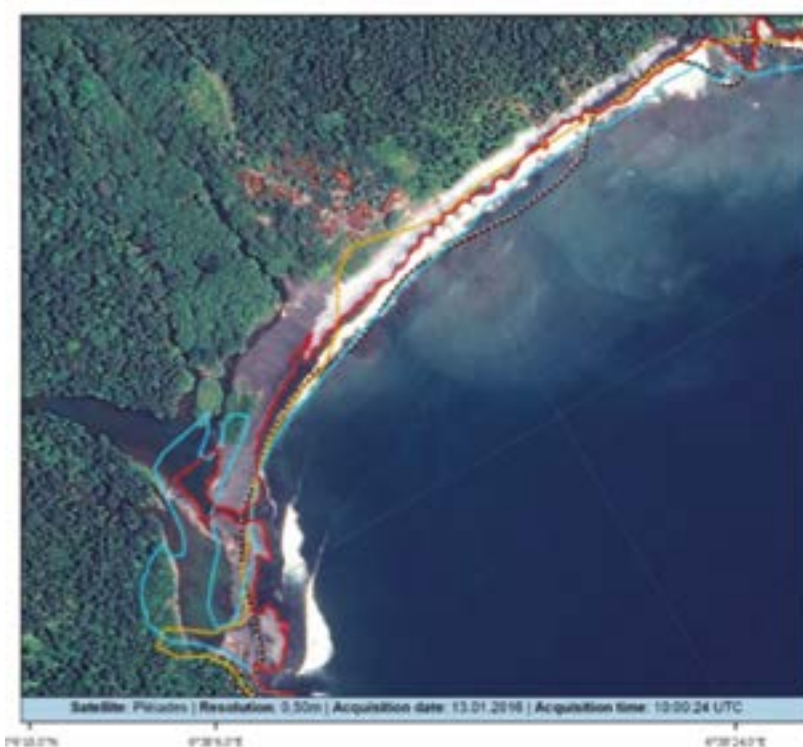
<sup>7</sup> <https://www.wacaprogram.org/fr/country/sao-tome-et-principe>

<sup>8</sup> MRNE, 2004. First National Communication on Climate Change. 94p.



| STP2-d                    | RIBEIRA AFONSO – LÔ GRANDE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BASELINE – 2010           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| DIAGNOSTIC                | <p>This sector located in the central-eastern part of the island of São Tomé is assimilated to a transition between the artificial North zone and the purely natural South zone, corresponding to the south-eastern limit of the São Tomé Nature Reserve.</p> <p>Population and housing densities are very low compared to the country's capital city.</p> <p>Ecological tourism is very present in this region, but fishing is also the greatest means of survival for the population living in the communities of this sector.</p> <p>It is home to an important forest reserve, which is nothing more than an extension of the São Tomé Park in the center and on the eastern side of the coastline.</p> <p>Agroforestry is also somewhat developed in this sector.</p> <p>A turtle nesting and feeding area.</p> <p>The hydrography of this sector is characterized by the presence of permanent watercourses and areas favorable to the infiltration of rainwater.</p> <p>The coast is predominantly rocky. But there are a few portions of sandy bays.</p> |                       |
| DYNAMICS                  | <p>Erosion is noted to the north of the sector, corresponding to the Ribeira Afonso and to the south to Lô Grande.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
| STAKES                    | <p>Safeguarding sea turtle nesting and feeding areas.</p> <p>Urban development and tourist facilities on the seafront.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| CURRENT PROJECTS          | <p>West African coastal resilience investment project – WACA ResIP<sup>9</sup> (World Bank Group). São Tomé &amp; Príncipe.</p> <p>Project for the sustainable co-management of fisheries in the south of São Tomé Island, financed by the European Union and Instituto Camões – NGO OIKOS.</p> <p>Project for the establishment of a network of marine protected areas in São Tomé and Príncipe, financed by Blue Action Fund – NGO OIKOS.</p> <p>Tato program in São Tome &amp; Príncipe. – National program for the conservation of marine turtles – NGO Marapa.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| OUTSTANDING NATURAL AREAS | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |
| HAZARDS                   | <p>Coastal erosion.</p> <p>Marine Submersions.</p> <p>Floods (river and rain)</p> <p>Soil Erosion.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
| RECOMMANDATION            | <p>Safeguarding sea turtle nesting and feeding areas.</p> <p>The construction of containment barriers for protection against submersion at sea.</p> <p>Increase conservation efforts and awareness of sea turtle consumption, change behaviors, and thereby reverse the decline of sea turtle populations and improve the standard of living of members of coastal communities.</p> <p>Promote a system that increases local participation in the sustainable management of fisheries in the southern coastal zone of São Tomé Island.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| MONITORING                | Watch-keeping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CRITICALITY    Medium |

<sup>9</sup> <https://www.wacaprogram.org/fr/country/sao-tome-et-principe>

**ACTIONS IMPLEMENTED IN THE DESIGN OF THE PROJECT ADAPTED TO CLIMATE CHANGE IN COASTAL AREAS**  
Ribeira Afonso Community – 2017**SHORELINE EVOLUTION AT LÔ GRANDE FROM 1958 UNTIL 2016**



## STP3

# SÃO TOMÉ ISLAND

## SOUTH AND SOUTH-WEST ZONE

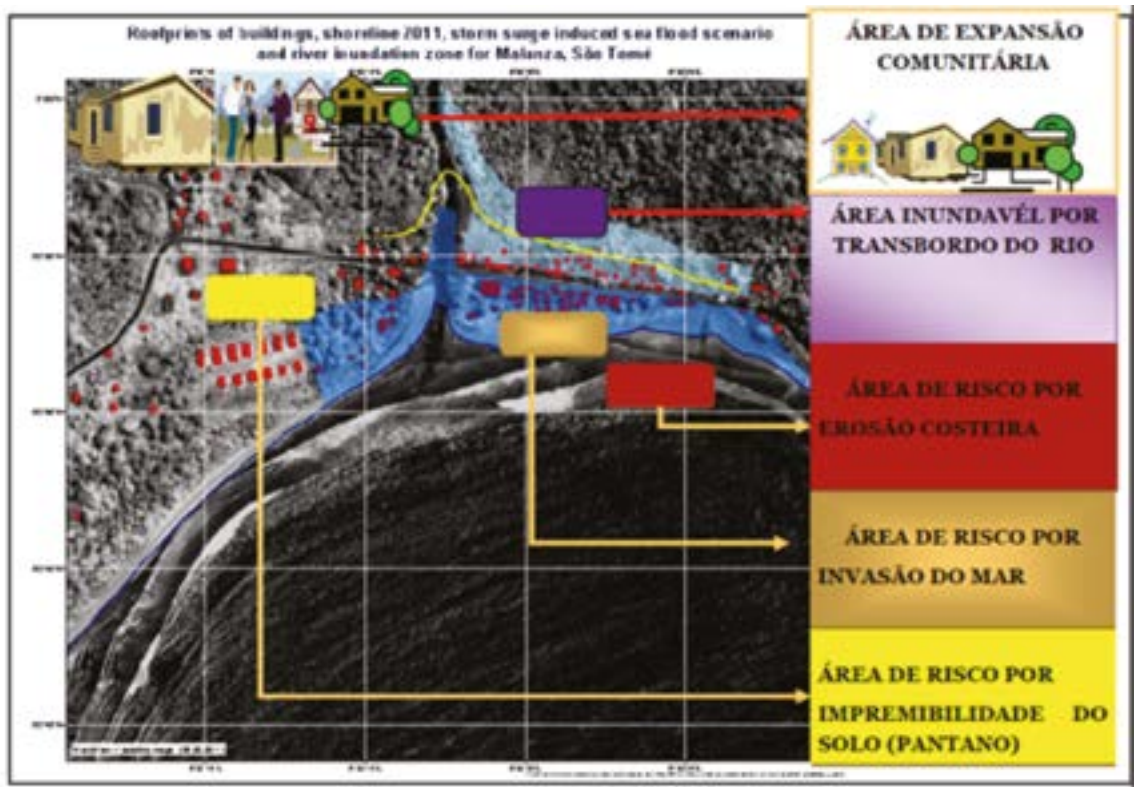
| STP3-a                    |  | YO GRANDE – RIO LEMBÁ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                  |
|---------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| BASELINE - 2010           |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                  |
| DIAGNOSTIC                |  | <p>Located in the southeast and southwest of the island, this area is characterized by a relatively very low population and housing density. In fact, it corresponds to the Obo do São Tomé National Park in its natural entirety, where there is a strong activity of protection and conservation of ecosystems in general (Ville Malanza mangrove, sea grasslands, etc.) and biodiversity in particular (the most important areas for nesting and feeding of sea turtles, rhodolite sites, areas where cetaceans are present, etc.). The largest rivers are born and flow into this area.</p> <p>After the community of Porto Alegre, there is no land link road that gives access from Porto Alegre to Rio Lembá.</p> <p>This sector still has some sites of ecological tourism (associated with the beach and the city) and fishing centers. Agriculture is also poorly developed in this sector, especially in the southeast.</p> <p>This sector shelters some corridors favorable to the infiltration of rainwater.</p> <p>The coast is rocky in this area.</p> |                                  |
| DYNAMICS                  |  | <p>The area subject to coastal erosion and marine submersion. Generally, water erosion in various forms, both fluvial and rainy.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                  |
| STAKES                    |  | <p>Threats to sea turtle predilection areas in the face of galloping urbanization and the uncontrolled exploitation of beach sand.</p> <p>Preservation of Obo do São Tomé National Park.</p> <p>Ecological touristic valorization to be developed.</p> <p>Threats to sea turtle nesting and feeding areas.</p> <p>Threat to fish concentration area</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                  |
| CURRENT PROJECTS          |  | <p>West African coastal resilience investment project - WACA ResIP<sup>10</sup> (World Bank Group). São Tomé and Príncipe.</p> <p>Project for the sustainable co-management of fisheries in the south of São Tomé Island, financed by the European Union and Instituto Camões - NGO OIKOS.</p> <p>Project for the establishment of a network of marine protected areas in São Tomé and Príncipe, financed by Blue Action Fund - NGO OIKOS.</p> <p>Tato program in São Tome &amp; Príncipe. - National program for the conservation of marine turtles – NGO Marapa.</p> <p>Support program for the preservation of biodiversity and fragile ecosystems in Central Africa (ECOFAC 6). São Tomé &amp; Príncipe.</p>                                                                                                                                                                                                                                                                                                                                                      |                                  |
| OUTSTANDING NATURAL AREAS |  | <p><b>Obo do São Tomé National Park</b></p> <ul style="list-style-type: none"><li>• WDPA ID : 124355</li><li>• Classification: lei N°6-2006</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                  |
| HAZARDS                   |  | <p>Coastal Erosion.</p> <p>Marine Submersions.</p> <p>Rain and river floods.</p> <p>Soil Erosion.</p> <p>Landslides.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                  |
| RECOMMANDATION            |  | <p>Safeguarding sea turtle nesting and feeding areas.</p> <p>Increase conservation efforts and awareness of sea turtle consumption, change behaviors, and thereby reverse the decline of sea turtle populations and improve the standard of living of members of coastal communities.</p> <p>Promote a system that increases local participation in the sustainable management of fisheries in the southern coastal zone of São Tomé Island.</p> <p>Promoting sustainable fishing practices</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                  |
| MONITORING                |  | <p><b>Watch-keeping</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p><b>CRITICALITY    Low</b></p> |

<sup>10</sup> <https://www.wacaprogram.org/fr/country/sao-tome-et-principe>





ROOFPRIENTS OF BUILDINGS AND COASTAL CHANGE 1958, 1990, 2003 & 2011 FOR MALANZA



[illegible]



## STP – São Tomé &amp; Príncipe

## SUMMARY TABLE

| HABITAT | <br>Desert area                                | <br>Mangrove<br>Wetland | <br>Camp<br>Small village       | <br>Rural                                | <br>Rurban                               | <br>Urban                                    |                                                                                                                                             |                                                                                                               |                                                                                                                                      |                                                                                                                                                       |                                                                                                          |
|---------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| STAKES  | <br>Fishing<br>Fishing port<br>& landing areas | <br>Rice-growing        | <br>Palm oil<br>Palm plantation | <br>Trade<br>Commercial port             | <br>Trade+<br>Commercial port<br>Airport | <br>Oil & Gas<br>Exploration<br>Exploitation | <br>Extractive ind.<br>Salt, metal-bearing sand,<br>gold | <br>Tourism                | <br>(Tourism)<br>Unexploited outstanding<br>areas | <br>Biodiversity<br>Outstanding areas<br>(Biodiversity, landscape) |                                                                                                          |
| HAZARDS | <br>h<br>Soil erosion<br>Landslide             | <br>Coastal erosion     | <br>d<br>Marine submersion      | <br>c<br>Pluvial and/or fluvial flooding | <br>Intusion of saltwater                | <br>Pollution                                | <br>Anthropization                                       | <br>Sargasso proliferation | <br>Jellyfish proliferation                       | <br>n<br>Industrial risk                                           | <br>Nothing to report |

| N°                      | REF           | NAME                                                                              | HABITAT                  | STAKES        |        |           |              |                                                                                                                                                                                                                                                          | HAZARDS | CRITICALITY |      |        | MONITORING |                   |      |
|-------------------------|---------------|-----------------------------------------------------------------------------------|--------------------------|---------------|--------|-----------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|------|--------|------------|-------------------|------|
|                         |               |                                                                                   |                          |               |        |           |              |                                                                                                                                                                                                                                                          |         | 2011        | 2016 | 2020   | 2011       | 2016              | 2020 |
| STP1 ISLAND OF PRÍNCIPE |               |                                                                                   |                          |               |        |           |              |                                                                                                                                                                                                                                                          |         |             |      |        |            |                   |      |
| STP1-a                  | High Príncipe |  | Chocolat<br>Noix de coco | Agro-forestry | Trade+ | Tourism   | Biodiversity |    |         |             |      | Medium |            | Regular and light |      |
| STP1-b                  | Low Príncipe  |  |                          |               |        | (Tourism) | Biodiversity |                                                                                       |         |             |      | Low    |            | Watch-keeping     |      |

|                                                      |        |                              |  |         |               |        |         |                |  |  |  |  |  |        |  |                       |
|------------------------------------------------------|--------|------------------------------|--|---------|---------------|--------|---------|----------------|--|--|--|--|--|--------|--|-----------------------|
| <b>STP2 ISLAND OF SÃO TOMÉ - NORTH AND EAST AREA</b> |        |                              |  |         |               |        |         |                |  |  |  |  |  |        |  |                       |
|                                                      | STP2-a | Rio Lemba - Diogo Nunes      |  | Fishing |               |        | Tourism | Biodiversity   |  |  |  |  |  | Medium |  | Regular and light     |
|                                                      | STP2-b | Diogo Nunes - Praia Melao    |  | Fishing | Agriculture   | Trade+ | Tourism | (Biodiversity) |  |  |  |  |  | High   |  | Regular and intensive |
|                                                      | STP2-c | Praia Melao - Ribeira Afonso |  | Fishing | Agro-forestry |        | Tourism | (Biodiversity) |  |  |  |  |  | Medium |  | Régulier et léger     |
|                                                      | STP2-d | Ribeira Afonso - Yo Grande   |  |         |               |        | Tourism | (Biodiversity) |  |  |  |  |  | Low    |  | Watch-keeping         |

|                                                            |  |                       |  |         |             |  |         |              |  |  |  |  |  |     |  |               |
|------------------------------------------------------------|--|-----------------------|--|---------|-------------|--|---------|--------------|--|--|--|--|--|-----|--|---------------|
| <b>STP3 ISLAND OF SÃO TOMÉ - SOUTH AND SOUTH-WEST AREA</b> |  |                       |  |         |             |  |         |              |  |  |  |  |  |     |  |               |
|                                                            |  | Yo Grande - Rio Lemba |  | Fishing | Agriculture |  | Tourism | Biodiversity |  |  |  |  |  | Low |  | Watch-keeping |





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