



Distr. LIMITED

UNEP(DEPI)/CAR WG.43/INF.15
20 December 2022

Original: ENGLISH

Tenth Meeting of the Scientific and Technical
Advisory Committee (STAC) of the Protocol
Concerning Specially Protected Areas and Wildlife
(SPA W) in the Wider Caribbean Region

Virtual, 30 January – 1 February 2023

**PROPOSAL OF THE “PARC NATUREL MARIN DE MARTINIQUE” FOR
LISTING UNDER THE SPA W PROTOCOL**

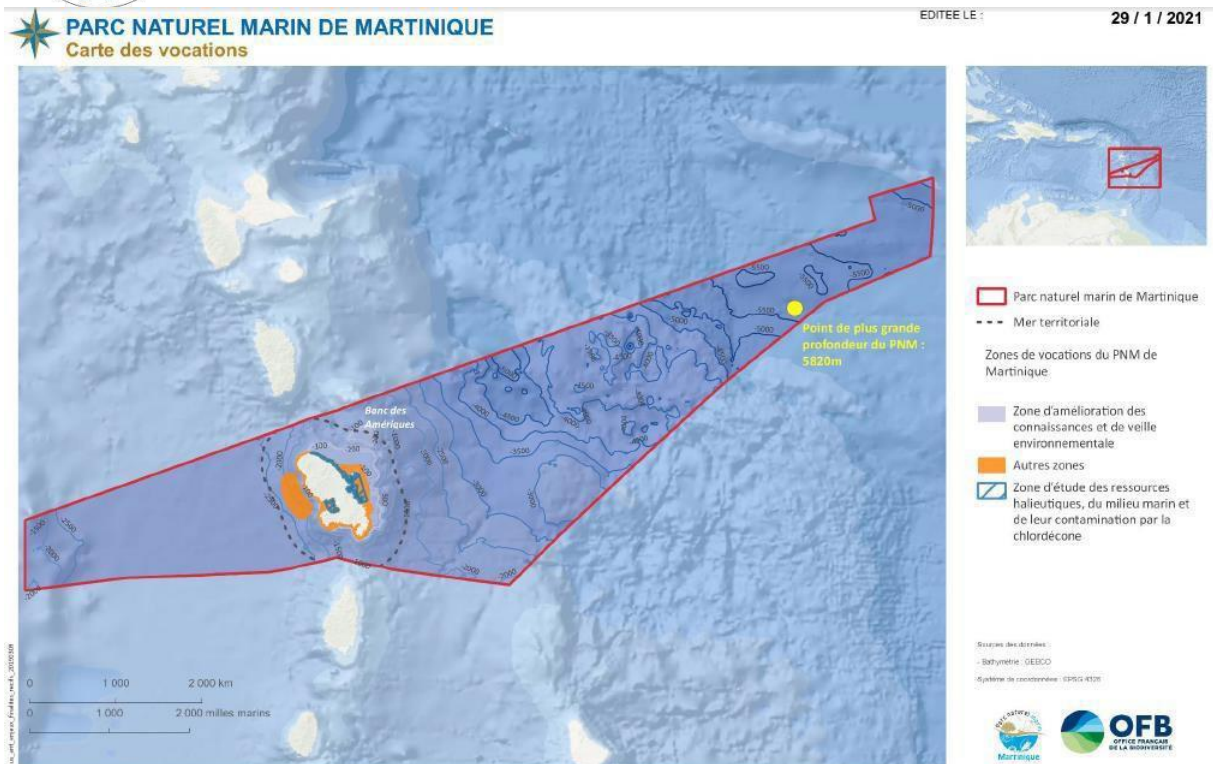
This meeting is being convened virtually. Delegates are kindly requested to access all meeting documents electronically for download as necessary.

*This has been reproduced without formal editing.

OVERVIEW REPORT FOR
INCLUSION ON
THE SPAW LIST OF THE MARINE
NATURE PARK OF MARTINIQUE

I. IDENTIFICATION OF THE PROPOSED AREA

- * a – Country: France
- * b – Area Name: Martinique Marine Nature Park
- * c – Administrative Region: Martinique Region
- * d – Creation date: 5 May 2017 by Decree no.2017-784.
- * e – If different, date of legal declaration:
- * f – Geographic location (include a separate appendix with a geographic map as indicated in the area's legal declaration), as well as geographical coordinates (X, Y for the central point, WGS84, UTM projection system):



- * g – Size (km ²) : 48,900 km²
- * h – Contact address (including website address, if applicable): 1 Rue des Pionniers, Texaco, Fort-de-France 97200
<https://parc-marin-martinique.fr/>
- * i – Marine ecoregion (as per the marine ecoregions in the global ranking): Eastern Caribbean
Code: 20064

II. EXECUTIVE SUMMARY

Martinique is an island in the Caribbean Sea, with a population of almost 400,000. In 1983, the States of the Greater Caribbean Region met under the auspices of the United Nations to launch the Caribbean Environment Programme and draw up the Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region. This regional Convention is divided into 3 protocols, including the SPAW (Specially Protected Areas and Wildlife) protocol dedicated to the protection of regional biodiversity.

The Martinique Marine Nature Park (MMNP) was created by Decree 2017-784 on May 5th 2017 in order to address the many issues involved in preservation of natural and cultural heritage and practices at sea. It covers all the French waters around Martinique. It is the most recent of the eight Marine Nature Parks managed by the Office Français de la Biodiversité (OFB – French Biodiversity Agency) (Article L334-2), whose objectives are to preserve the marine environment, improve knowledge and contribute to sustainable development of maritime activities. A team of OFB personnel implements the annual action programmes through actions carried out in-house or in collaboration with local partners.

Its Management Plan was the subject of broad consultation and major mobilisation on the part of the Management Board. It was voted on by the Management Board on February 24th 2021 and adopted by the French Biodiversity Agency on June 30th 2021. The Institution's Objectives and Performance Contract presents the priority operational objectives pursued for the Protected Areas and specifically for Overseas French territories.

Hence, the Martinique Marine Nature Park's inclusion on the SPAW list is a priority for the members of the Management Board and for the French Biodiversity Agency. The Management Plan provides for the strengthening of links with the Caribbean's marine protected areas.

This priority is illustrated by the Management Board's 8 values, the first of which is territorial anchorage, and by the collective artwork carried out by the Martinique Marine Nature Park's stakeholders during workshops on development of the Management Plan (see photo below). This work is entitled "La construction commune" or "*Ensemble Créons NOU*" (*Common Construction: Let's Create US Together*). Here the NOU lacks an "s", it is a Caribbean "nous" ("we"), a reminder of the need for territorial anchorage and a territorial project that takes account of its Caribbean environment, and whose development is due to collective intelligence.



Collective art work by 70 stakeholders: Ensemble Créons NOU (Let's Create US Together)

III. SITE DESCRIPTION

a) General characteristics of the site

- Land area under sovereignty, excluding wetlands (km²): 0
- Wetland area (ha): 2,268 hectares
- Sea surface (sq.km) : 48,900 km²

b) Physical characteristics

An island of volcanic origin, Martinique was formed by the meeting of the American and Caribbean tectonic plates between 22 and 24 million years ago. These original rocks are found on the Caravelle and Sainte-Anne peninsulas. Martinique was brought into being from south to north by a succession of volcanic eruptions, the last of which brought about the emergence of Mount Pelée, which rises to a height of 1,397 metres and whose soils are easily eroded. Major geographical disparities have created significant contrasts across the territory, in particular with regard to surface and groundwater bodies. We can distinguish:

- a wet mountainous northern area, with greater propensity for rainfall on the Atlantic side;
- a southern area with a lot of sunshine and little rainfall;
- rugged relief in the south-centre of the island, explaining the presence of microclimates (transition from a sheltered position to strong exposure to rainfall in just a few hundred metres).

In direct connection with the 7 main drainage basins, Martinique's marine environment fluctuates in accordance with these land-sea relations. The phenomenon is accentuated by the volcanic relief above and below the surface of the water, and the tropical climate.

c) Biological characteristics

- Habitats:

The diversity of Martinique's geological formations has led to major diversity in the seabed and the species it harbours. From the land to the deepest areas, numerous interdependent ecosystems have developed around Martinique, including coastlines (470 km), mangroves, seagrass beds, corals, sands and deep-sea habitats. Martinique's main natural marine habitats are as follows:

- Mangroves (and associated wetlands, mudflats, salt meadows, etc.)
- Coral reefs and associated communities (nearshore and marine benthic reef habitats and non-reef coral hard beds)
- Marine magnoliophyte (flowering plant) beds
- Other benthic habitats (these include all seabed types: algal beds, muddy beds, sandy beds, etc.)
- Pelagic habitats (in near-surface waters or between surface and seabed)
- Coastlines, beaches, cliffs and islets.

Martinique has 22 km² of mangroves (2% of the island's surface), 47 species of corals with community coverage estimated at 56 km² in 2009 and 7 species of marine phanerogams covering about 50 km² in 2009.

- Flora:

The seagrass beds are made up of 7 species of marine phanerogams. The species *Thalassia testudinum* and *Syringonium filiforme* constitute a coastal marine ecosystem of major heritage interest. The invasive species *Halophila stipulacea* is also very much in evidence. Finally, we may note the lesser presence of the following species: *Halodule wrightii*, *Halodule beaudettei*, *Halophila decipiens* and *Halophila baillonis*.

The mangroves in the West Indies are composed of four strict mangrove genera: the red mangrove (*Rhizophora mangle*), the white mangrove (*Laguncularia racemosa*) and the black mangroves (*Avicennia germinans* and *Avicennia schaueriana*). The latter type only occurs in the Baie des Anglais.

Other species are also present. We find the button mangrove (*Conocarpus erectus*) and the golden leather fern (*Acrostichum aureum*) in the mangroves on the edge of fresh water zones. It should be noted that the mangrove hinterland (tannes, salt meadows and supralittoral forests) also plays an important role in the mangroves' health. They are home to numerous plant and animal species.

The following species are listed in Annex III SPAW: *Avicennia germinans*, *Conocarpus erectus*, *Laguncularia racemosa*, *Halodule wrightii*, *Syringodium filiforme*, *Thalassia testudinum*, *Halophila baillonis*, *Halophila decipiens*, *Rhizophora mangle*.

- Wildlife:

Located in the heart of a global biodiversity hotspot, Martinique's marine environment is home to many highly endangered marine species. 21 species of marine mammals, 5 species of sea turtles, elasmobranchs, coral species, over 300 species of coastal fish and many large pelagic fish, 200 species of seaweed, over 100 species of sponges, gorgonians, molluscs, crustaceans and echinoderms, and 35 species of migratory and pelagic limicolous birds are present in Martinique's waters.

The list of marine mammals present and their statuses are provided in the appendices, along with the list of fauna and flora protected by orders in Martinique.

* Also provide the list of animal species on the site, namely:

In Appendix II SPAW: *Acropora cervicornis*, *Acropora palmata*, *Orbicella annularis*, *Orbicella faveolata*. Green sea turtle (*Chelonia mydas*), Hawksbill sea turtle (*Eretmochelys imbricata*), Leatherback sea turtle (*Dermochelys coriacea*), Olive ridley sea turtle (*Lepidochelys olivacea*), Loggerhead sea turtle (*Caretta caretta*), *Pristis pectinata*, *Pristis pristis*, *Pelecanus occidentalis*, *Picoides borealis*, *Puffinus lherminieri*, *Hydrobates pelagicus*, *Sterna dougallii dougallii*.

- In Appendix III SPAW: *Milleporidae*, *Stylasteridae*, *Antipatharia*, *Alcyonacea*, *Scleractinia*, *Strombus Gigas*, *Panulirus Argus*, *Epinephelus Striatus*, *Iguana Delicatissima*, *Iguana Iguana*, *Carcharhiniformes*.

- On the IUCN Red List, *Acropora cervicornis* and *Acropora palmata* are listed as Critically Endangered, and *Orbicella annularis* and *Orbicella faveolata* as Endangered. Green sea turtle (*Chelonia mydas*), Hawksbill sea turtle (*Eretmochelys imbricata*), Leatherback sea turtle (*Dermochelys coriacea*), Olive ridley sea turtle (*Lepidochelys olivacea*), Loggerhead sea turtle (*Caretta caretta*).

d) Current activities and human population

At January 1st 2018, Martinique's population was estimated at 368,783. Tourist numbers should be added to this figure as tourism accounts for a significant part of human activity on the island. There were 964,000 visitors in 2019. It should be noted, however, that total visitor flow for 2019 was down by 8.2% compared with 2018.

Maritime activity in Martinique falls within a rich historical and cultural context that must be taken into account. A number of major events that have helped forge the island's identity, including its settlement and, later, the slave trade, have involved a close and complex relationship with maritime areas. This explains why the Martiniquans are so intimately linked to their marine environment, and the importance and diversity of their tangible and, above all, intangible cultural heritage. The sea continues to be a source of life and income, and it is estimated that 12% of the island's jobs are connected with it, not counting indirect activities.

The main maritime activities identified to date are as follows: professional fishing, aquaculture, recreational fishing, goods transport, cruises, activities relating to port infrastructures, yachting, nautical events, excursions, passenger transport, underwater leisure activities and water sports activities. The aforementioned activities will be detailed in section f), and related to the potential threats they pose to the site.

e) Impacts and threats affecting the site (both within and around the area)

Several types of activities use fishery resources.

Professional fishing harvests the largest quantities of these resources, with almost 950 tons of production (Ifremer, SIH, 2020). **Aquaculture**, which has been in crisis for several years, produces about 40 tons of red drum *Sciaenops ocellatus* a year. There are no accurate figures for **recreational fishing**. The professional fishing industry comprises 1,053 fishermen and 614 active vessels (Ifremer, SIH, 2020).

Resources have weakened. Ifremer figures between 1987 and 2009 highlight a **decrease in catches per trip** for the main activities exploiting the insular shelf, including fish traps (61% of trips targeting fishing shelf resources) and nets (26% of trips). However, catches per trip of large offshore pelagic fish and inshore pelagic fish increased. Even though this trend reversed between 2008 and 2019 for the aforementioned activities (traps and nets), it is evidence of significant exploitation of a resource that may already be weakened by factors other than fishing (pollution, global changes, etc.).

A survey among 25 fishermen shows the radical disappearance of certain species (Waliwa grouper, Feathered dogfish, Watalibi grouper and platax, all of which are in sharp decline) as well as a less abundant and less diversified coastal resource. Pelagic fish also seem to be under major pressure, especially flying fish, even though fewer marlin are caught than was previously the case. Small pelagic species (sauries and saurels) are tending to decrease in size, raising fears of excessive exploitation of juveniles. Finally, numbers of queen conches are clearly decreasing, in particular in the species' historical exploitation area, the South Atlantic.

Other factors are involved in the depletion of some species. This is the case, for example, with regard to loss and destruction of habitats. Anthropogenic pressures (eutrophication, chemical contamination, coastal development, hyper-sedimentation, etc.) also cause major disruption of ecosystems essential to the health of fisheries (mangroves, seagrass beds and coral reefs).

There are a dozen activity sectors, not including fishing and aquaculture, involved in the island's blue economy.

Goods transport

Goods transport is essential to the island's functioning because of its dependence on many imported products, chief among which is oil. Petroleum products are essential for supply of transport and operation of the island's thermal power plants, including the Bellefontaine plant. Supplied via a dedicated wharf, this plant alone meets 60% of local electricity needs. Approximately 1 million tons of oil is imported to the island per year. In 2018, the Grand Port Maritime de Martinique reached a tonnage of over 3 million tons, for 1,900 calls, ranking it 16th nationally. In addition to the personnel embarked by shipping companies, **1,116 full-time equivalents (FTEs) work in the sea transport sector**, with all its related branches (Directorate of the Sea figures for 2016).

Cruises

Passenger transport accounts for a large proportion of the maritime transport managed by the Grand Port. Long-distance cruises, i.e., large cruise ship companies (accommodating several hundred or thousand passengers), provide voyages lasting one or two weeks with stopovers on the Caribbean islands. **Nearly 900,000 passengers** embarked or disembarked in Martinique in 2018. Two sites receive such vessels in Fort-de-France: two wharves located at Pointe Simon and Quai des Tourelles. The economic benefits for the island are estimated at 12.8 million euros, or about 45 euros spent per tourist.

Port infrastructures

Its port infrastructures are essential to the island's economy and channel most imported manufactured goods and petroleum products. Exports, which account for less than a third of flows, are limited to transshipment and the banana trade to France. Waste containers are also sent to processing centres.

In addition to the 2 main marinas (Le Marin and Fort-de-France), most boats are to be found in small ports, usually in wild anchorages around the island. Only the marina of Le Marin has been awarded the "Blue Flag" label, highlighting its consideration of environmental criteria (water quality, waste management, etc.), environmental awareness-raising, and accessibility. Lack of waste-sorting infrastructures, malfunctioning of wastewater collection pumps (or their difficulty of use) and the low number of boats equipped with tanks are all factors that make Martinique's port areas real potential

sources of pollution and degradation of the marine environment. It has to be said that development of anchorages is anarchic, generating considerable pressure on the seabed and water quality: destruction of the bed by anchors, water pollution, conflicts of use with other activities (professional fishing, nautical activities and swimming). Figures for 2013 (Martinique Chamber of Commerce and Industry) reported 830 illegal anchorages, to which illegal pontoons should be added, with frequent impacts on the environment: coral destruction and reduction of seagrass bed surface areas.

Yachting

Yachting is a promising sector that plays a key role in the territory's blue growth strategy. It takes place along the coasts and between the islands of the Lesser Antilles and, more generally, of the Antillean Arc. The nautical sector accounts for about 900 direct jobs in some 260 companies, but its scale is difficult to gauge accurately due to the large number of activities and services. Its weight is estimated at about 63 million euros a year in Martinique. There are between **4,500 and 5,000 pleasure craft in Martinique**. The trend is upward with approximately 200 registrations a year.

Nautical events

Although the Martiniquans are not culturally orientated towards sailing, the last few generations have developed a taste for it, in particular through such recently popular festive events as the "Tour des Yoles" a regatta, during which the population support its team of yachtsmen by following them around the island for a week. Such nautical events have developed in recent years: **the Directorate of the Sea processes over 150 requests for authorisation every year**.

While most regattas and sports competitions do not have a significant impact, their frequency on the same site can result in cumulative effects that are disruptive to wildlife and habitats: disturbance of sensitive species, trampling of seagrass beds and coastal vegetation, anchoring on sensitive seabeds, and macro-waste.

Excursions: professional yachting

Yacht excursions are a very popular activity, directly linked to the island's tourist attractiveness. It targets the islets along the Atlantic coast and discovery of emblematic species along the Caribbean coast. **Nature discovery outings**, mostly on the lookout for marine mammals and, more recently, turtles and bats, are developing along the Caribbean coast. In addition to fishermen who have opted for a career change, the number of operators has been constantly increasing over the last 10 years: there are almost 53 operators primarily targeting cetaceans (AGOA, 2019) and about 20 (Aquasearch, 2018) whose main activity is turtle watching. wildlife observation activities generate turnover of nearly 4 million euros (Souffleurs d'écume, 2015; Aquasearch, 2018).

The recent turtle observation activity is evolving. It consists of seeing and swimming with turtles in the Anses d'Arlet. There may be up to 32 swimmers around a single turtle, as tourists on the beach are added to swimmers diving off boats (Source: Aquasearch, 2019). Although disturbance mechanisms are poorly documented, significant behavioural changes have been observed following high observation pressure.

Passenger transport

A passenger transport offer enables inter-island and intra-Martinique journeys. Hence, **216 calls, accounting for over 140,000 passengers, are made at the Fort-de-France maritime station** (part of the Grand Port Maritime) by boats belong to the Express des Iles and Jean's companies.

Underwater leisure activities

This practice includes scuba diving, freediving and snorkelling. **There are around a hundred diving sites**, mainly located on the Caribbean coast and in the south as far as Sainte-Anne. More than 160,000 dives were recorded in 2006. The most popular sites are Cap Salomon (13,220 dives), Rocher du Diamant (8,500 dives) and Pointe Burgos (8,240 dives). With 35 diving companies plus associations and self-employed workers, it would seem that numbers have been maintained.

Water sports activities

The great majority of water sports enthusiasts do not belong to clubs, so it is difficult to know how many there are. Even though most activities are environmentally friendly, some practices can have direct or indirect impacts on the environment. Studies conducted in Martinique show that, although trampling of seagrass beds does not seem to be responsible for decreases in surface area, trampling of certain coral reefs can be irreparable.

Pollution: migration from land to sea

Whether individual or collective, pollution comes from domestic, agricultural and industrial human activities. **Land pollution has the marine environment and its ecosystems** (mangroves, sea grass beds, coral reefs, etc.) as its receptacle. In addition, climate change tends to increase the impacts of pollution (by generating dry periods, physicochemical upheavals, ecosystem upheavals, invasions of exotic species, etc.).

Sources of pollution are multiple and cumulative: wastewater from unconnected households, runoff, direct emissions from agriculture, industrial emissions, stormwater from the separation system, collective wastewater treatment plants, and atmospheric deposition on surface waters.

Macro-waste, in particular lost fishing gear (such as nets, traps and longlines), continues to trap fish, turtles and marine mammals for months or even years, preventing them from breathing on the surface and/or feeding, and resulting in certain death. It is also responsible for degradation of habitats and benthic species by abrasion (scraping) of the seabed. Some species of building corals, gorgonians and sponges are particularly vulnerable. Finally, they constitute "visual pollution" which contributes to degradation of underwater landscapes and diminishes diving sites' attractiveness.

On average, almost 40 tons of waste are collected each year along Martinique's coast (Martinique Waste Prevention and Management Plan, CTM 2019). During the "**Récup' Mer**" operation organised by the Marine Nature Park in 2019, **5 tons of waste** were collected underwater and on beaches.

Massive beaching of sargassum

For the last ten years or so, the islands of the Antillean Arc (in particular) have regularly witnessed episodes of massive beaching of brown seaweed. Massive beaching in areas where seaweed accumulates, generally at the bottom of bays, cause phenomena detrimental to humans, marine fauna, benthic ecosystems and mangroves. In these sectors, during paroxysmal episodes, deaths among corals, phanerogams, and benthic macrofauna have been observed. Habitats then tend to be recolonised by opportunistic species (seaweeds and the invasive phanerogam *Halophila stipulacea*), leading to decreases in biodiversity.

e) Other relevant factors (including educational, scientific, research, historical and archaeological characteristics)

Within the French nation, Martinique's inhabitants are a community with its own culture. It has been enriched by various influences, coming from the original cultures of the various populations on the island as well as from the Caribbean region as a whole.

Both historically and geographically speaking, Martinique is a crossroads of cultures and populations. Hence, we find descendants of slaves and European, Indian and Asian descendants, all very much influenced by Creole and Caribbean culture.

The Creole language, music, gastronomy and, more generally, arts, along with the relationship to the sea, are **characteristics shared with the Caribbean's other regions.**

The population

With an average annual decline of 0.8% over the last five years, it is the most rapidly depopulating French region. This situation is explained by an apparent negative inflow-outflow balance that is not compensated by the natural balance.

The departure of young people, many of them graduates, contributes considerably to this ageing: 18-27-year-olds account for half of departures from the territory. Since 2009, Martinique has lost 4,300 inhabitants a year.

The Caribbean Basin is one of the world's leading basins with regard to navigation and nautical practice, and even the northern hemisphere's leading basin in winter. Nevertheless, maritime professions remain relatively unknown and are still perceived as limited to the fishing industry.

Through the Martinique Marine Nature Park, the island, with its strong marine culture, is involved in the network of marine educational areas enabling schoolchildren to acquire **knowledge and participate in the protection of the coastal and marine environment from their fourth year at primary school to their final year of lower secondary education.** Guided by their teachers and an environmental education structure, pupils define the perimeter of the educational area they will be in charge of, and elect a student council to determine the actions they will carry out on it over the course of the school year. **9** classes are currently involved in participatory protection of Martinique's natural heritage.

g) Expected and measured trends in the impacts and threats listed above.

Exploitation of resources

Whether they are living or non-living resources, we will need to ensure their rational exploitation, essential to the sustainability of the activities that depend on them. Hence, to enable the balance between fisheries resource and ecosystem preservation, the fishing and aquaculture sectors will have to commit to better practices. . Likewise, innovative technologies must be put at the service of the environment, in order to ensure progress in the energy mix and production of materials, as well as in research and medicine.

The primary objective is to reduce the impacts of fishing and aquaculture activities on non-target species and habitats alike. To do so, experiments will be launched and innovations encouraged, all in close collaboration with professionals on the ground. Materials, forms, energy... all the research carried out will have to focus **on making significant improvements in practices.**

In compliance with the Law on Energy Transition for Green Growth, Martinique must try to achieve energy autonomy by 2030. In this regard, every effort must be made to promote the energy mix and to develop projects essential to the territory. It will be necessary to identify local production potential in order to ascertain exploitation opportunities. From preoperational stages to the final project, by way of development stages, **the whole cycle will have to respect the fragile ecosystems.**

Environment quality

In order to **achieve the good-quality environment objective**, activities that use this environment must contribute to its preservation, all the more so as it contains the resources necessary to their performance. Hence, we shall need to ensure that their development does not degrade the marine environment, making use of the precautionary principle if necessary. Although they generate wealth on the island, development of sea-related activities must not be at the expense of the heritage on which activities are based. On the contrary, the territory's attractiveness depends on the quality of these sectors. From this point of view, a spatial vision of nautical activities must enable definition of areas favourable to their development, in full respect of environmental concerns. All the sectors concerned must be involved in the various planning strategies, whether local, regional, national or even international.

Measurements carried out over the last 10 years do not show any significant trend in the quality of coastal waterbodies.

In the context of the drafting of the Schéma Directeur d'Aménagement et de Gestion des Eaux (SDAGE – Water Development and Management Master Plan), a forward-looking exercise has been carried out to identify the waterbodies that would not be able to achieve good status at the end of the management cycle. This approach is based on cross-referencing of the known state of waterbodies with the pressures exerted on them, in order to determine trends in environmental quality. Gradual improvement of this knowledge and of the status indicators relating to the parameters measured should lead to better understanding of **the actual quality of marine waters** (coastal waters in particular) with regard to the needs and sensitivity of the biocenosis they harbour. Complementary targeted measurements will have to be obtained in order to add to such knowledge and enable more accurate identification of the pressures exerted on the marine environment that are the most impactful and must therefore be reduced as a priority.

Martinique already has a number of marine areas that meet some or all of the criteria for a Zone de Protection Forte (ZPF – Strong Protection Area), like nature reserves and fishing cantonments. One of the Park's goals will be to maintain this high level of protection in existing areas, give ZPF status to areas meeting some of the criteria, and complete the network by creating strict regulations wherever protection is needed. This network of highly protected areas will be an efficient structure, coordinating the actions of the various managers identified.

IV. ECOLOGICAL CRITERIA

Nominated areas must meet at least one of the eight and ecological criteria. Describe how the proposed site meets one or more of the following criteria.

Representativeness:

Martinique Marine Nature Park integrates 3 biotopes representative of the Caribbean region: mangroves, phanerogam meadows, and coral and sponge reefs.

Mangroves, forestland between land and sea, take up 2% of the island's surface area, 22 km² in all. Mangroves contribute to stabilisation and protection of the coastline; they help purify the drainage basins' waters by filtering them and retaining pollutants, to the benefit of reefs and seagrass beds located downstream. Hence, their presence is important for the maintenance of seawater quality and the reduction of turbidity, and is therefore beneficial to the health of nearby habitats. Development of the coastline and destruction of mangrove hinterlands, along with various types of pollution, are major pressures on wetlands. Sargassum beaching also degrades the mangrove habitat. These pressures have an impact on all the species that transit or live in the mangroves.

Coral communities, covering 56 km², are habitats essential to maintenance of numerous ecological services: habitat, nurseries and spawning grounds for a large number of remarkable species. They provide essential services to human societies: fishing resources, physical protection of the coastline (reduction of wave force) against climatic phenomena and coastal erosion, strong landscape and heritage value, and tourism.

Consisting of 7 species including *Thalassia testudinum* and *Syringonium filiforme*, the phanerogam meadows constitute a coastal marine ecosystem of major heritage interest. The ecological importance of seagrass beds is considerable due to their multiple functions: oxygenation, seabed stabilisation, production of organic matter, food source, and spawning ground and refuge for many organisms. Like mangroves and corals, they are true ecosystem "engineers" providing a while range of ecological services.

Conservation Value:

Encompassing the island's entire Exclusive Economic Zone (EEZ), MMNP's goal is the conservation and development of the species restricted to these waters as well as migratory species. Located in the heart of a global biodiversity hotspot, Martinique's marine environment is home to many highly endangered marine species for which we are responsible. Some species have already disappeared from our waters, others are endangered, many remain unknown... The presence of such emblematic species as marine mammals and sea turtles is an asset when it comes to helping the territory take account of the issues involved in marine species. Martinique already has a number of marine areas that meet some or all of the criteria for a Zone de Protection Forte (ZPF – Strong Protection Area), like nature reserves and fishing cantonments. One of the Park's goals will be to maintain this high level of protection in existing areas, give ZPF status to areas meeting some of the criteria, and complete the network by creating strict regulations wherever protection is needed. This network of highly protected areas will be an efficient structure, coordinating the actions of the various managers identified.

Rarity:

The most recent Madibenthos scientific expedition confirmed that only small quantities remain of the species encountered. The decreasing number of individuals observed per species constitutes a threat to our ecosystems' resilience. The endemism of many of our animal species contributes to the island's remarkable biological wealth.

Critical Habitats:

The Marine Nature Park includes critical habitats for a number of endangered and endemic species. The following species are listed in Annex II or III of the Protocol: *Avicennia germinans*, *Conocarpus erectus*, *Laguncularia racemosa*, *Halodule wrightii*, *Syringodium filiforme*, *Thalassia testudinum*, *Halophila baillonis*, *Halophila decipiens*, *Rhizophora mangle*, *Acropora cervicornis*, *Acropora palmata*, *Orbicella annularis*, *Orbicella faveolata*, *Milleporidae*, *Stylasteridae*, *Antipatharia*, *Alcyonacea*, *Scleractinia*, *Strombus gigas*, *Panulirus argus*, *Epinephelus striatus*, *Iguana delicatissima*, *Iguana iguana*, *Carcharhiniformes*, Green sea turtle (*Chelonia mydas*), Hawksbill sea turtle (*Eretmochelys imbricata*), Leatherback sea turtle (*Dermochelys coriacea*), Olive ridley sea turtle (*Lepidochelys olivacea*), Loggerhead sea turtle (*Caretta caretta*), *Pristis pectinata*, *Pristis pristis*, *Pelecanus occidentalis*, *Picoides borealis*, *Puffinus lherminieri*, *Hydrobates pelagicus*, *Sterna dougallii dougallii*.

Diversity

47 species of corals have been identified in Martinique, 4 of which are classified as Endangered by the IUCN, and 16 of which are protected species. There are also 21 species of marine mammals, including the humpback whale, which is classified as Vulnerable by the IUCN, more than 300 species of coastal fish, 65 of which are found in the seagrass beds, and many large pelagic fish, 5 species of turtles and 175 listed nesting sites, over 200 species of seaweeds, more than 100 species of sponges, gorgonians, molluscs, crustaceans and echinoderms, including such emblematic species as the white sea urchin and the queen conch.

Connectivity / coherence:

Due to the migratory nature of certain species (large marine mammals, turtles and seabirds) and the presence of pelagic phases (gametes and larvae) other species' lifecycles (queen conches and corals), Martinique's waters form part of the continuity of the waters of all the Caribbean countries, and beyond via marine currents. We also need to take account of problems arising in island territories connected by marine currents, such as massive arrivals of sargassum and proliferation of invasive exotic species (lionfish *Pterois volitans*, *Halophila stipulacea*).

V. CULTURAL AND SOCIOECONOMIC CRITERIA

Where applicable, nominated areas must meet at least one of the three cultural and socioeconomic criteria.

Productivity:

Marine and coastal ecosystems perform **numerous ecological functions** essential to the life of all species, including respiration, primary production, food chains, biodiversity support, geochemical cycles, gas exchanges, recycling, water purification and sediment transport. These ecological functions can themselves provide resources and **valuable, vital services to human societies**: oxygen and respiration, food resources from fishing, climate regulation, protection against coastal erosion, production of useful molecules (health, etc.), environmental amenities, and creative inspiration.

Cultural and traditional use:

From Native Americans to World Wars, inventorying of underwater archaeological sites and wrecks has been carried out since 1990 by the Groupe de Recherche en Archéologie Navale (GRAN – Naval Archaeology Research Group), in the context of an agreement between the Ministry of Culture, Martinique Regional Council, Martinique Départemental Council and GRAN, under the auspices of the Département des recherches archéologiques subaquatiques et sous-marines (DRASSM – Department of Subaquatic and Submarine Archaeological Research). This research is accompanied by excavations and has been divided into five main themes covering maritime activity in Martinique: the pre-Columbian period, control of the Caribbean space, trade, the slave trade, and coastal shipping. A number of wrecks and fragments of wrecks, isolated objects such as anchors, chests and boxes, masts, ceramics, coastal battery cannons thrown into the sea, dumpsites, moorings, metal debris and even submerged Saladoid Amerindian sites have been identified off Martinique's coasts.

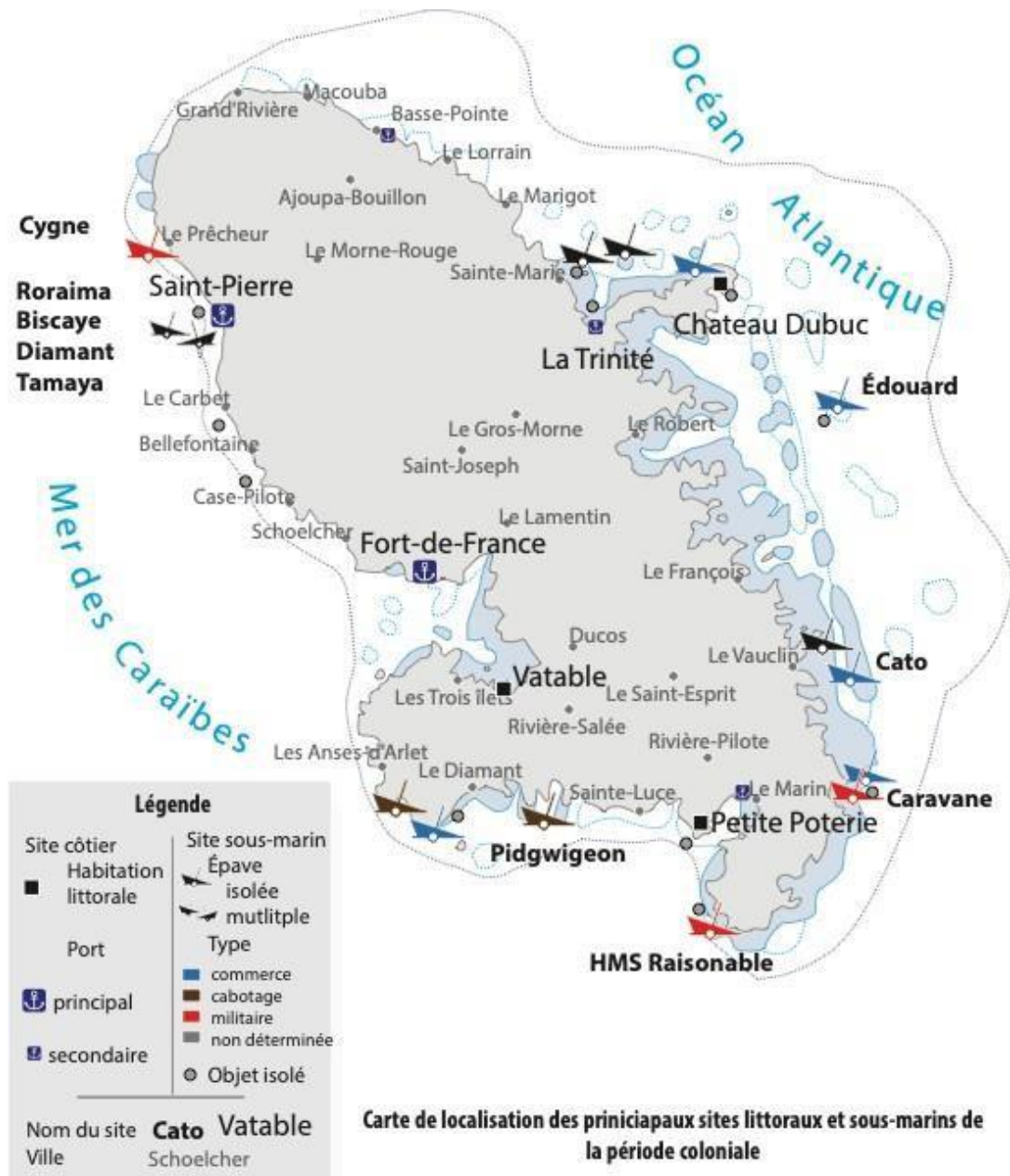
Focus: Traditional boats:from the kanawa to the round yole

The Kalinago are "the heirs of several millennia of maritime tradition, a tradition that was the fundamental factor enabling them to form a society on the Caribbean archipelago". (Bérard et al., 2016a: 133). They have three types of boats.

The kanawa remains the indispensable traditional canoe carved from a single tree trunk, the craft most representative of the Kalinago's island lifestyle. The kanawa played a major role in helping the Amerindians tame the seas, and was also a support for the populations of the Antilles' reappropriation of a common heritage, a common space and a common identity" (Bérard et al. 2009b: 7).

The sail arrives with the Europeans during the contact period. The Amerindians quickly adapted to this new mode of propulsion. As a result, the "gommiers" (gum-tree boats) made their appearance in Martiniquan boat typology. The fisherman's preferred craft, it is a kanawa hull, fitted with a sail in the 16th century, and then with a rudder in the 19th century. The relationship between the gommier and the yole is widely detailed in numerous works on the identity, heritage, tourism and economic issues involved in sailing activities, as well as their "sportivisation" and institutionalisation in Martinique (Pruneau et al., 2006; Dumont, 2009; Moravie, 2011, 2014; Nicolas-Bragance and Saffache, 2015). The

most popular explanation of the origins of the yole is that the scarcity of gum trees in Martinique's forests led to the creation of a new "Creole" boat in the 1950s, the round yole.



Socioeconomic benefits:

In a unique and highly integrated Caribbean tropical system such as Martinique's (high rate of endemism, coral reefs that develop in an oligotrophic environment, strong land-sea link, and social and economic activities highly dependent on the quality of the marine environment), it is important to remember, above all in this period of recovery, that targeted degrees of sustainability can only be very strong. Hence, in Martinique, its Marine Nature Park believes that there can be no overall recovery or

pursuit of sustainable territorial development without the recovery of marine biodiversity. Preserving a critical minimum of natural capital will not enable replacement of this lost wealth by assets of another nature. A stockpile of equipment, knowledge, and skills will not replace an ecologically sound mangrove or substitute for coral communities.

VI. MANAGEMENT

The protected area must be subject to a legal management framework, guaranteeing its effective protection over the long term. The approved site's management framework must be able to achieve its biophysical and socioeconomic objectives. With this objective in mind, describe the following management aspects.

a) * Legal and policy framework (international, national, regional and local) attach copies of the original texts to the appendices, and indicate IUCN status if possible):

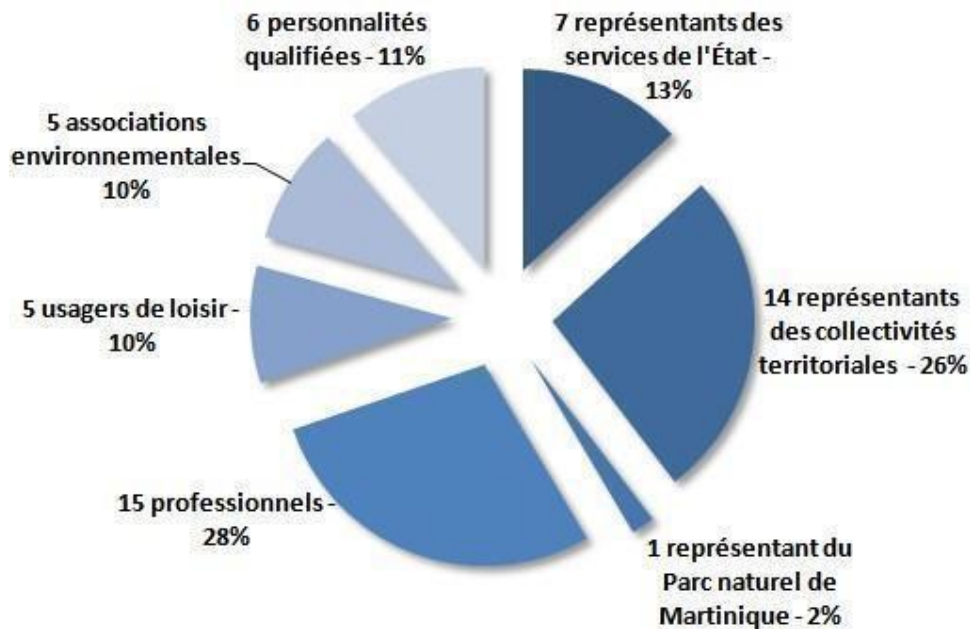
Martinique Marine Nature Park was created by Decree No. 2017-784 of May 5th 2017. The "Marine Nature Park" tool was created in 2007 in the Environmental Code, which describes its organisation and operation. Marine Nature Parks are Marine Protected Areas under Article L334-1 of the Environmental Code.

b) Management structure, authority.

A Marine Nature Park's management body is its Management Board, composed of representatives of all marine environment stakeholders in the territory covered by the Park. In Martinique, the Management Board is composed of 53 members: representatives of the State, elected local authority officials, representatives of sea professionals (including 8 representatives of the professional fishing industry), representatives of recreational use organisations (sports federations and associations, diving clubs, sea excursion companies, etc.), representatives of environmental protection associations and qualified individuals.

The Board is responsible for drawing up the Park's Management Plan, which sets out its objectives over 15 years. It then approves the annual action programmes drafted by the Park's technical team, and issues opinions and decisions on projects and policies concerning the Park's marine environment. The Management Board cannot create regulations applicable within the Park but can make proposals to the competent authorities. In addition, the opinions it issues on projects likely to have a significant impact on the Park's marine environment are binding, and must be followed up by the departments responsible for authorising such projects.

The Management Board meets between two and four times a year. In order to maintain a sustained work dynamic within the assembly, a bureau has been set up and can be convened in more flexible fashion in order to give advisory opinions or monitor the progress of actions carried out in the Park.



c) * Functional governing body (with the authority and means to implement the framework):

As is the case for all Nature Parks, Martinique Marine Nature Park's technical team is composed of personnel from the French Biodiversity Agency (OFB), a State public institution resulting from the merger (between 2017 and 2020) of the Agence des Aires Marines Protégées (AAMP – Agency for Marine Protected Areas), the Office National de l'Eau et des Milieux Aquatiques (ONEMA – National Office for Water and Aquatic Environments), the Office National de la Chasse et de la Faune Sauvage (ONCFS – National Office for Hunting and Wildlife), and the Atelier Technique des Espaces Naturels et de Parcs Nationaux de France (Technical Workshop for France's Natural Areas and National Parks). The institution has around 2,800 employees across French soil, who implement various missions for the protection of biodiversity.

In June 2022 Martinique Marine Nature Park's team is composed of 20 agents divided into two departments: An Engineering Department made up of theme-based project managers, and an Operations Department made up of field agents with policing powers. The Park Director is the OFB Director General's delegate to the Management Board. Actions carried out by the Park's team aim to achieve the Management Plan's objectives through four levers of action: acquisition of knowledge, provision of support to stakeholders, awareness-raising among all sectors of the public, and monitoring of activities and the environment. The Park can take action directly, via service providers, or by providing financial and technical support to partnership projects. In 2022, the budget dedicated to Martinique Marine Nature Park is about €1M excluding salaries and investments, and is provided by the OFB's central departments.

d) * Objectives (specify if priority or of equal importance):

The Park's objectives are framed by the management guidelines set out in its Decree of Establishment, without prioritisation:

1° To contribute to greater knowledge of natural heritage, including river mouths, mangroves, seagrass beds and reefs, its biodiversity and functionality, and maritime cultural heritage;

2° To raise awareness, among as many people as possible and as early as possible, of the specificity and preservation of Martinique's maritime space, and share these initiatives in the Caribbean;

3° To propose the protection, restoration and enhancement of marine species and environments, such as corals and bay seabeds and coordinate their management;

4° To support small-scale coastal fishing and aquaculture;

5° Taking account of the strong land-sea link, to support innovative, participatory management in development projects aiming to reconcile the various uses, improve water quality and integrate the services provided by marine ecosystems;

6° To engage tourism, sports, nautical leisure activities and ports and anchorages in responsible practices by training the actors concerned and providing suitable facilities;

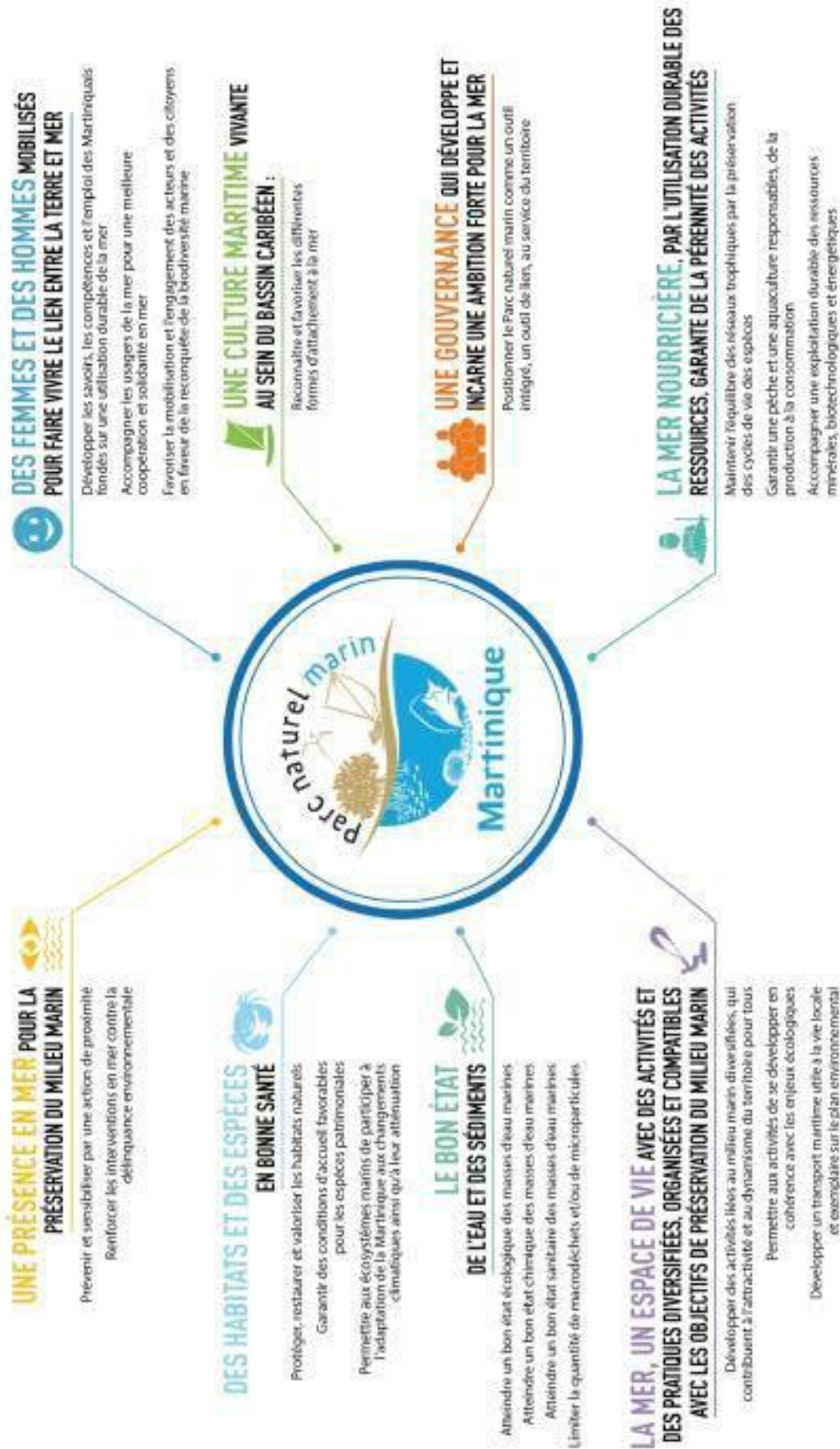
7° To contribute to the planning of uses, prevention of conflicts, and effectiveness of the marine environment police.

The objectives of the 2021-2026 Management Plan adopted in February 2021 are organised into 9 concerns, 20 goals and no fewer than 140 levels of requirement.

e) Brief description of the Management Plan * (attach a copy of the Plan to the appendices):

The Management Plan's general philosophy is based on a strong mobilisation of the Martiniquan population and all stakeholders, drawing on references from Creole culture and therefore on better appropriation of the marine environment's challenges, by younger generations in particular. Such mobilisation will enable achievement of ambitious objectives for conservation of species and habitats, as well as improvement of the quality of marine waterbodies. Given the concerted and partnership-based way in which the document was prepared, the objectives it contains are shared, and the principles of action listed in it are intended to be implemented by all stakeholders.

A summary of the Management Plan in table form is appended (Appendix 1).



f) Specify whether certain species and habitats listed in Article III-C are subject to more management/recovery/protection measures than others.

Various management measures govern activities within the Park, due to regulations that predate its creation or concern areas outside the Park itself.

- The **AGOA Sanctuary**: a vast marine area focusing on management of marine mammals, in particular through implementation of best-practice charters and acquisition of knowledge. Its covers all the French West Indies' marine waters. This tool provides us with a coherent vision as far as the French West Indies and the international cooperation projects in the context of the SPAW protocol are concerned.
- National protections: The following are concerned: 49 species of corals, 24 species of marine mammals, 5 species of sea turtles, large colonies of seabirds and shorebirds with status, and many species of sponges and gorgonians.
- Ministerial and local protections:
 - Ministerial Order regulating approach of **cetaceans** in waters under French jurisdiction in the West Indies (15 March 2017)
 - Ministerial Order establishing the list of **marine mammals** protected on national territory, and methods of protection (10 May 2019)
 - Ministerial Order establishing the list of **protected corals** in Guadeloupe, Martinique and Saint-Martin, and methods of protection (25 April 2017)
 - Ministerial Order establishing the list of **sea turtles** protected on national territory and methods of protection (14 October 2005). Sea turtles are the subject of a National Action Plan for the French West Indies (currently being validated for the period 2020-2030).
 - Prefectural Order regulating **professional sea fishing** in Martinique (25 April 2019)
 - Prefectural Order regulating **recreational sea fishing** in Martinique (April 8, 2019)
- **Prêcheur Regional Nature Reserve** is composed of three regulated marine areas:
 - EP (Enhanced Protection Zone): Professional fishing prohibited (except with surface nets) – Recreational fishing prohibited – Underwater hunting prohibited
 - NRZ (Nature Reserve Zone) Professional fishing authorised (excluding use of trammel nets) – Recreational fishing prohibited (except for non-motorised angling) – Underwater hunting prohibited
 - EFZ (Exclusive fishing zone): Professional fishing authorised during the periods fixed by order – Recreational fishing prohibited – Underwater hunting prohibited.
- The three **fishing cantonments** limit harvesting in the following areas: Baie du Trésor (Trinité): Prefectural Order no.9922 bis of 8 January 1999 / Îlet Ramier (Trois- Ilets): Prefectural Order no. 991521 of 17 June 1999 / Case Pilote: Prefectural Order no.20160932 of 21 September 2016.
- The Le François underwater activity zone was established by Prefectural Order (no.2013107-0003 of 17 April 2013).

- The Le Pothuau underwater activity zone was established by Prefectural Order (no.R02-2016- 12-13-005 of 13 December 2016).

g) Describe how the protected area is integrated into a broader planning framework in the country (if applicable):

The 2009 "Grenelle of the Sea" led to a number of proposals for the marine environment, including creation of a network of marine protected areas covering 20% of the French maritime area's waters, in particular through creation of 8 Marine Nature Parks. The National Protected Areas Strategy, adopted in 2021, reinforces this ambition by setting a target of 30% of French territory in protected areas and 10% under strong protection. For the marine component, the so-called "strong protection" zones are mostly located within marine protected areas such as Marine Nature Parks.

In addition, the Strategic Document for the Antilles Basin, drawn up by the Conseil Maritime Ultramarin de Bassin (the Basin's Overseas Maritime Council) establishes the main guidelines for development of activities and conservation of ecosystems in the French West Indies. It sets various objectives, including "strengthening management and protection measures within existing MPAs".

h) Zoning, if applicable, and basic regulations applied to zones (attach a copy of the zoning map to the appendices):

The Marine Nature Park is not divided into zones where specific regulations apply. However, the Management Plan has a map of priority focus areas (carte des vocations), which geolocates issues and priorities for action in the maritime territory.

This zoning does not constitute a hierarchy of levels of protection sought, or an overview of the importance of uses or any prioritisation of actions to be implemented. It aims to summarise the characteristics common to certain areas and spatialise the Management Board's wishes for the maritime territory. **There is no gradient of importance between the zones, only specific readings of the various issues present.**

Four zones have been identified:

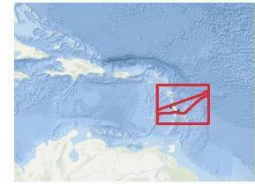
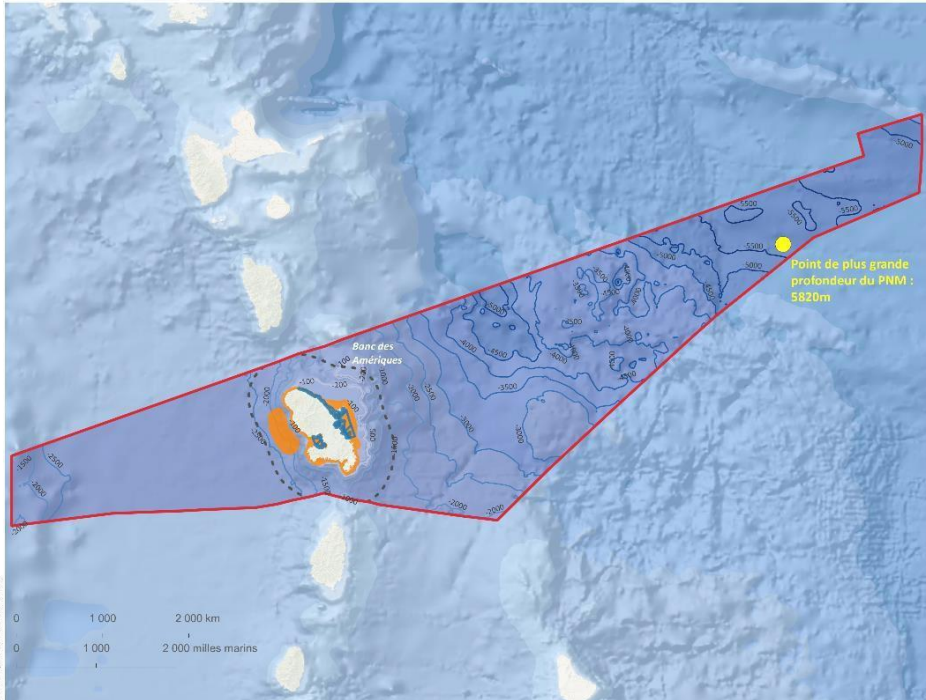
- Zones for pressure reduction and maintenance of remarkable biodiversity
- Zones for monitoring, regulation of pressure and restoration of ecosystems
- Zones for promotion and preservation of natural and cultural heritage
- Zones for improvement of knowledge and environmental monitoring

A transversal zone is overlapped on the zones so defined, in order to take specific account of the need to acquire knowledge on fishery resources, the marine environment, and **their contamination by chlordecone.**

PARC NATUREL MARIN DE MARTINIQUE
Carte des vocations

EDITEE LE :

29 / 1 / 2021



- Parc naturel marin de Martinique
- Mer territoriale
- Zones de vocations du PNM de Martinique
- Zone d'amélioration des connaissances et de veille environnementale
- Autres zones
- Zone d'étude des ressources halieutiques, du milieu marin et de leur contamination par la chlordécone

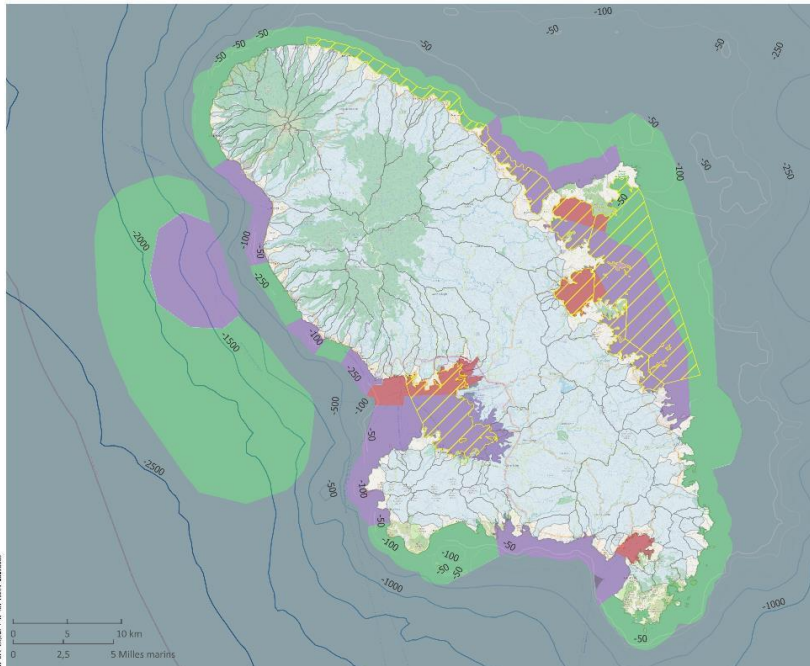
Sources des données :
- Bathymétrie : GEBCO
- Système de coordonnées : WGS 84



PARC NATUREL MARIN DE MARTINIQUE
Carte des vocations

EDITEE LE :

29 / 1 / 2021



- Bassins versants
- Parc naturel marin de Martinique
- Zones de vocations du parc
- Zone de réduction des pressions et de maintien d'une biodiversité remarquable
- Zone de surveillance, de régulation des pressions et de restauration des écosystèmes
- Zone de valorisation et de préservation du patrimoine naturel et culturel
- Zone d'amélioration des connaissances et de veille environnementale
- Zone d'étude des ressources halieutiques, du milieu marin et de leur contamination par la chlordécone

Sources des données :
- Données bathymétriques : GEBCO 2004
- Système de coordonnées : WGS 84



i)* Application measures and policies:

See appended 2020 and 2021 Activity Reports.

j) * International status and dates of designation (e.g., Biosphere Reserve, Ramsar site, Important Bird Area, etc.) :

Martinique and all its Marine Nature Park's waters have had UNESCO Biosphere Reserve status since September 15, 2021. Alongside effective implementation of the World Biosphere Reserve's governance and Management Plan, two major projects are set to be launched in 2022: a forum for young people from the Caribbean Biosphere Reserves, and a network of committed stakeholders across the territory.

The Etang des Salines is a wetland of international importance. It is a 207-hectare site with RAMSAR classification since 15 September 2008. The site is the last stop for birds coming from North America before crossing the Saint Lucia Channel.

k) The site's contribution to local sustainable development measures or similar plans:

Various National Action Plans for protection of emblematic and sensitive species are implemented in the Park, including the plan in favour of sea turtles (overseen by the National Forestry Office) and the Action Plan for the Protection of Cetaceans.

The Marine Nature Park supports the sustainable development of maritime sectors. Hence, the Park implements several projects in the context of the France Recovery Plan:

l) Management resources available for the area

- **Human resources (total number, with details:staff, volunteers, partners):**
- **Material resources (equipment, infrastructure):**
- **Financial resources and funding sources (present and additional or planned; indicate annual budget)**

See point c), p.18

33. *Conclusion: Describe how the management framework described above will be enough to achieve the ecological and socioeconomic objectives created for the site (Guidelines and Criteria Section C/V).

The Marine Nature Park's management is based on solid foundations, thanks in particular to its team, which is made up of personnel from France's main operational public institution responsible for the environment, itself under the tutelage the Ministries responsible for the environment and agriculture.

The resources allocated to operation of the Park's team and its intervention policy are in addition to those for stakeholders already operating in the territory on behalf of the marine environment (government services, local authorities, civil society, etc..), which is integrated into already ambitious public policies.

Local governance is based on the Management Board's operation and helps ensure the relevance and acceptability of the measures implemented. Such local anchoring of decisions taken on management of activities in the marine environment is an essential prerequisite for achievement of the Management Plan's ecological and socioeconomic objectives. Use of tools provided by the human and social sciences will ensure growing citizen mobilisation.

VII. MONITORING AND ASSESSMENT

34. The protected area must be subject to appropriate indicators and programmes in order to measure management effectiveness and conservation success.

35. * In general, describe how the proposed site manages monitoring and assessment:

At the OFB, on which the Park depends, strategic orientations are set by the Objectives and Performance Contract, part of which sets out the assessment procedure, which is of substantial importance in the actions undertaken by the OFB's personnel.

The Park has just had its Management Plan approved and is implementing a scientific strategy that consists of producing assessment sheets for each of the Plan's goals and sub-goals. These sheets present the context, issues involved in the subject to be assessed, parameters to be monitored and existing monitoring actions compared with monitoring actions to be implemented, in order to fill the gaps in terms of knowledge acquisition. A map of monitoring actions for the various themes addressed has been produced, along with a dashboard with the main indicators for each major ecological, cultural and socioeconomic compartment.

An inventory of the monitoring actions implemented in Martinique's marine environment is appended.

In order to be able to inform ourselves in simplified fashion on the issues and actions carried out relative to each of the Management Plan's purposes, we decided to create a set of sheets.

These sheets are intended to be synthetic and easy to consult in order to be accessible to a maximum number of people and provide an overall vision of what is being implemented with regard to the major issues relating to Martinique's marine environment and its uses.

Below is a guide on how to read the goal sheets; all sheets will be available in a separate document.

It should be noted that these sheets are not exhaustive regarding the inventory of studies carried out; their content is limited to what seemed the most relevant and useful for the assessment of the level of achievement of the objectives set by the MMNP Management Plan.

It should also be noted that the "What remains to be done" boxes include actions not necessarily carried out by the MMNP.

Guide de lecture des Fiches Finalités

Recto :

1. **Titre** : Finalité ou sous-finalité évaluée sous forme de question + numéro de la fiche correspondant à la numérotation des finalités dans le plan de gestion (« a, b, c » correspondent aux sous-finalités).
« **Contexte** » et « **Enjeux** » : Informations introductives pour présenter les caractéristiques du sujet traité, les particularités, les problématiques ou le statut des espèces.
2. « **Que faut-il suivre ?** » : Liste des paramètres à évaluer, ils correspondent aux niveaux d'exigence du plan de gestion.
3. « **Ce qui existe** » : Etat des lieux (non-exhaustif) des suivis et études existantes menées par les acteurs du milieu marin et précision sur les données qui en résulte.

Verso :

4. « **Ce qu'il reste à faire** » : Liste des suivis ou études proposés. Sont précisés les données recherchées et les fiches action correspondantes. Ces propositions portent sur une durée de 15 ans.
5. « **Tableau de Bord** » : Sélection des données qui seront utilisées pour définir un indicateur du tableau de bord.

Reader's guide for the Goal Sheets

1. **Title** : Goal or sub-goal to be assessed in the form of a question + the number of the corresponding goal in the management plan (« a,b,c » correspond to the sub-goals).
2. **Context and challenges** : Introductory informatins to present the context and challenges of the subject matter, the characteristics, the issues or the species status.
3. **What are we assessing ?** The variables to be assessed, they are the requirement levels of the management plan.
4. **Existing assessments** : Inventory (non-exhaustive) of the existing assessments and studies with the corresponding data available.
5. **What remains to be done** : List of the surveys of studies suggested, are specified the desired data. These suggestions cover a timeframe of 15 years.
6. **Evaluation chart** : Data selected to define an indicator in the evaluation chart.

Fiche finalité 16b
Comment maintenir et améliorer la vitalité et l'intégrité des herbiers de phanérogames?
1

LE CONTEXTE
2

Les herbiers sont constitués de plantes marines, avec des racines et des fleurs, qui se développent sur des fonds sableux. 94 % des herbiers martiniquais sont à moins de 7 mètres de profondeur afin d'obtenir suffisamment de lumière pour réaliser la photosynthèse. Ces « prairies » représentent un écosystème d'intérêt patrimonial majeur et sont de véritables 'ingénieurs' d'écosystème offrant de nombreux services écologiques notamment comme source de nourriture ou refuge pour d'innombrables espèces associées. En Martinique, parmi les 7 espèces présentes *Thalassia testudinum* et *Syringodium filiforme* sont majoritaires cependant, l'espèce invasive *Halophila stipulacea* recouvre de nombreuses zones et domine le Nord Caraïbe. D'autres espèces sont rencontrées telles que des *Halophila* ou *Halodule*.

LES ENJEUX
2

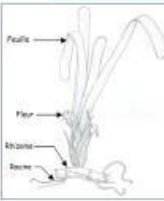
D'importance écologique considérable, les herbiers remplissent de nombreuses fonctions: oxygénation, stabilisation des fonds, production de matière organique... Fréquemment placés entre récifs coralliens et mangroves, les herbiers sont une zone de transit et de frayère pour beaucoup d'organismes. Cependant ces zones sont fortement dégradées. La destruction physique liée à de mauvaises pratiques, les polluants et l'apport en sédiment sont les principales causes de cette dégradation ainsi que la surexploitation des herbivores et l'invasion par des espèces exotiques.

QUE FAUT-IL SUIVRE ?
3


La surface des herbiers
L'état fonctionnel des habitats
Les secteurs prioritaires

CE QUI EXISTE
4


Type de suivi ou étude	Acteurs et fréquence	Données disponibles
Cartographie et état de santé des biocénoses benthiques 0-50m	H.Légrand, OMMM Ponctuel en 2009	Surfaces par type de biocénoses et par type de substrat, Etat de santé
Suivi DCE - Herbiers	ODE, Impact Mer Annuel	Recouvrement, composition spécifique, fragmentation, type de limite, comptage oursins-communautés coralliennes-bioturbation, relief, Etat de santé



Halodule



Thalassia



Syringodium

Thalassia testudinum et *Syringodium filiforme* sont communément appelées 'herbe à tortue' et 'herbe à lamantin', respectivement.


Fiche finalité 16b
Comment maintenir et améliorer la vitalité et l'intégrité des herbiers de phanérogames?
5

CE QUI RESTE À FAIRE
5

Type de suivi ou étude	Données recherchées	Fiches actions correspondantes
Actualisation de la cartographie des biocénoses marines 0-50m Prévue pour 2022 (MAREX et Aquasearch)- tous les 10 ans	Surfaces par type de biocénoses et par type de substrat, Etat de santé	PN-1
Suivi des herbiers et macrofaune associée des zones réglementées (+ control en dehors) et sites de haute pression (ancrage)	Etat de santé (Bouchon - DCE) de l'herbier, densité de l'herbier et caractérisation des perturbations, densité d'espèces phares (oursins, lambis)	PN-10
Suivi de l'état de santé des sites avec pression lié aux arrivages de sargasses	Impacts des sargasses et aménagements liés sur les biocénoses marines	PN-8

Tableau de bord
6

Surface par type de composition, état de santé



Niveaux de protection des herbiers attendus :

- Niveau 1: Pas de destruction définitive d'habitat, pas d'abrasion profonde
- Niveau 2: Pas de pression chimique, physique
- Niveau 2 bis: 2 + réduction des apports des bassins versants
- Niveau 3: Pas de pression sur le site y compris l'abrasion superficielle et le tassement

Figure : Guide de lecture des fiches évaluation : illustration avec la fiche Finalité 16b sur les habitats d'herbiers de phanérogames marines

The Action Sheets

The action sheets provide more details on the "What remains to be done" boxes on the goal sheets. For each of the actions listed, the sheet provides the following information:

Description of the action, Location, Period, Planning, Methodology, Status or Pressure Indicator, Implementation Partners and Service Providers, Estimated Expenditures, Financing.

Appendix 2 contains an example of an action sheet drawn up to monitor reef communities.

The scientific strategy underway has already made it possible to identify priority actions and monitoring for natural heritage for the coming years (see figure below).

Priority actions :

Control of the existing regulated areas and awareness raising on the disturbance of species. Implement highly restricted areas for the tranquility of marine life

Establish a mooring strategy

Priority assessments :

Evaluation of fish stocks and assessment of population dynamics of high interest species Population assessments in restricted areas (no take zones) and in high pressure areas Anthropogenic pressure assessments (human activity monitoring centre

Recommendations :

Implement an « Ocean monitoring centre » for a better collaboration between the various stakeholders. Construct an assessment grid with a global spatio-temporal approach

Standardize the assessment methods

Thoroughly define the evaluation modalities before hand Assess the water column parameters for every survey

Priority areas :

High stakes zones defined in the management plan Existing regulated and restricted zones

La caye d'Olbian (Olbian Reef)

Récif sud entre le Diamant et Sainte Luce (Southern reef between Le Diamant and Sainte Luce)

Les actions prioritaires



Surveiller les zones règlementées et sensibiliser sur le dérangement des espèces

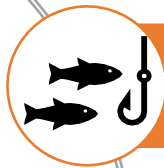


Instaurer des zones de quiétudes



Mettre en oeuvre une stratégie mouillage

Les suivis prioritaires



Evaluation des stocks des espèces halieutiques et des populations d'espèces phares



Suivis des populations dans les zones gérées (effet réserve) et dans les zones à forte pression



Caractérisation du paysage anthropique (Observatoire des pratiques et des pressions)

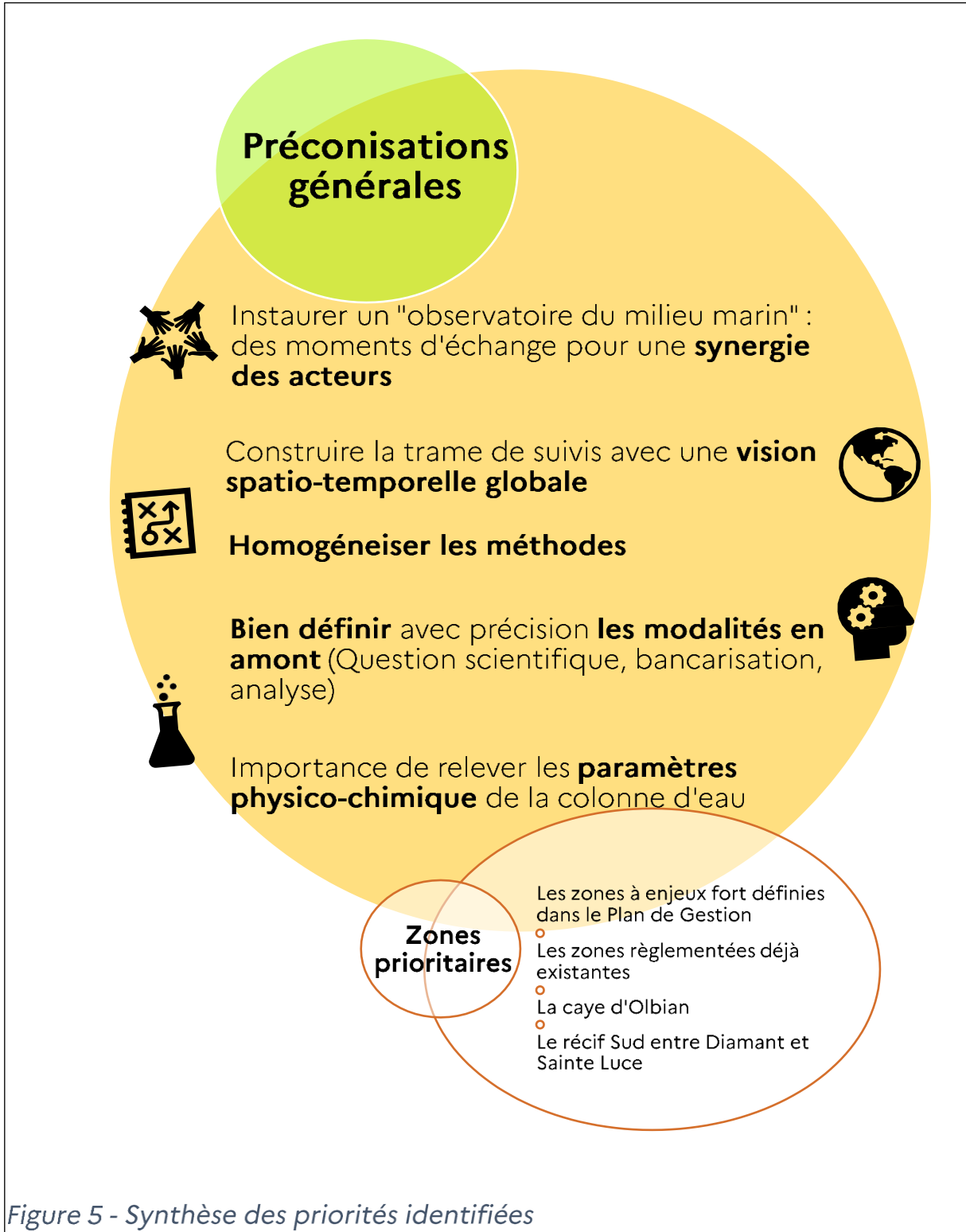


Figure 5 - Synthèse des priorités identifiées

36. * What indicators are used to assess management effectiveness and conservation success? In particular, what indicators are used to assess the impact of conservation measures on the status of species populations, habitats and ecological processes in the protected area and its surroundings:

The choice of indicators to be used is currently being validated. In general, they will be health status indicators for habitats, mainly based on coverage data and visual assessment of disturbances present, and diversity and abundance indicators for species. In order to assess the effectiveness of conservation measures, monitoring of the "reserve" effect will be implemented, with characterisation of the differences between priority areas under strong protection and surrounding areas without protection measures, in particular by assessing visible impacts (traces of deterioration due to anchoring, pollution and waste) and by estimates of anthropic pressure (number of boats, number of violations noted) with regard to health status indicators (% coverage, diversity and abundance).

Action sheets have been drawn up in consultation with the territory's stakeholders, and in particular with scientists. The sheets will be validated during the next meetings of the Marine Nature Park's Management Board. Summarized, they link: the Marine Park's issues to goals, actions implemented and indicators.

Appendix 2 contains an example of an action sheet presenting the monitoring of reef communities.

37. What indicators are used to assess the Management Plan's impact on local communities?

Indicators will soon be finalised and validated by the Management Board. They will enable monitoring of the following factors demonstrating the Management Plan's impact on local communities:

- Sensitive habitats' and species' physical integrity
- Training offers on the marine environment and its sustainable use
- The proportion of Martiniquan students working on sustainable use of the sea
- The share of local jobs based on sustainable maritime activities
- Martiniquans' ability to swim
- The number of operations, commissions, pooling of resources and joint training involving different categories of sea users
- Raising schoolchildren's awareness of the marine environment
- The number of exchanges between schoolchildren in the Caribbean Region
- Appropriation and implementation of best practices by the general public
- Strategy for raising awareness among sports federations
- The number of artistic productions undertaken for protection of the marine environment
- Promotion of maritime heritage in the cultural policy
- Maritime and coastal landscape quality
- The Park's involvement in the Caribbean network of Marine Protected Areas
- Mobilisation of all users for protection of the marine protected area
- Development of the aquaculture sector (species, feed, infrastructure, waste)
- Fishery infrastructures and innovations (gear, professions)
- Quality of landed products and consumption of species of high environmental value
- Consumer awareness

VIII. STAKEHOLDERS

The Park's creation and the drafting of its Management Plan were based on broad consultation procedures that mobilised all stakeholders and were open to civil society. The decision-making process for actions carried out by the Park continues to be based on consultation with the stakeholders concerned (development of the Park's scientific strategy, creation of ecological anchorages, etc.).

In total, over three hundred Martiniquan stakeholders were directly involved in the consultation procedures, enabling them to combine their knowledge of the marine environment and its uses and develop the Park project, its scope, its management guidelines and the composition of its Management Board.

The specificity of a Marine Natural Park lies in its governance. All decisions on actions carried out by the Park, the opinions it issues, and the management measures it proposes are taken by its Management Board, which brings together representatives of all the marine environment's stakeholders: State departments, local authorities, sea professionals, environmental associations, user associations and experts in the various fields relating to the sea (scientific, social, development, etc.). As regards the Park, the body acts as a local "parliament of the sea".

The Park's governance is therefore based on its Management Board, which is composed as follows 14 representatives of local authorities, 1 representative of the Regional Nature Park (protected area governed by a joint association of local authorities), 20 representatives of professional and recreational users of Martinique's waterbody, 5 local environmental protection associations, and 6 qualified individuals chosen for their expertise on the marine environment, from ecological and socioeconomic points of view alike.

In addition, the 53-member Management Board has delegated some of its powers to a 14-member bureau (monitoring and assessment of subsidised actions) and draws on the advice of three thematic commissions: boating, sustainable fishing and technical opinions. In accordance with the Management Board's rules of procedure, these commissions invite other stakeholders when they wish to benefit from their expertise.

Finally, one of the Park's levers of action is mobilisation of local actors, and their technical and financial support. In 2022, **the Park has an intervention budget of €600K**, intended for implementation of projects for the benefit of the marine environment and its actors, in particular by means of subsidies. This philosophy of "doing with" enables the OFB's local partners to gain momentum and increase their competences, both in the community environment and among the marine environment's socio-professionals.

IX. APPLICATION MECHANISM

41. As regards the specific characteristics of each area, the management framework should include measures and provisions designed to achieve the goals and objectives, and address specific threats to the sector concerned.

"Natural Heritage" issues are a priority as threats are significant. The following are the first measures and provisions designed to achieve objectives for marine species.

Tortues marines	<ul style="list-style-type: none"> • Mise en oeuvre du suivi des populations en alimentation (3 protocoles en cours de finalisation) • Meilleure analyse des données de pontes et aboutir à des indicateurs plus représentatifs de l'évolution de l'activité reproductrice (taux de succès de ponte, d'éclosion et d'émergence, % de demi-tour) • Définir les sites majeurs de ponte pour y instaurer des réelles mesures de gestion et accompagner les actions de ramassages de sargasses
Mammifères marins	<ul style="list-style-type: none"> • Sensibilisation, suivi et contrôle de l'activité de Whale-Watching • Redéfinir les suivis, se diriger vers l'acoustique • Améliorer les réponses et les analyses dans le cadre des échouages • Définir les zones à fort enjeu grâce à la valorisation des données par la modélisation
Avifaune marine	<ul style="list-style-type: none"> • Organiser une stratégie globale de suivis des effectifs • Mettre en place un suivis du dérangements et une gestion des prédateurs
Faune ichthyologique	<ul style="list-style-type: none"> • Evaluer les stocks des espèces halieutiques • Suivre les populations d'espèces phares notamment les grands poissons (Mérus, Perroquets) et améliorer les connaissances • Caractériser l'effet réserve dans les zones existantes et améliorer le suivi en place à Pothuau • Mettre en place des suivis simples (présence /absence) sur un grand nombre de sites • Faire un inventaire des espèces dans les milieux de transition (mangroves)
Communautés benthiques	<ul style="list-style-type: none"> • Suivre la faune, suivre et améliorer les connaissances des espèces phares (Oursins et Lambis) • Suivre la pression d'abrasion liée au mouillage • Mettre en place une veille dans les zones non fréquentées (notamment pour les maladies et espèces invasives) • Augmenter l'approche spatiale des suivis GCRMN
Autre	<ul style="list-style-type: none"> • Valoriser les données existantes pour en tirer des mesures de gestion et des outils de sensibilisation (MadiBenthos, An Ba D'Lo) • Mettre place des suivis des déchets en mer et à terre et en faire une occasion de temps fort d'échange et de sensibilisation • Caractériser l'hydrodynamisme • Etudier la dynamique à court terme (semestrielle) de l'évolution de la marge cotière et de la masse corallienne

42. Describe the mechanisms and programmes in place with respect to each of the following management tools, on the nominated site (only complete the fields relevant to your site):

a) Public awareness, education and information dissemination programmes:

- "Marine Educational Areas" Programme: support to a coastal site management initiative by schoolchildren, organised by a "children's council". This is an initiative that helps recreate the link between children and nature while helping them to acquire knowledge on the environment through three focuses: **live, know, transmit**. There are currently 9 Marine Educational Areas in Martinique.
- Dissemination of **awareness-raising messages** on social networks;
- "**Educational Raiding**" programme on the coast, managed by Park employees.
- **The Belya Lanmè, the 1st Festival of the Sea** : With 3,690 places available, the week-long Belya Lanmè enabled almost 1 out of every 100 Martiniquans to take part in an activity at sea. Priority audiences were targeted: people with reduced mobility, people with disabilities, students from the Second Chance School and people in difficulty. Access to the sea for all is also one of the goals of Martinique Marine Nature Park's Management Plan. The week-long event helped raise awareness on the richness and vulnerability of Martinique's marine ecosystems.
- Technical support to and 80% financing of a new training course in the territory: **the "Les Métiers de la Mer" (Sea Professions) University Diploma**
- The Park promoted **the Art&Mer (Art&Sea) project**, an academic initiative that aims to use art as a vehicle for educating schoolchildren on the environment. The Park sends its staff to speak to classes and held a webinar on 8 June, on the occasion of World Ocean Day.

b) Staff and management capacity building:

The Marine Natural Park's Management Team has set up a training and skills development programme for the Park's staff: professional diving, marine environmental inspector, and health and safety at work. In addition, Martinique Marine Nature Park's participation in the OFB's HSS (Human and Social Sciences) network enables its team, and more specifically its Maritime Culture Heritage & Awareness project managers, to develop skills in promoting citizen mobilisation. As a result, the team is building its capacities through training and participation in and/or facilitation of thematic networks.

Synergy with the AGOA Sanctuary for conservation of marine mammals in the West Indies is also a source of improvement of Marine Nature Park employees' skills. By sharing the same premises and hierarchy, pooling of efforts enables the two marine protected areas to develop their skills together.

Hence, the Park contributes to training programmes for socio-professionals (training of whale-watching operators organised by the AGOA Sanctuary).

The Park has already worked to assist other actors who also contribute to the achievement of the objectives pursued, and intends to continue its commitment in this respect. In 2020, the Park organised a study trip to the Gulf of Morbihan and set up a dedicated working group for local authorities, the Directorate of the Sea and the Directorate of the Environment, Planning, and Housing (DEAL) in order to deal with the issue of organisation of anchorages collectively.

The Park also invited voluntary underwater work companies to the professional forum in Marseille and funded their trip.

c) **Research, data storage, and analyses:**

Several actions illustrate the Marine Nature Park's commitment to research, data storage and analysis:

- Funding of and technical collaboration on a doctoral thesis on the impacts of sargassum on coastal ecosystems;
- Funding of a sociological study on Martiniquans' relationship with the marine environment;
- Two research projects at the MMNP in the context of a call for projects launched by the Directorate of Research and Scientific Support (DRAS):
 - The National Museum of Natural History's MOSCECO project, which aims to model the Caribbean Basin's benthic habitats, connectivity and the impacts of climate change;
 - the Institute for Research and Development's (IRD) PACO project, which identifies individuals naturally more resistant to thermal stress among targeted coral species, and identifies their genetic markers.
- **Updating of the mapping of marine benthic habitats** on all coasts from 0 to 50 metres in depth is a priority, in particular in order to analyse projects submitted to the Park's opinion. It was therefore rapidly undertaken by the team. The contract has been awarded and will enable updating of mapping and analysis of evolution compared with the mapping carried out in 2009 (H. Legrand (OMMM – Marine Institute of Martinique)).
- In 2021, creation of an **Atlas of traditional "Senne" fisheries**, followed by a study characterising the impact of these practices was carried out in-house by MMNP personnel.

d) **Monitoring and application:**

Several of the priority actions identified during development of the Management Plan are already underway:

- **Implementation of monitoring of existing regulated areas** (Reserves, Pothuau Underwater Activity Zone, Chlordecone Zones, Cantonments, etc.) in partnership with managers and other actors responsible for these regulatory tools. The protocol development phase has begun.
- Carrying out of **awareness-raising missions on the coast** with collection of data on profiles of its users, their knowledge of best practices, frequentation and disturbances. Since creation of the MMNP's Operations Department, its personnel have been present in the field carrying out these awareness-raising missions, and will soon be at sea thanks to recent acquisition of nautical facilities and their attendance of various training courses (including professional diving and commissioning of oaths).

- Drafting of **guides for sargassum collection practices**, by DEAL and the MMNP in consultation with municipal departments, with a view to limiting impacts on sea turtles' nesting habitats.
- Implementation of **macro-waste monitoring** on the coast in accordance with the Centre for Documentation, Research and Experimentation on Accidental Water Pollution's (CEDRE) national protocol; monitoring is carried out internally by the MMNP's staff, and the reference status was established in March 2022.
- **Surveillance rounds** (environmental police and fishery police) integrated into the regional control and surveillance plan managed by the Directorate of the Sea;

e) External User Participation:

Martinique Marine Nature Park covers the whole island and achievement of its objectives requires **the participation of all users**. The Marine Nature Park is committed to implementing innovative **governance** with decisions based on collective intelligence. Thematic commissions (Mooring, Fishing and Technical Advice) meet and, if necessary, can invite users from outside the Management Board.

The 1st Festival of the Sea, the Belya Lanmè, held from 27 June to 3 July 2022, mobilised more than 80 external users (nautical service providers, actors from the world of Martiniquan culture, town halls, environmental associations, schools, etc.) and enabled over 3,000 people to get to know their marine protected area differently by comparing their viewpoints with those of external users. For most of the activities on offer during the Festival, scientists and/or managers were paired with storytellers or sea professionals and/or students studying for the "Sea Professions" University Diploma. The Festival will be a regularly renewed event (annual or biennial: decision to come)

In addition, the Marine Nature Park welcomes scientists and makes its boat and Operations Department available for **logistical support to external missions** (CNRS, University of the West Indies, etc.)

f) Adaptive management:

Global changes and their impacts on the Caribbean region reinforce the need for Martinique Marine Nature Park to develop a management method that makes assessment of results obtained and effects of management measures central to decision-making and planning. The assessment process in an evaluation chart (dashboard) form resulted from this need.

It should be noted, however, that effective implementation of flexible and time-mobile measures is complex and will require working with all the other Caribbean marine areas on the SPAW list in order to share feedback and be more effective in consequence. This adaptive approach should enable **development of regional cooperation projects and revision of implementation programmes in each marine protected area as knowledge evolves**.

X. OTHER RELEVANT INFORMATION

Website: <https://parc-marin-martinique.fr/documentation>

*** 43. _ CONTACT ADDRESSES

Name(s), position(s) and contact address(es) of person(s):

Aude Brador, Managing Director of the Martinique Marine

Nature Park Aude.brador@ofb.gouv.fr

1 rue des

pionniers

97200

Fort-de-

France

Who is presenting the proposal:

Paul Giannasi, Deputy Director of the Martinique Marine Nature

Park Paul.giannasi@ofb.gouv.fr

1 rue des pionniers 97200 Fort-de-France

Who prepared the report:

Margaux Pestel, Scientific Strategy Project Manager

Margaux.pestel@ofb.gouv.fr

44. __ DATE AND SIGNATURE(S)

On behalf of the State(s) Party or Parties making the

proposal. 13/07/2022

Fort-de-France

Aude BRADOR

Managing Director of the Martinique Marine
Nature Park

Martinique Marine Nature Park



APPENDIXES

APPENDIX 1: Summary of the Management Plan in table form (page 1 to page 12)

APPENDIX 2: Example of an action sheet

APPENDIX 3: Inventory of monitoring actions carried out on
Martinique's marine environment

ANNEXES

ANNEX 1: Marine Nature Park of Martinique (PNMM) Management plan summarised in table form

ANNEX 2: Example of an action sheet

ANNEX 3: Inventory of monitoring carried out on the marine environment of Martinique

ANNEX 1: MARINE NATURE PARK OF MARTINIQUE (PNMM) MANAGEMENT PLAN SUMMARISED IN TABLE FORM

Issue	Goals	Sub-goals	Requirement levels
Issue 1: Women and men aware of marine issues, mobilised to strengthen the link between land and sea	Goal 1: To develop the knowledge, skills and employment of the Martinican people based on the sustainable use of the sea	Develop local academic and technical skills related to knowledge of the sea and its sustainable use	A - A comprehensive range of training courses (initial and continuing) on the marine environment and its sustainable use exists
			B - Research programmes that increasingly involve users of the sea
		Develop local employment around the sustainable use of the sea	C - Improved traditional knowledge, recognised by science and transmitted for sustainability
			D - A higher proportion of Martinique students work on the sustainable use of the sea
	Goal 2: Supporting users of the sea for better cooperation and solidarity at sea	Structuring and (re)promoting the sea user community	E - The share of local jobs based on sustainable maritime activities is increasing
			F - Membership in the federations is increasing
		Promote the pooling of knowledge, skills and resources within the sea users' networks	G - The number of joint operations between different categories of sea users is increasing
			H - Joint user commissions are developing and sharing knowledge and skills
			I - Relevant pooling of resources is identified, shared and implemented
			J - Joint on-the-job and/or paperless training is offered to users
	Goal 3: Promote the mobilisation and commitment of stakeholders and citizens in favour of the recovery of biodiversity	Make sea users ambassadors for marine biodiversity and the Park's values	K - A network of sea users carrying the values and messages of the Park is created.
			L - The challenges of the marine environment are integrated and taken into account in land-use planning and water quality management policies.
		Raise awareness among land-based actors to make them aware of and supportive of the requirements of the marine environment	M - 100% of schoolchildren are made aware of the challenges of the marine environment
			N - The number of exchanges between schools in the

Issue	Goals	Sub-goals	Requirement levels
			Caribbean Region around the issues of protection of the Caribbean Sea is increasing.
		Mobilising all citizens to protect the marine environment	O - The appropriation and implementation of good practices by the general public
		Develop a strategy of discovery and attachment to the sea based on the practice of water sports and culture	P - Sports federations are integrating awareness of marine ecosystems into their strategy and daily actions. Q - The number of artistic productions that convey marine protection messages is increasing.
Issue 2: A living maritime culture within the Caribbean basin: Nou Ké pran lanmè sévi Savan	Goal 4: Recognise and promote the different forms of attachment to the sea	Enhance the value of heritage (tangible and intangible) and make it a pillar of sustainable development in Martinique	R - Cultural policy at the level of Martinique and the Caribbean promotes maritime heritage S - Coastal and maritime developments do not impact on landscape quality
		Maintaining the culture of orality and intra and inter-generational transmission	T - Times and spaces for exchange around maritime heritage will be built U - The use of symbols, Martinican representations and Creole is maintained
Issue 3: Governance that develops and embodies a strong ambition for the sea	Goal 5: Position the Marine Natural Park as an integrated tool, a tool for linking up, at the service of the territory	Collaborate with all other managers	V - The State services, agencies, public establishments and local authorities involved in the management of the Park shall ensure that their actions and resources are consistent with the Park's management plan.
		Use all the tools in the area to ensure that the aims of the Marine Natural Park are integrated at all levels	W - Strategic documents, plans and programmes integrate all the objectives of the management plan
		Ensure that the Park's decisions, opinions and recommendations are followed up	X - The Park's decisions are taken into account Y - All the recommendations of the simple and technical opinions are taken into account
		Strengthen links with Caribbean Marine Protected Areas	Z - The Martinique Marine Natural Park is part of and involved in the Caribbean MPA network

Issue	Goals	Sub-goals	Requirement levels
Issue 4: The nourishing sea, through the sustainable use of resources, guaranteeing the sustainability of activities	Goal 6: Maintain the balance of food webs by preserving the life cycles of species	Restore the trophic balance of fish populations	1 - Herbivore populations (parrots, surgeons, herbivorous sea urchins) regain their functional roles in the ecosystem.
		Achieving a stock level that allows sustainable exploitation of coastal species	2 - In five years' time, the Park has a list of priority species based on precise knowledge of life cycles and stock status. 3 - At 15 years, MSY is reached for these species.
		Maintain or restore species of high local interest	4 - At 15 years of age, flagship species can be harvested and consumed sustainably.
		Diversifying offshore removals while maintaining stocks	5 - New species are exploited sustainably (black tuna, squid, etc.).
		Maintain the functionality of the main fisheries functional areas	6 - At 3 years, the functionality of blocking areas is guaranteed and at 15 years, it is reinforced.
			7 - The functionality of mangrove and seagrass habitats is improved.
	8 - Priority FHAs are covered by a strong protection zone.		
	Goal 7: Ensure responsible fishing and aquaculture from production to consumption	Make fishing and aquaculture practices compatible with the good status of sensitive habitats and species	9 - Abrasion of sensitive habitats (sea grass beds and reefs) is avoided.
			10 - Innovative techniques are being experimented with on issues such as plastics and selectivity.
			11 - Incidental catches are reduced so as not to affect populations in the long term.
			12 - new, more selective and less impactful trades and gears were tested
			13 - 100% of the traps are equipped with escape hatches or another effective device to limit ghost fishing.
			14 - Abandoned or lost fishing gear (nets, lead, etc.) is reported.
			15 - Local species are favoured in the development of the aquaculture sector.

Issue	Goals	Sub-goals	Requirement levels
		Supporting local actors in their efforts to develop small-scale, responsible fishing and aquaculture	16 - 100% of fishermen and fish farmers are aware of ecological issues and the majority adopt good practices.
			17 - Aquaculture is practised extensively with feed from responsible and sustainable production and without inputs (in particular without drugs).
			18 - 100% of suppliers (cooperatives) are aware of the issue.
			19 - The recommendations and areas of least constraint are identified and applied for the development of the aquaculture sector.
			20 - 100% of the fishing infrastructure is exemplary (ports, stalls, etc.).
		Ensuring exemplary non-professional fishing	21 - All non-professional fishermen know the regulations.
			22 - Most of the non-professional fishermen declare their catches.
		Structuring the artisanal and traditional sectors for sustainable fishing and aquaculture	23 - Artisanal and traditional fishing activities are recognised and valued.
			24 - the added value of sustainable artisanal and traditional fisheries products is increased.
			25 - Responsible, assertive aquaculture that is compatible with protection objectives
		Ensuring the quality of seafood products	26 - 100% of fish farmers implement a sanitary monitoring of their activity and their discharges into the natural environment.
			27 - 100% of the products landed are of human consumption quality.
		Adapting the consumption of seafood products to the challenges of the territory	28 - Consumers are aware of sustainable fisheries and aquaculture
			29 - the consumption of environmentally sensitive species is reduced.

Issue	Goals	Sub-goals	Requirement levels
	Goal 8: Supporting the sustainable use of mineral, biotechnological and energy resources	Supporting the development of new activities that are exemplary in terms of the ecological challenges facing the marine environment	30 - 100% of the projects authorised in the park implement the least impacting technologies. 31 - 100% of the projects are located in areas of least sensitivity for habitats and species.
Issue 5: The sea, a living space with diversified and organised activities and practices compatible with the objectives of preserving the marine environment	Goal 9: Develop diversified activities linked to the marine environment, which contribute to the attractiveness and dynamism of the territory for all	Making environmental performance the driving force behind business development	32 - Maritime and coastal activities are developed and supported on the basis of environmental excellence.
		Making tourism compatible with ecological issues	33 - 100% of hoteliers and tourist offices are relays for eco-responsible offers linked to the marine environment.
			34 - The share of tourists who come with the motivation to experience unspoilt nature is increasing.
			35 - 100% of tourists are aware of environmental issues.
		Structuring the sectors necessary for the development and sustainable management of the marine environment	36 - The territory has competent companies and/or efficient equipment, particularly for the management of waste, dredging sludge and the installation and management of ecological moorings.
		To ensure respect for the environment through activities to discover the marine environment and to observe it,	37 - There is no disturbance in the functional areas sensitive to this pressure.
			38 - The share of the total number of outings carried out as part of a 'soft' service is increasing.
		Promote accessibility to the marine environment for all: disabled, disadvantaged, etc.	39 - The number of Martiniquans who can swim is increasing.
			40 - The number of people practising "soft" water sports at sea is increasing.
			41 - Abrasion of sensitive habitats (sea grass beds and reefs) is avoided.
		Organise moorings in order to optimise the water surface and preserve the natural public maritime domain	42 - A mooring strategy, validated on the scale of Martinique, is drawn up in 2 years.
			43 - 100% of the MELAs are committed to a quality approach (same as clean ports).

Issue	Goals	Sub-goals	Requirement levels
		Support nautical events towards eco-responsibility, adapting them to the sensitivity of environments and species	44 - 100% of water sports events are compatible with the physical integrity of sensitive habitats.
			45 - No disturbance of sensitive species is generated.
			46 - Waste directly linked to these events (catering, goodies, etc.) is eliminated.
		Supporting the development of responsible boating	47 - 100% of marinas are equipped with efficient water management systems.
			48 - 100% of marinas have an environmental quality label.
		Making the cruise business eco-friendly	49 - 100% of boaters and water sports enthusiasts have been made aware of the right actions to take.
			50 - 100% of the cruise companies communicate about the Marine Natural Park.
			51 - 75% of the cruise lines' excursion offer is eco-responsible.
			52 - Exemplary wastewater and waste management during stopovers.
		Prevent and avoid conflicts of use	53 - 100% of ships at berth are connected to the electricity grid.
	54 - 100% of the territory's projects are compatible with existing activities.		
	Goal 11: Develop maritime transport that is useful to local life and environmentally exemplary	Contribute to the development of soft passenger transport that contributes to local life	55 - 100% of domestic journeys are made by noiseless vessels.
		Move towards environmental performance of ports and ships (freight + cruise)	56 - Impulsive noise, exceeding species tolerance thresholds, generated during construction is reduced to zero.
			57 - Inputs of pollutants that may affect water and sediment quality are reduced to zero.
Contribute to the achievement of ecological		58 - Collision rates with mammals and sea turtles do	

Issue	Goals	Sub-goals	Requirement levels	
Issue 6: Good water and sediment status	Target 12: Achieve good ecological status of marine water bodies	objectives (freight + cruise)	not have a negative effect on their populations.	
		To guarantee physico-chemical parameters favourable to the proper functioning of marine ecosystems	59	- The physico-chemical status of all the marine waters is good to minimum.
			60	- In the sectors with priority issues for biocenoses, very good status has been achieved.
		Guarantee a quantity of phytoplankton compatible with the balance of the ecosystems and the environment	61	- The amount of phytoplankton is compatible with the balance of the ecosystems and the environment.
			62	- The risk of eutrophication is controlled.
		Make catchment inputs compatible with the proper functioning of marine ecosystems	63	- The good physico-chemical status of all land water bodies is maintained or achieved.
	64		- The occasional, but intense, inputs generated during rainy events (organic load, suspended solids) are greatly reduced.	
	Target 13: Achieve good chemical status of marine water bodies	To guarantee a chemical status of marine waters and sediments, favourable to the proper functioning of marine ecosystems	65	- There is no significant disturbance to the species and their life cycle: reproduction, development, health status
			66	- Sediment quality is improved.
			67	- Discharges in the vicinity of priority areas for biocenoses are greatly reduced or even eliminated.
		Guarantee a chemical status of water bodies compatible with uses	68	- The contamination of fish species with chemical pollutants that make them unfit for consumption is reduced.
			Reducing catchment inputs	69
		70		- The use of phytosanitary products in the catchment areas is eliminated.
	Controlling the risk of accidental pollution	71	- Accidental pollution does not reach priority areas for biocenoses, nor functional areas for sensitive species	
72		- Environmental sensitivity is taken into account as a criterion for the selection of priority intervention areas (in case of pollution)		
Target 14: Achieve good	Ensuring a sanitary quality compatible with	73	- There is no disturbance and/or pathology of	

Issue	Goals	Sub-goals	Requirement levels
	health status of marine water bodies	the health of marine species	marine species.
		Maintain a sanitary quality of marine waters compatible with uses	74 - The risk of contamination of fish species, which would make them unfit for consumption, is controlled.
		Achieve and maintain good quality at all bathing sites	75 - 100% of bathing sites are of excellent quality.
	Target 15: Limit the amount of macro- and/or micro-waste	Reduce the amount of waste to a level compatible with the health of marine species	76 - There is no disturbance and/or pathology of marine species due to the presence of macro/micro waste
			77 - The input and presence of waste in the sea and on the coast are significantly reduced.
Issue 7: Healthy habitats and species	Goal 16: Natural habitats are protected, restored and enhanced	Maintain and improve the physical integrity and health of coral habitats	78 - Coral reef surfaces (geomorphology, etc.) are maintained or even restored.
			79 - Coral cover is increased.
			80 - Functional status of habitats is improved (status indicators) (coral).
		Maintain and improve the vitality and physical integrity of phanerogam meadows	81 - The surface area of the meadows is maintained or even restored.
			82 - The functional status of habitats is improved (status indicator).
			83 - Priority areas (to be identified) are maintained or improved.
		Maintain the health of mangroves	84 - The area and length of coastline occupied by mangroves are increased.
			85 - The good conservation status of mangroves is maintained or restored.
			86 - Freshwater inflows are maintained in the mangroves.
		Maintain the physical integrity of benthic habitats	87 - The surface area of habitats is maintained or even restored.
88 - The functional status is improved (status indicator) (benthic).			


Issue	Goals	Sub-goals	Requirement levels	
			89 - The physical integrity of deep-sea corals is maintained.	
		Maintain the functionality of pelagic habitats	90 - Functional status is improved (status indicator): maintenance of the level of primary production (diversity and abundance of plant and zooplankton biomass).	
		Maintain or restore coastal habitats, beaches, cliffs, caves and islets	91 - The surface area and the length of the coastline of habitats are maintained or even restored. 92 - The functional status is improved (status indicator).	
	Targets 17: Ensure favourable conditions for heritage species	Guarantee favourable conditions for marine mammals		93 - All species assessed in Martinique by the AGOA sanctuary are in good condition.
				94 - The level of disturbance and ambient noise is compatible with the sensitivity of the species, particularly in the functional areas.
				95 - Levels of mortality at sea (collisions, catches) are compatible with maintaining populations.
				96 - Quiet zones are set up
				97 - A sufficient level of trophic resources is guaranteed. (MM)
		Guarantee favourable conditions for the reception of marine turtles		98 - The number of clutches and egg-laying sites [and reproductive success] is maintained or increased.
				99 - Numbers at the main feeding sites (green and hawksbill turtles) are maintained.
				100 - Levels of mortality at sea (collisions, catches) are compatible with maintaining populations.
				101 - Quiet zones are set up.
				102 - Light pollution is reduced.
		Guarantee the potential for marine birds to live in the area		103 - The health status of marine turtles is maintained (e.g. fibropapillomatosis).
				104 - All species assessed are in good condition (stable or increasing numbers).
	105 - The level of noise and light disturbance is compatible with the sensitivity of the species,			

Issue	Goals	Sub-goals	Requirement levels
			particularly in the functional areas of the colonies.
			106 - Priority areas (to be identified) are maintained or improved (especially for breeders).
			107 - A sufficient level of trophic resources is guaranteed. (Avifauna)
		Maintain the abundance and species richness of elasmobranchs	108 - Population diversity and numbers are maintained.
Issue 8: Good quality of the marine environment and ecosystems in Martinique	Goal 18: Enable marine ecosystems to participate in Martinique's adaptation to and mitigation of climate change	Provide conditions that allow ecosystems to adapt to climate change	109 - The free evolution of coastal ecosystems is ensured.
		Enable marine ecosystems to protect the coastline (erosion)	110 - Mobility areas for coastal habitats are maintained or increased, particularly for mangroves and coastal forests.
		Valuing the role of ecosystems in carbon sequestration	111 - The length of coastline that is protected by [the physical structure and functionality of] marine (seagrass, reefs) and coastal (mangroves, coastal forests) habitats is maintained or increased. 112 - Marine ecosystems are taken into account in climate change mitigation strategies.
Issue 9: A presence at sea to preserve the marine environment	Goal 19: Prevention and awareness-raising through community action	Prevention and awareness through community action	113 - Users are aware of the regulations and good practices to be observed with regard to the sensitivity of habitats and species.
	Aim 20: To strengthen interventions at sea against environmental crime	Ensure compliance with regulations	114 - The frequency of offences is significantly reduced.

ANNEX 2: EXAMPLE OF AN ACTION SHEET

Action sheet PN-1.	Carry out comparative monitoring of reef communities and associated macrofauna in and outside regulated areas
Priority 1	
Issue	Issue 7: Healthy habitats and species
Purpose	Goal 16: Natural habitats are protected, restored and enhanced Sub-goal: Maintain and improve the physical integrity and health status of coral habitats
Description	<p>In addition to the monitoring of the health of reef communities carried out within the framework of the Water Framework Directive (WFD), the GCRMN-IFRECOR and the Reef Check network, the aim here is to monitor the state of the communities in areas where there are issues. Monitoring of the benthos and associated macrofauna will be carried out in areas subject to regulation and outside these areas in order to report on the effect of pressure reduction</p> <p>Monitoring of the Pothuau and Anse Turin Areas of underwater activity (ZASMs) has already been implemented by Asso-Mer since 2019, at the request of the City of Carbet. The management of the Pothuau area has been transferred to the Marine Nature Park of Martinique (PNMM) in 2022, which will therefore take over the implementation of ichthyological and benthic monitoring.</p> <p>Monitoring will be set up in partnership with the Regional Nature Park of Martinique (PNRM) in the nature reserves (Prêcheur, Baie de Génipa and Baie du Trésor, Ilets de Sainte Anne).</p> <p>Monitoring will be set up in partnership with the Regional Committee of Fisheries and Marine farms of Martinique (CRPMEM) for the cantonment areas (Vétiver, Baie du Trésor and Ilet à Ramier)</p> <p>Underwater trails will also be monitored in the future.</p> <p>In the long term, the aim is also to monitor the health of the reefs and associated fauna in high-pressure areas.</p>
Location	<ul style="list-style-type: none"> Regulated areas: reserves, cantonments, ZASM, underwater trails + controls outside the area High pressure areas: <i>to be defined</i>
Period	<ul style="list-style-type: none"> Monitoring of ZASM: 2 times a year Monitoring of reserve areas: <i>to be defined</i> Monitoring of fishing boxes: <i>to be defined</i>

<p>Action sheet PN-1.</p>	<p>Carry out comparative monitoring of reef communities and associated macrofauna in and outside regulated areas</p>
<p>Priority 1</p>	
	<ul style="list-style-type: none"> Monitoring of underwater trails: <i>to be defined</i>
<p>Methodology</p>	<p>With the aim of being able to report on the reserve effect, each monitoring will have to be composed of control sites outside the managed areas. Work to standardise the methods and procedures for monitoring implemented in the various management tools that are these regulated zones will be carried out in collaboration with all the stakeholders concerned. Protocols are currently being developed. <u>Monitoring of the ZASMs by Asso-Mer: In the process of being redefined After</u> an initial assessment, a frequency of 2 trips/year is planned Pothuau: 4 transects of 100m in the zone, 3 transects of 200m outside the zone, all perpendicular to the coastline Anse Turin: A single transect which makes a curve crossing the zone over its width Ichthyofauna protocol: Counting of species present by size class from a predefined list of 18 species groups Benthic protocol: Notation of substrate type every meter of the transect + depth</p>
<p>Status indicators</p>	<ul style="list-style-type: none"> Benthics: Health status, % live coral cover, % diseased or bleached coral Macrofauna: species diversity, abundance and size Characterisation of the reserve effect on fish fauna: indicator to be defined
<p>Implementation, partners and providers</p>	<ul style="list-style-type: none"> Implementation : PNMM coordinates the development and implementation of monitoring <p>Monitoring of the Carbet ZASM: L'Asso-Mer then transfer of the management of the Pothuau zone to the PNMM in 2022 Reserve monitoring: NRMP Monitoring of boxes : CRPMEM</p> <ul style="list-style-type: none"> Providers: to be defined

<p>Action sheet PN-1.</p>	<p>Carry out comparative monitoring of reef communities and associated macrofauna in and outside regulated areas</p>
<p>Priority 1</p>	
	
<p>Human and material resources</p>	<ul style="list-style-type: none"> • Human: Natural Heritage engineering department staff for coordination, protocol development and field days (engineering + operation with professional divers) • Equipment: Diving and water sports equipment

ANNEX 3: INVENTORY OF MONITORING CARRIED OUT ON THE MARINE ENVIRONMENT OF MARTINIQUE

Theme	Sub-theme/location	Follow-up	Frequency / Perspectives	Funding / Partners	Follow-up contacts
Fishing	Fishing effort and landings	Fisheries Information System		IFREMER	Jean Pierre Allenou IFREMER
Water quality _ Coastal waters	Biological quality and chemical quality: 19 coastal ME and 1 transition /7 bay stations FdF Ex-RNO (Water quality and phytoplankton, from the bottom of the bay to the open sea)	WFD monitoring - coastal, transitional ME + reinforced hydrological monitoring of the Bay of FdF (Ex -RNO)	Annual reports / Fort de France Bay was considered as homogeneous, therefore with only one monitoring site for 3 water bodies; 2022 wishes to monitor each of the water bodies separately - Perhaps funding by the OFB to develop a mangrove protocol	Project sponsor and funding: ODE - Implementation: IFREMER - Service providers: Impact Mer	Melissa Bocaly /Alexandre Arque ODE - Jean Luc Lefebvre DEAL - Jean Pierre Allenou IFREMER
	Coral communities: 15 sires	WFD - Biological quality: Coral communities	Annual measurements in June - Annual reviews/ Macroalgal coverage is no longer carried out - Health status is not taken into account in indicator com.cor.		

Theme	Sub-theme/location	Follow-up	Frequency / Perspectives	Funding / Partners	Follow-up contacts
	Herbarium: 9 sites	WFD - Biological quality: Herbarium	Annual measurements in June - Annual reports to be finalised - Herbarium index under development (F. Kerninon FASI indicator to reflect health status and degree of anthropisation)		
	Phytoplankton: 20 sites	WFD - Biological quality: Phytoplankton	Monthly or bimonthly measurements - Annual reports/ Only the abundance of microphytoplankton is taken into account in the abundance index		
Water quality _ Rivers	20 stations + 8 for pesticides	WFD monitoring - Rivers + specific pesticide network	Annual reviews	ODE	Melissa Bocaly /Alexandre Arque ODE
Water quality _ Chemical contamination	4 ROCCH stations with bi-annual sampling.	ROCCH monitoring - Network for the observation of chemical contamination via bivalve bioindicator (Isognomon alatus)	Annual reports/ ODE wants to add a site north of Robert Bay to be prospected	Project sponsor and funding: ODE - Implementation: IFREMER - Service providers: Impact Mer	Melissa Bocaly /Alexandre Arque ODE

Theme	Sub-theme/location	Follow-up	Frequency / Perspectives	Funding / Partners	Follow-up contacts
Water quality _ Seaports	Port sediments: analysis of 94 molecules + physico- chemical characterisation, 2 sites Fort-de-France (5 stations, 19 sub- stations) and Marin (1 station, 7 sub- stations), National N1 and N2 thresholds defined by order of July 2020	REPOM Water and sediment quality monitoring in seaports	Sampling and assessment every 3 years	ODE, DEAL, Impact Mer	Melissa Bocaly /Alexandre Arque ODE
Water quality _ Bathing water	Bi-monthly measurements of E. coli and intestinal enterococci (2020: 62 sites, 64255 samples)	Bathing water quality	Access via map in real time and evolution over the year + Annual reports, fortnightly measurements	ARS	Olivier Perronet
Water quality _ Pollution	Inventory of pollution: geolocation, typology, nature of pollution	Pathways network	Since 2013	ODE, ONF, PNRM (148,000 euros paid by ODE)	Olivier Perronet
Waste on the coast		Macro-waste monitoring on the beaches	Started in 2022 - Cedar Protocol	MMFN	Olivier Perronet
Corals	5 sites	GCRMN follow-up	(IFRECOR=GCRMN+DCE) Every 2-3 years: Assessment 2016-2019-2020	DEAL, NovaBlue/Créocéan (2021)	Sabrina Munier DEAL - Jean Philippe Maréchal

Theme	Sub-theme/location	Follow-up	Frequency / Perspectives	Funding / Partners	Follow-up contacts
Corals _ SCTLD disease		Discovery and monitoring of the SCTLD in Martinique.	2020-2022	(Funding: OCEANvironment/A REBio/ODE/BIOSPH ERES)	Romain Ferry
Corals _ SCTLD disease	5 Creoccean sites, 5 GCRMN sites.	Follow-up SCTLD	Initiated in 2021 - 2 campaigns conducted to date (02/2022)	Créocéan, DEAL	Sabrina Munier DEAL - Béatrice DeGaugelac Créocéan
Fish fauna _ Reserve effect	ZASM of Carbet: Pothuau and Raisiniers - 2 sites for fish monitoring	ZASM follow-up	Initiated in 2019 - Biannual monitoring and annual reviews / Monitoring and follow-up management transmitted to the MMNP in 2022 - Protocols under revision (benthos and fish)	Assomer, Ville du Carbet, PNMM	Jessica Crillon - Amandine Limouzin
Corals _ Bleaching		Coral bleaching monitoring (2003-2005-2010)	Bleaching since 2003 - <i>Tubastrea</i> since 2009	(Funding: OCEANvironment).	Romain Ferry
Sponges _ Diseases		Monitoring of sponge diseases.	2009-2023.	(Funding: AREBio/FEDER-Europe/CTM/ODE/SARRA/OCEANvironnement)	Romain Ferry
Marine Invasive Alien Species of invertebrates		Discovery, ecological impact assessment and distribution mapping of : -Crab: <i>Charybdis hellerii</i> / - Ophiuro: <i>Ophiothela</i>	Crab (<i>Charybdis hellerii</i>): 2013-2016: Discovery, ecological studies of impacts and distribution mapping / - 2020-2021 and 2022-2026: : population monitoring	(funding: OCEANvironnement /BIOSPHERES/DEAL Martinique)	Romain Ferry

Theme	Sub-theme/location	Follow-up	Frequency / Perspectives	Funding / Partners	Follow-up contacts
		<i>mirabilis</i> /- <i>Corail</i> : <i>Tubastrea coccinea</i> .	Ophiuroids (<i>Ophiothela mirabilis</i>): 2017-2018: Discovery, ecological impact studies and distribution mapping / 2020-2022 and 2023-2025: population monitoring	(funding: OCEANvironnement /BIOSPHERES/DEAL Martinique)	
			Coral (<i>Tubastrea coccinea</i>): - 2017-2022: Discovery, ecological impact studies and distribution mapping. - 2023-2025: Population monitoring	(Funding: OCEANvironment/BIOSPHERES)	
Coastal _ Coastal dynamics	1 site in Schoelcher	DYNALIT follow-up	Biannual monitoring as part of a national observation system, data centralised in BREST, accessible on site	University of Antilles (UA)	Franck Dolique
Coastal _ Coastal dynamics		Coastline monitoring - BRGM		BRGM	
Marine mammals	Participatory science	Obs en Mer : census of observations		AGOA Sanctuary	Jérôme Couvat
Marine mammals	Strandings	Management and analysis of MM strandings and collisions		RNE, ROCEM, MIRACETI, AGOA	Jérôme Couvat

Theme	Sub-theme/location	Follow-up	Frequency / Perspectives	Funding / Partners	Follow-up contacts
Marine turtles _ Laying activities	Sea Turtle NPA - Variable monitoring efforts - Volunteers 2020: 63 beaches monitored	Morning counting of egg traces	Annual during the spawning season since 2009 / Multi-year analysis underway (Marc Girondot) / Prospects for improving indicators to achieve success rates, currently a number of ascents	Carried out by the ONF/ Financed by the PNMM/ Contract awarded to Aquasearch and Asso-mer	ONF: Nicolas Paranthoen / Melvin Beatrix - Aquasearch: Benjamin De Montgolfier - Asso-mer: Amandine Limouzin
Marine turtles _ Stranding and distress	Monitoring and management of strandings	RETOM		Project leader: NFB, coordinator of the PNA - Service provider: Aquasearch - Funding: PNMM, DEAL, ODE, ONF...	Nicolas Paranthoen
Marine turtles	Population dynamics/ Health status/ Tropical ecology/ Habitats	Monitoring by CMR and photo identification	Since 2012 - EPD renewed until 2023 - Many aspects studied - Subject of several theses	Project sponsor: CNRS	Damien Chevallier
Marine turtles _ Developing population	Juvenile feeding population in coastal waters - Declined in 3 protocols: INAScuba, Aerial monitoring, Distance sampling	Monitoring of the developing population	In the process of validating the protocols	Project leader: PNA Tortue marine - Implementation and financing: PNMM	NFB: Nicolas Paranthoen / Melvin Beatrix - PNMM: Jessica Crillon
Reef communities	Awareness raising through participatory science - 3 sites	Reef Check	Under development / Objective: 1 time/year/site - 18 people trained in 2021	Coordinator: Asso- Mer	Amandine Limouzin

Theme	Sub-theme/location	Follow-up	Frequency / Perspectives	Funding / Partners	Follow-up contacts
Avifauna	Visual and acoustic monitoring of all species - Ilets du François and Robert, 64 sites in all	Temporal Monitoring of Common Birds - Simple Point Sampling (STOC-EPS)	Annual	DEAL, LE CAROUGE, la Sepanmar, MNHN	Julie Gresser DEAL
Avifauna _ Participatory science	Census of opportunistic wildlife sightings	Faune Martinique - Life+ CAP DOM	Ongoing		
Avifauna _ Roseate Terns		Monitoring of breeding colonies of roseate terns	Annual	DEAL	Julie Gresser DEAL
Avifauna _ Waders		Monitoring of waders		PNRM / OFB UTC	Fabian Rateau
Sargassum	Monitoring the route, condition and impacts of sargassum booms	Monitoring of Sargasso dams		PNMM	Lilia Leconte/ Olivier Perronet
Sea Urchins	Stock assessment and seasonal dynamics	Sea Urchin Monitoring	Under development	PNMM/ IFREMER/ CRPM	Axelle Lefaucheur / Tiphaine Rivière
Marine turtles _ Population and disease	Population and prevalence assessment of fibropapillomatosis	Photo-identification tracking	Initiated in 2019 as part of a thesis - repeated annually until 2023	Aquasearch / MNHN / OFB	Benjamin DeMontgolfier