

Action Plan

Sea Basin Strategy Document

North Atlantic-Western Channel (NAMO), France



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Introduction

A. The European and national framework

► Fundamental principles of maritime spatial planning in France

In Mainland France, maritime spatial planning is structured into four plans covering its different marine regions¹, called sea basin strategy documents. The sea basin strategy document [document stratégique de façade or DSF] enforces the principles of the 2017 National Strategy for the Sea and Coast [Stratégie nationale pour la mer et le littoral] taking into account the socio-economic and environmental issues specific to that area. Moreover, the DSF addresses the requirements of two European framework directives: the Marine Strategy Framework Directive (MSFD), which aims to achieve the good environmental status of marine ecosystems through the implementation of a marine strategy² containing a programme of measures that is reviewed every six years; and the Maritime Spatial Planning Directive, which promotes the coordination of human activities in the marine areas of each Member State. By implementing these two directives at the level of sea basins, the DSF allows human activities (both existing and in development) to be regulated to prevent conflicts linked to the use of land or marine resources. The coordination of activities, associated with measures targeting specific environmental issues, also enables to reduce pressures on the marine and coastal environment, in line with the objective of achieving the good environmental status of marine ecosystems. The main challenge is to reconcile marine activities with the necessary protection of the marine environment. This delicate balance is at the core of sustainable development and integrated maritime policy.

There are numerous and diverse public policies, schemes, plans and programmes developed on the coastal territory. All of these include actions that contribute to the protection of the marine environment and the sustainable development of activities at sea (fisheries, transport, energy, tourism, etc.). However, the integrated management of marine and coastal areas are set out in the National Strategy for the Sea and Coast and its sub-national plans, the sea basin strategy documents. These instruments recommend going past sectoral policies and considering the development of human activities at sea through an integrated, global and ecosystem approach.

The preparation and content of the sea basin strategy documents are set out in article R219-1 and following of the French Environmental Code [Code de l'environnement]. The formulation of the DSF is the responsibility of the French government: it is prepared under the authority of the "coordinating prefects" – high representatives of national authorities at regional and sea-basin levels – in a joint effort with marine and coastal stakeholders. All stakeholders are gathered in the Maritime Council for the Coast [Conseil maritime de façade] and its Standing Committee [commission permanente]. The public is consulted through an online platform. Neighbouring countries can also express their views on these documents.

Each sea basin strategy document comprises four parts distributed in two components:

- The **strategic component** consists of: 1) an initial assessment; 2) the vision for 2030 and the strategic objectives that are to be achieved by that time;

1 There are four marine regions in metropolitan France: "Manche Est-mer du Nord" (MEMN), "Nord Atlantique-Manche Ouest" (NAMO), "Sud Atlantique" (SA) and "Méditerranée" (MED) which can be translated as Eastern Channel-North Sea, North Atlantic-Western Channel, South Atlantic and Mediterranean sea basin.

2 In France, the marine strategy elaborated under the MSFD is called "Plan d'action pour le milieu marin" (PAMM) which means Plan of action for the marine environment.

- The **operational component** contains the last two parts: 3) the **monitoring framework** assessing the compliance of objectives; and 4) the **action plan** outlining the implementation programme for the achievement of the previously set objectives.

► The action plan, the operational tool of the DSF

The action plan will be carried out over six years from the date of its adoption. According to the Ministerial Order of 20 September 2019³ amending the order of 11 July 2018, the action plan introduces new actions: additional measures to those that already exist and that are necessary to ensure the achievement of the strategic and specific objectives. These actions are classified into two types: environmental or socio-economic actions. The action plan also identifies existing actions that contribute to the achievement of the objectives. To formulate new actions, a gap analysis was carried out: whenever existing measures were not considered sufficient to reach the objectives, new actions were identified. Finally, this preparatory work also facilitated the definition of some of the targets concerning the strategic objectives: these targets were still to be defined, following the adoption of the first part of the DSF in 2019. These targets have now been identified together with the related actions.

The action plan cannot be exhaustive and include all of the actions undertaken by every stakeholder. Nevertheless, it provides an operational framework applicable at the level of the sea basin and its subareas (the designated use areas specified in the strategic component of the DSF). Each part of the sea basin strategy document will be updated in light of newly available information, every six years. Thanks to this iterative process, local stakeholders engagement is reinforced with regards to sustainable economic development and marine environment preservation.

► Land-sea interactions and the scope of the DSF

Inland activities have major impacts on marine and coastal water quality or the conservation status of coastal ecosystems. These interactions are well-known; this is why marine concerns are regarded as a cross-cutting issue of public policies (urban planning, transport, energy, etc.).

According to Act No. 2016-1087 of 8 August 2016 for the restoration of biodiversity, nature and landscapes⁴, it is mandatory for marine licenses and consents to be compatible with the strategic objectives of the DSF; the same applies to the River Basin Management Plans [schémas directeurs d'aménagement et de gestion des eaux or SDAGE] as they must comply with the environmental objectives of the DSFs, which in turn meet the requirements established by the MSFD.

Because of the major influence of freshwater on marine and coastal water quality, the environmental objectives of the North Atlantic-Western Channel Sea Basin Strategy Document (hereinafter DSF NAMO) must become part of the River Basin Management Plan of Loire-Brittany. The SDAGE is a water management tool establishing guidelines, provisions and objectives concerning integrated water resources management, at the level of the river basin, in order to reconcile environmental preservation with economic development. Moreover, it includes a programme of measures to ensure the attainment of its objectives. The SDAGE is elaborated through a close dialogue with the River Basin Committee and updated every six years. Its latest version will be implemented over the same period as the action plan of the Sea basin Strategy Document, i.e. from 2022 to 2027.

³ Arrêté ministériel « critères et méthodes » du 20 septembre 2019.

⁴ Loi n° 2016-1087 du 8 août 2016 pour la reconquête de la biodiversité, de la nature et des paysages.

B. The DSF NAMO and its action plan: preparation, content and implementation

► Continuous stakeholders' involvement: a trademark of NAMO maritime planning

The DSF is drawn up under public responsibility: the Direction interrégionale de la Mer Nord Atlantique-Manche Ouest (DIRM NAMO), a sub-national authority, acts as technical secretariat to perform this task in coordination with other government offices and public entities. A national methodological support is ensured by the Department of Water and Biodiversity of the Ministry of the Environment [direction de l'eau et de la biodiversité/ministère de la Transition écologique] and the Sea and Coast Department of the Ministry of the Sea [délégation mer et littoral/ministère de la Mer].

Stakeholders are closely associated with the preparation of the DSF by the coordinating prefects, through the Maritime Council for the Coast (which they co-chair) and its Standing Committee, presided by an elected member of the Regional Council of Brittany [Conseil régional de Bretagne] and, since the end of the year 2019, by an elected member of the Regional Council of Pays de la Loire [Conseil régional des Pays de la Loire]: through this process, proposals from all stakeholders are gathered and shared. The DSF is thus based upon proposals constructed through stakeholders' dialogue and engagement. The DSF is also closely related to the regional maritime and coastline strategies of Pays de la Loire and Brittany and adopted by a dedicated body: the maritime and coastline regional assembly [Assemblée régionale mer et littoral] in Pays de la Loire and the maritime and coastline regional conference [Conférence régionale de la mer et du littoral] in Brittany as well as the strategies adopted by "departments" (smaller administrative units).

On 24 September 2019, the coordinating prefects of NAMO sea basin have adopted the first component of the Sea Basin Strategy Document, called "Stratégie de façade maritime Nord Atlantique-Manche Ouest". It comprises an initial assessment of the maritime and coastline territory, the vision for 2030 (a time horizon in which the Strategy has been completed), strategic objectives to be met and a map of the areas where they are to be applied (<http://www.dirm.nord-atlantique-manche-ouest.developpement-durable.gouv.fr/strategie-de-facade-maritime-nord-atlantique>).

On 25 November 2019, the CMF NAMO has been renewed: the members of the Standing Committee and its new chair have been subsequently elected. From December 2019, the Chair of the Standing Committee convened its members to monthly meetings in order to collectively identify the existing actions, as well as new actions to meet the strategic objectives adopted in 2019. Written contributions from the members of the Committee and hearings of field experts also enhanced these proposals. The active and continuous involvement of the members of the Standing Committee, despite the preponderant difficult health conditions through 2020, is noteworthy.

The work of the Standing Committee was presented for information purposes at the meeting of the Maritime Council for the Coast on 23 November 2020, as well as at the Maritime and Coastline Regional Conference on 8 December 2020.

► An ambitious and integrated action plan

The action plan was formulated based on the "vision for 2030" – a statement structured by key thematic elements (items) synthesizing the outcome the stakeholders would like to achieve by 2030 – and the associated strategic objectives. First, a review of the existing actions per objective was carried out. Then, the existing actions were connected to the items of the vision statement to analyze them through an integrated approach (promoting a balance between environmental, social and economic components).

Next, new actions were identified: they were deemed relevant, operational and efficient from an environmental, social and economic perspective. After that, a strategic environmental assessment was initiated to analyze the potential impacts of the actions and their relevance. As it is an iterative process, adjustments to the action plan were made accordingly. Finally, the outcome of this process is a set of 114 actions: 67 social and economic actions (OSE), and 47 environmental actions (OE).

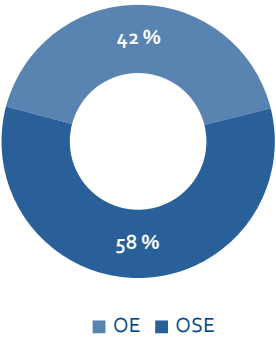


Figure 1: Respective share of environmental and socio-economic actions.

Three descriptors (D1 “Biodiversity”, D10 “Marine litter” and D8 “Contaminants”) account for more than half of the environmental actions (see figure 2). Regarding socio-economic actions, the greatest number of actions are associated with the objectives “Sustainable fisheries and aquaculture” and “maritime and island territories” (see figure 3). Actions linked to research, innovation and sea exploration are also well represented in the action plan (objectives DE-OSE I, DE-OSE-X and RF-OSE-II).

Objectives are closely interconnected. For this reason, when some of them appear to be associated with a low number of actions, it means that the existing actions were either deemed sufficient or new actions (carried out under other objectives) also contribute to their achievement.

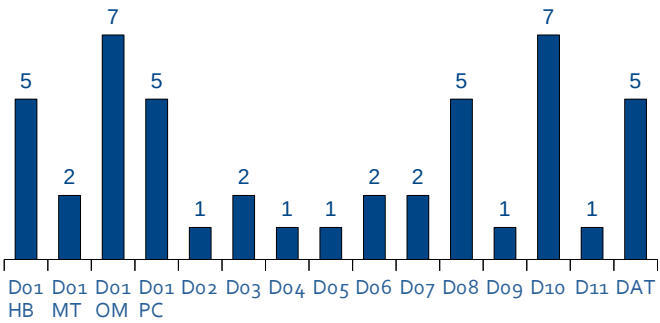


Figure 2: Number of actions by environmental objective.

Each action is described on a data sheet containing key information. It specifies the main item to which the action is related and the objectives whose fulfilment the action contributes; it describes the context and outlines the steps to carry it out. Moreover, possible lead implementing entities and financial or technical partners are also stated. Government offices and public entities (Office français de la biodiversité, Agence de l’eau) are the main implementing partners of environmental actions; socio-economic actions will mainly be executed by local authorities, in particular regional or departmental councils and inter-municipal cooperation institutions⁵, professional organisations and research institutions.

5 French municipalities can gather into an entity, an *établissement public de coopération intercommunale* or inter-municipal cooperation body, to pool their resources.

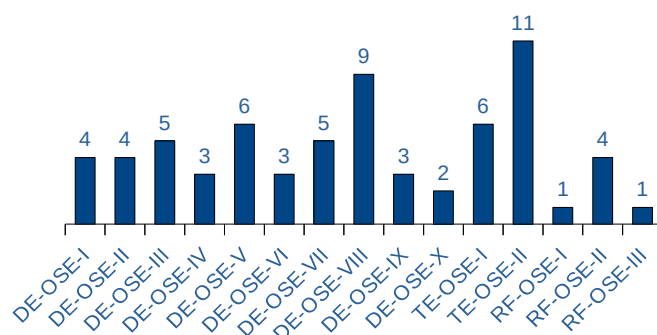


Figure 3: Number of actions by socio-economic objective.

The data sheet contains fields dedicated to socio-economic and environmental effects, and a “no net biodiversity loss approach”⁶. These fields have been filled out with the results of an analysis carried out by DIRM NAMO and were complemented by an external environmental assessment of the action plan and an analysis of social and economic effects of environmental actions. The environmental report is the outcome of the strategic environmental assessment, which aims at ensuring that environmental considerations are taken into account throughout the preparation of the action plan.

Finally, to ease the reading of the action plan, this document was prepared. It provides a broad overview of the action plan, brings out its coherence and outlines the links with existing policies. This document starts from the vision statement and its key elements: the vision items are the foundation of the actions that are to be taken to meet the common goal. Identifying the key items lead to the formulation of a thematic structure covering all strategic objectives. This structure also sheds light on the main challenges addressed by the action plan.

For the sake of clarity and conciseness, each action is linked to one main item. To keep a balance between the number of actions assigned to each item and to define the main item of an action likely to be related to several of them required making choices, made at discretion.

In this document, the strategic objectives related to each item are enumerated so as to bring forward the internal logic of the action plan (the link between existing and new actions). It may be recalled that the section on existing actions is a non-exhaustive summary. As such, all of these actions are not therein mentioned. Similarly, specific objectives, which describe strategic objectives in a more precise way, are not listed in the document. It can be useful to refer to their full content to better perceive the connection between items, objectives and actions.

► Effects of Covid-19 pandemic and Brexit

The action plan has been drawn up in the course of the Brexit transition period, that is before an agreement on a new partnership was signed between the European Union and the United Kingdom. It was a period of uncertainty as to the new rules governing activities at sea beyond the EU borders. **In that sense, in the case this new partnership agreement is considered to deeply modify the performance of activities included therein, the action plan – as foreseen in the strategic component of the DSF – may be subject to an early review.**

Moreover, the action plan was developed in the context of the health crisis induced by the COVID-19 outbreak, which impacted economic activities in France and the social circumstances of its inhabitants. Considering that the action plan is a long-term vision document that promotes an integrated approach and implements actions addressing key issues (ecological transition, social welfare, innovation, among others), NAMO stakeholders wished to complete the process.

⁶ In France, this approach is implemented through the “avoid, reduce, offset” sequence [éviter-réduire-compenser].

However, the potential impact of the crisis is taken into account: **NAMO stakeholders have approved the possibility of an early review of the action plan depending on the evolution of the health and socio-economic situation, as well as their mobilizing capacity.** The implementation timeline of some actions shall be adjusted and funding shall be prioritized, if necessary.

The action plan is to be operated along with the recovery plan deployed by the French Government since September 2020, and specifically its part related to the sea and coastline: some projects funded by “France Relance” Recovery Plan in 2020-2021 will pave the way for actions contained in the action plan.

► Implementation and monitoring of the action plan

The actions will be executed by lead implementing partners along with co-implementing partners and financial partners.

The monitoring framework will identify the relevant indicators and assess the achievement of objectives and targets. As it is another deliverable (part 3 of the DSF), please refer to it for more information.



1

A maritime identity rooted in the territory

With a seashore close to 2 700 kilometres long – representing 40% of the national coastline, the North Atlantic-Western Channel region is a maritime territory. Several historical, symbolic and cultural representations related to the ocean and the coast bear testament to its maritime identity. Commercial and recreational fishing is a long-established activity in Brittany and Pays de la Loire. It has shaped the territory through the development of port towns, the establishment of canneries and other industries associated with fishery exploitation and trade. Nowadays, this activity is still a defining feature of the area.

Furthermore, with a network of marine protected areas (MPAs) and a diversity of seaside landscapes, natural coastal heritage is a distinctive geographical component of the region. In turn, historic sites (lighthouses or defence constructions), square-rigged ships (historic vessels or replicas), maritime infrastructure and facilities (beachfront architecture, harbours, military complexes or industrial buildings) or sporting and cultural events (regattas, sailing festivals and nautical events) reflect the essential function played by the sea in the development of the territory and the life of its dwellers. Maritime identity is deeply rooted in the everyday life of NAMO inhabitants and in the popular culture that passes on sea-related oral traditions, customs, practices and skills.

All these particularities bring people together, fostering a sense of belonging to a maritime community. Indeed, today's regional landscape is the result of centuries-long interactions between society and the coastal environment. Through their relation to the sea and the coast, whether it be a means of livelihood, a simple hobby or a true passion, NAMO stakeholders embody this maritime identity. And they play a central role in the management of this dynamic coastal territory.

1.1 A dynamic coastal territory

► What is the context?



Overflight of the coastline of Lorient. Photo credit: Arnaud Bouissou/Terra.

NAMO sea basin is a dynamic territory: thanks to a favoured geographic location and a range of key maritime facilities, the region can benefit from land-sea interactions. It can also count on a strong web of economic activities (in both established and emerging sectors) able to add value to marine resources, research and innovation clusters as well as cutting-edge industries with proven expertise. Its strong maritime culture fosters social bonds and contributes to its quality of life, which attracts many visitors.

► What are the existing actions?

Objectives

DE-OSE-V: Accelerating the energy and ecological transition of the ports on the coastline

DE-OSE-VII: Encouraging sustainable water sports and tourism that are accessible to all

DE-OSE-VIII: Encouraging sustainable and resilient fisheries and aquaculture

TE-OSE-II: Promoting resilient and balanced maritime, island and coastal territories

There are numerous ports in NAMO territory: the “Grand Port maritime de Nantes-Saint-Nazaire” (a major seaport) and the harbours of Brest, Lorient or Saint-Malo bring economic dynamism, employment opportunities and cutting-edge technology. The ports located in NAMO sea basin have begun to work on innovative proposals in terms of spatial planning, services to users and hinterland interactions. Whether they be marinas, fishing or commercial harbours, the ports of the future will maintain their own identity while blending in with their environment (which can be an urban setting) by hosting new economic activities that create employment opportunities (in particular, marine energy and sailing transport). These new activities must abide by space efficiency and sensitive areas preservation.

Local authorities support this transformation: the departmental councils of Loire-Atlantique, Vendée and Finistère lead several initiatives in this sense (delegation of power through the creation of a joint association of port authorities, a study on marinas hosting capacity); to support innovative facilities and equipment in ports, the region of Pays de la Loire issued a call for proposals (according to the regional strategy document⁷). The Regional Plans for Sustainable Development and Territorial Equality [Schémas Régionaux d’Aménagement, de Développement Durable et d’Égalité des Territoires] (hereinafter SRADDET) of both regions (Brittany and Pays de la Loire) also deal with land planning in ports and hinterland interactions.

Lastly, one of the strategic areas of work of the maritime cluster Pôle Mer Bretagne Atlantique is seaports, logistics and maritime transport. It supports innovative projects to plan space allocation and expand port capacity.

7 Stratégie Ambition maritime régionale Pays de la Loire.

The fisheries sector account for nearly 40% of the national fleet; aquaculture farms, with more than 15.000 leases granted, are distributed along the entire coastline. These sectors are changing to adapt to economic, social and environmental sustainability concerns. A partnership agreement between the national government and the regional authorities of Brittany⁸ plans to support the fishing and aquaculture industries, in particular competitiveness of ports and fleet renewal, with the assistance of the fishing ports grouping groupement interportuaire Pêche de Bretagne.

Nautical activities also contribute to the vitality of the area, which hosts many nautical events. The *Vendée Globe*, a vivid illustration of this nautical dynamism, starts and ends in the department of Vendée with the support of local authorities (the municipality of Sables-d'Olonne, the departmental council of Vendée and the regional council of Pays de la Loire), the main companies of the area and the Chamber of Commerce and Industry. The *Solitaire du Figaro* is another example: thanks to a partnership between the organizing company and the departmental authorities, the main departures or arrivals of the race will be held in Loire-Atlantique from 2021 to 2026. These events, in particular the smaller ones, are becoming more professional with the use of charters, certifications or labels.

Natural and cultural heritage also contribute to the attractiveness of the region, and therefore to its dynamism. Local authorities and the national government – through their *directions régionales des affaires culturelles* [regional departments of cultural issues] – support and promote this heritage. Examples of these are the street art festival “La Déferlante” in Pays de la Loire and the regional call for proposals for awareness-raising activities on marine and river culture⁹. The promotion of cultural heritage, the introduction of signage for heritage sites and the organization of Maritime Heritage Days are put forward by the department of Vendée in its action plan, “Vendée Ambition Maritime”. According to “Loire-Atlantique, terre maritime”, the departmental action plan, local authorities intends to bring support to museums, cultural associations and Arc'Antique lab, a scientific and technical structure dedicated to terrestrial and underwater archaeological sites preservation.

► What is included in the action plan?

The action plan contains six new actions addressing these objectives:

Ports	DE-OSE-V-2-AF ₃	DE-OSE-V-2-AF ₄
Water sports	DE-OSE-VII-2-AF ₁	
Fisheries and aquaculture	DE-OSE-VIII-4-AF ₁	DE-OSE-VIII-6-AN ₂
Maritime heritage	TE-OSE-II-5-AF ₁	

With regards to ports, the action plan proposes to improve port interactions with hinterlands by supporting policies promoting port-city linkages, enhancing collaboration between ports and inter-municipal cooperation bodies through charters, as well as by considering ways of decarbonising road transport. Another focus of the action plan is the consolidation of connections between ports and city residents through a feedback process from past experiences, i.e. territorial initiatives involving ports (Territorial Climate-Air-Energy Plans, charters) and the development of port centres. Port centres act as exhibitions venues to share information, engage in discussion and explore the diversity of port activities and industrial settings.

The vitality of the region is highly dependent on economic activities, which must adapt their practices to meet sustainability standards. To support the evolution of economic sectors, the action plan will promote the development of certifications and labels for nautical events. These events are an important source of income and media attention for the region and, as such, they should set an example in terms of sustainability. Regarding the fisheries sector, collecting and selling facilities (fish auction markets) will diversify their services and improve coordination to enhance the quality and distribution of their services.

⁸ This partnership is called “Contrat d'action publique pour la Bretagne” and was signed in February 2019.

⁹ The call for proposals was entitled: “Pays de la Loire, une terre fluviale et maritime”.

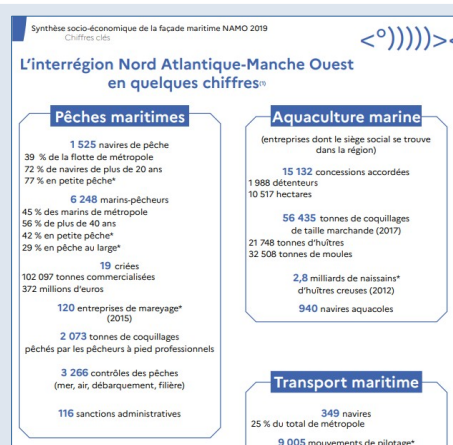
To deal with sanitary hazards and be more sustainable, the aquaculture sector must guarantee the sanitary quality of products and diversify aquaculture production.

Finally, the action plan proposes several initiatives to highlight the value of landscape and maritime heritage in a broad sense, including ordinary landscape (characteristic of the quality of life enjoyed by residents), heritage-listed buildings (lighthouses and beacons) and port cities.

Find out more:

Main facts and figures of maritime activities in Brittany and Pays de la Loire can be found (in French) in [Synthèse socio-économique de la façade](http://www.dirm.nord-atlantique-manche-ouest.developpement-durable.gouv.fr/IMG/pdf/synthese_socio-economique_de_la_façade.pdf), an overview report updated and published every year by DIRM NAMO.

Key figures and maps can be downloaded from: http://www.dirm.nord-atlantique-manche-ouest.developpement-durable.gouv.fr/IMG/pdf/synthese_socio-economique_2020_cle769c8f-1.pdf.



1.2 Coordination of human activities

► What is the context?

There are different leisure and economic activities in NAMO marine and coastal area. This coexistence involves spatial and temporal interactions. If actors' interactions are incompatible, if their use of natural resources is competing with one another, tensions and public expressions of discord may arise. Marine spatial planning is a management tool that enables to prevent and handle conflicts while providing the opportunity to take part in the discussion and ensuring transparency in decision making. For better coordination of activities and uses, it is best to build upon dialogue with stakeholders and public consultation through a governing body.

Coastal stakeholders are numerous and diverse in NAMO sea basin. They take a significant part in creating a dynamic and attractive territory. They are used to collaborating to bring forward a common policy project. Two maritime governing bodies (one in the region of Brittany and another one in the region of Pays de la Loire) contributed to the concerted formulation of maritime and coastline regional strategies. These strategies were taken into account to draw up the Sea Basin Strategic Document. Concerted efforts are also present in departments, as shown by the adoption of "Charte partenariale Défi maritime et littoral", a strategy document elaborated by the departmental council of Loire-Atlantique that gathers stakeholders from both public and private sectors, committed to achieving a common plan for their territory.

► What are the existing actions?

Objectives

DE-OS-IV: Developing marine renewable energies

DE-OSE-VII: Encouraging sustainable water sports and tourism that are accessible to all
DE-OSE-VIII: Encouraging sustainable and resilient fisheries and aquaculture
RF-OSE-I: Enhancing the understanding of and love for the sea

To foster the coordination of human activities and facilitate the coexistence of multiple uses of marine space, the existing framework builds on early planning, governance and dialogue.

To structure the energy transition and promote the development of renewable energies, the Government drew up a multi-annual energy plan that lays out its priorities for the following ten years. This plan aims to produce a share of 40% of electricity from renewable sources by 2030, especially offshore wind energy. The development of marine energy, in particular offshore wind farms, is driven by an early planning process intended to identify suitable areas. The selection criteria of these areas take into account technical and economic factors, national defence and maritime safety restrictions (exclusion of incompatible areas), environmental considerations (avoid sensitive areas) and impacts on other human activities (commercial fishing and aquaculture, marine aggregate extraction, etc.). In NAMO region, there are three commercial farm projects based on fixed-foundation wind turbines: the Parc du banc de Guérande wind farm, located off the city of Saint-Nazaire (first tender round), Saint-Brieuc offshore wind farm and Yeu-Noirmoutier offshore wind farm (second round). There is also one commercial floating wind project currently in development off the coast of southern Brittany (round five). Finally, NAMO region hosts other commercial and demonstration projects dedicated to marine energy (EOLFI, Fromveur and SEM-REV, among others).

Defining potential areas requires land-use planning and a wide-ranging consultation process involving local authorities, socio-economic stakeholders and the public. The French Public Debate Commission [Commission nationale du débat public] set up the framework and implemented the consultations on the projects of Saint-Nazaire and Saint-Brieuc. Another round of consultation was held to identify a site for a commercial tidal energy project in the Fromveur passage (Brittany). Project developers, with the support of local authorities, have put in a great deal of effort to promote a greater understanding of their project and hence contribute to their social acceptance. Tours of SEM-REV test site facilities and Saint-Nazaire Visitor Centre dedicated to wind energy are worth mentioning.

With the formulation of Departmental Plans for Spaces, Sites and Itineraries [plans départementaux des Espaces Sites et Itinéraires], outdoor sports are another example of the type of output stakeholders' engagement and consultation can lead to. These plans facilitate the coordination of sports and tourism activities as well as geographic distribution. The departments of Loire-Atlantique and Ille-et-Vilaine have adopted such plans to secure outdoor access for sports, of which nautical sports are a significant part.

Coordination can also take place within sectors: it is the case with the fishing sector. Several entities deal with the management of fisheries resources. The regional committee for marine fisheries and aquaculture¹⁰ of Pays de la Loire and the Joint association for the development of aquaculture and fishing sectors¹¹ in Pays de la Loire created an inter-branch organisation so that the different parts of the supply chain (from production to trade) work better together: Loire Océan Filière Pêche, this inter-branch organisation, was launched in 2020. In Brittany, fisheries and aquaculture stakeholders teamed up to create Breizh Mer, an entity in charge of promoting seafood products and highlighting workers' expertise. Finally, coordination is also present among nautical sports, structured into committees or leagues in each discipline. They came together to form a steering committee that addresses topics affecting several sports (sailing, surfing, land sailing, etc.).

► What is included in the action plan?

The action plan contains four new actions addressing these objectives:

¹⁰ Comité Régional des Pêches Maritimes et des Élevages Marins.

¹¹ Syndicat Mixte pour le Développement de l'Aquaculture et de la Pêche.

Marine energy	DE-OSE-IV-1-AN ₁
Outdoor sports	DE-OSE-VII-2-AF ₄
Recreational fishing	DE-OSE-VIII-5-AF ₁
Local governance	RF-OSE-I-2-AF ₁

Considering the issues at stake and the sensitivity of the topic, the action plan puts a special emphasis on offshore wind projects, taking into account planning arrangements for cable landing points. The action plan fosters the use of hubs to share infrastructure and achieve land-use efficiency. Further organizing efforts will be devoted to better coordinate access to the coastline and fishing resources. Information will be disseminated and responsible behaviours will be encouraged among recreational fishers to preserve the marine environment and its resources. The action plan will assist fishing federations in sharing information on good practices and carrying out outreach activities. Besides, the action plan will expand marine stakeholders engagement to include discussions on land-based policies influencing the achievement of the DSF environmental objectives. For instance, harmonization of directives criteria (the Marine Strategy Framework Directive and the Water Framework Directive) will be examined.

Find out more:

The Gulf of Morbihan covers 13.000 ha, one-third of which is foreshore. As it is an attractive but fragile area, its coastal and marine spaces are host to numerous ecological issues and multiple land use, thus requiring a local planning process. In order to reconcile marine uses with environmental protection, a planning tool called **Sea Enhancement Scheme** [schéma de mise en valeur de la mer or **SMVM**] was launched in 2006. As a local tool for integrated coastal management, the Sea Enhancement Scheme sets out basic orientations for environmental preservation, marine resources exploitation and coastal planning. It contributes to improving the coexistence of coastal and marine activities with the good environmental status of marine waters. The SMVM was created under law no. 83-8 of 7 January 1983¹² completed by Article 18 of the Coastline Act of 1986¹³ modified in February 2005 by the Act on the development of rural territories¹⁴. Acting on a proposal from national authorities, it was drawn up after a consultation process involving all stakeholders (elected representatives, nonprofit organisations, economic actors, the national government, local authorities and experts) and adopted in 2006. Since then, it has been updated and the revised version has been adopted by order of the prefect on 25 August 2020.



Interactive map of the Gulf of Morbihan. Source: Préfecture du Morbihan.

¹² Loi n° 83-8 du 7 janvier 1983.

¹³ Loi Littoral de 1986.

¹⁴ Loi sur le Développement des Territoires Ruraux.

1.3 Islands: finding the right balance between attractiveness and sustainability

► What is the context?



Immersion of a tidal turbine off the island of Bréhat. Photo credit: Laurent Mignaux/Terra.

There are many islands and islets in NAMO territory. The biggest inhabited islands have come together in an association called “Association des îles du Ponant” (AIP). Except for Chausey islands and Aix island, all of them are administratively attached to the regions of Brittany and Pays de la Loire. They are distinct in sizes and distance from the mainland; however, they deal with the same kind of issues. Beyond the social representation of islands as a symbol of freedom, they face genuine constraints – some of them are common to every coastal area but insularity makes islands

more vulnerable to certain issues: resources availability, coastal erosion, rising sea levels, power supply, employment opportunities, access to education and culture, etc. Islands respond to these daily challenges by working out adaptation mechanisms in different fields (energy transition, transport, social economy, entrepreneurship, etc.). Thus, they look for and try out tailored solutions that can be replicated elsewhere. Islands are testing grounds for innovative solutions to envision the future and overcome environmental and social constraints imposed by insularity. The Ponant islands are no exception: they constitute a pilot site for new initiatives and they showcase innovative solutions to reshape social interactions.

► What are the existing actions?

Objective

TE-OSE-II: Promoting resilient and balanced maritime, island and coastal territories

Most of the Ponant islands are located in Brittany. Thus, they are mentioned in public policies implemented in that area. Several planning documents (the regional coastal and marine strategy and the SRADDET of Brittany) contain strategic guidelines related to the ecological transition in the Ponant islands. Besides, in terms of energy policy, the development of demand-side management and renewable energies for Ouessant, Molène and Sein (islands that are not connected to the mainland power grid) is included in the coastal and marine action plan of the department of Finistère for 2017-2021. Unconnected islands have to produce local energy: they are supplied by an oil-powered plant and a few renewable energy sources. Concerned about fossil fuel impact, they committed to accelerating the energy transition with the first French multiannual energy plan, which had a component dedicated to the Ponant islands. The plan sets the goal of a range of 20% to 50% of renewable energy by 2023 for the three above mentioned islands. And more recently (April 2019), after a call for proposals the AIP – on behalf of these three islands and Île-d'Yeu were selected to formalise an ecological transition contract with the national government. These contracts will support energy efficiency, further development of renewable energy or promote a circular economy and thermal renovation.

However, to reach energy self-sufficiency from renewable sources by 2030 in those islands, ambition pursued by AIP, it is necessary to increase efforts. New actions are needed to contribute to decarbonising energy production and reducing socio-economic inequalities in power supply relating to insularity.

Moreover, resource management, and freshwater in particular, is essential for islands not connected to the mainland supply network (Ouessant, Molène, Groix, Belle-Île, Houat and Hoëdic). The strong

seasonality should not jeopardize freshwater supply continuity. Efforts shall be renewed to control the water supply.

Likewise, seasonality makes waste management more challenging. Besides the environmental impact, it results in a supplementary cost for waste disposal on the mainland. Local authorities have long been committed to implementing waste collection, sorting and processing systems but treatment facilities are nonetheless on the mainland. This is why waste reduction and reuse are crucial. The AIP launched a campaign to encourage ecological habits in visitors and inhabitants aimed at reducing beach littering.

► What is included in the action plan?

The action plan contains three new actions addressing this objective:

Energy transition	TE-OSE-II-3-AF ₁
Marine litter	TE-OSE-II-3-AF ₂
Freshwater	TE-OSE-II-3-AF ₃

In terms of energy transition, the action plan proposes an adjustment of buyback rate for power generated on islands, the development of pilot experiments adapted to the scale of islands (in particular tidal turbines). Efforts shall also be put in decarbonising ferry services between islands and the mainland – for instance with the use of sailing vessels. Developing the recycling sector and the use of waste recovery centres or bulk groceries will contribute to reducing waste at source. Enhanced onsite sewage facilities and increased sensitization to water saving, in particular in touristic facilities, will improve water management.

📌 Find out more:

The Association des îles du Ponant gathers elected representatives and socio-economic stakeholders of 15 islands located off the west coast of France (see the list on the map) to promote their visibility and attractiveness. The scope of the association involves different subjects, in particular public services, land-use planning and environmental policies. It is also the main contact of public authorities for insular issues.

For more information on ecological transition in the Ponant islands, see the [dedicated section on the association website](#) (in French).



Les Îles du Ponant



2

Fostering the blue economy

The blue economy refers to all economic activities related to oceans, seas and coasts. The marine and maritime sector is now acknowledged as one of the drivers of the economy, even though it is not yet fully exploited. To foster the blue economy, the potential of marine spaces and resources (biologic, mineral and energy resources) to create wealth and improve the knowledge base should be taken into account.

However, for that growth to last, economic interests must be kept in balance with environmental concerns so that economic activities neither deplete natural resources nor cause permanent damage. To do so, resource consumption level shall not be higher than the pace of their renewal and pollutant emission shall not exceed the assimilative capacity of the environment. What is more, the viability of an economic activity does not solely rely on natural capital: strong social inequalities hinder its continuity. Any activity that is not socially or environmentally acceptable is not viable, and therefore cannot be considered sustainable.

Although there is a broad consensus on the threefold nature of sustainability (covering social, economic and environmental aspects), its perception is variable among NAMO stakeholders. In this sense, a study was carried out to bring to light a shared view of this concept. The resulting definition is as follows:

- a seaside or marine activity that does not only comply with environmental regulations but also tries to reduce its impact on the environment and raises awareness among its users;
- an activity that upgrades its practices by using research and training to achieve good environmental status;
- an activity that is useful to the territory (whether it contributes to its attractiveness, fulfils a need, creates jobs or any fruitful use);
- an activity that is characterised by consultation and dialogue: it is open to change in light of the discussions held within the governing bodies.

Consequently, fostering the blue economy calls for the diversified and reasonable exploitation of marine resources, the improvement of working conditions to achieve social justice and the adjustment of practices to fit within the ecological transition framework.

2.1 Job creation in the blue economy

► What is the context?



Small-scale fishery off the coast of Le Guilvinec (Brittany). Photo credit: Laurent Mignaux/Terra.

The blue economy brings social and economic benefits: it provides seafood products and raw materials, adds value to marine resources and creates employment opportunities. If the blue economy is further developed, more jobs will be created. However, fostering the blue economy must go together with highlighting the value of marine careers to ensure the renewal of crews and workers as well as the evolution towards new professions and skills demanded by the blue sectors. Besides, quality of employment should not be left on the sidelines. Just as economic growth must go hand in hand with social progress, creating jobs without paying attention to their quality cannot be deemed sustainable. Several aspects have to be considered to ensure job quality: income, social protection, security of employment, working environment or access to training opportunities. Skill development can increase the employability of workers and maintain sectoral competitiveness.

Therefore, the blue economy faces several challenges: an ageing workforce in the fisheries sector, fishing business transfer difficulties, harsh working conditions, vocational training needs, occupational gender balance and adaptation to new technologies and environmental sustainability.

Capacity building for workers of the blue economy can enhance maritime occupations' attractiveness, bridge the skills gap and prepare the next generation for emerging careers. Besides, fisheries and aquaculture are sectors particularly affected by workforce ageing and strenuous working conditions. They rely heavily on marine water quality and the good status of ecosystems. Therefore, it is crucial to support them so that these industries are more secure, sustainable and modern thanks to the use of new techniques and technologies.

► What are the existing actions?

Objectives

DE-OSE-II: Developing a pool of skilled and competent labour for NAMO blue economy

DE-OSE-VIII: Encouraging sustainable and resilient fisheries and aquaculture

Oceans and maritime careers are regularly in the spotlight showing us the passion of seafarers and their challenging working environment. The exhibition that was held in Nantes in June 2019¹⁵ or the documentary by Mathilde Jounot¹⁶ are good examples. Sea workers can also make the news themselves: Breizh Mer, a fishing association in Brittany, was recently launched. Pavillon France is a national fishing inter-branch organisation that produced a video clip¹⁷ to illustrate the issues of intergenerational transmission.

¹⁵ La mer XXL.

¹⁶ Océans, la voix des invisibles.

¹⁷ La jeune femme et la mer.

Some initiatives are intended to familiarize young people with safety at sea and respect for the environment (the water sports programme for young people in the region of Pays de la Loire) or to encourage them to take an interest in careers at sea (the Career Days organised in secondary schools in Loire-Atlantique).

As for recruitment, the Maritime Employment Week – organised by the public employment service in every coastal region of the country – or the Campus des Métiers et des Qualifications des industries de la mer¹⁸ aim to facilitate the integration of recent marine graduates into the labour market. There are other vocational training programmes and occupational integration schemes, like the short training courses tailored to maritime careers, which are part of a broader programme (Région Formation-ACCÈS emploi), by the regional council of Pays de la Loire or École des Chantiers de l'Atlantique, a shipyard school that delivers skills training intended to lead to a long-term contract. In the region of Pays de la Loire, capacity building needs and shortage occupations were identified through sectoral dialogue.

To reinforce the attractiveness of marine careers and ensure that workers' skills match the sector's needs, the regional council of Brittany designed specific tools in collaboration with the national government and professional organisations (included in the policy document called "Contrat d'objectifs Produits de la pêche et de l'aquaculture 2019-2022"). This scheme seeks to improve the understanding of the working and living conditions of seafarers. It also intends to adapt training courses to emerging needs and support businesses in bridging the energy, environmental and digital gap. In the latter field, several initiatives aim to familiarize users and business managers of the blue economy (workers of the sailing industry, diving professionals or nautical industry businesses) with digital issues.

Even though several measures have already been taken at different scales, they appear to be insufficient to overcome the challenges faced and to reach the objectives. Therefore, new actions are proposed below.

► What is included in the action plan?

The action plan contains five new actions addressing these objectives:

Workers' rights	DE-OSE-II-1-AF1	
Training	DE-OSE-II-2-AF2	DE-OSE-II-3-AF1
Fisheries	DE-OSE-VIII-1-AF1	DE-OSE-VIII-2-AF1

Several actions are aimed at improving the working conditions of workers of the blue economy: assigning new duties to the French Maritime Prevention Institute [Institut maritime de prévention], upgrading skills of business executives related to risk prevention and improving seafarers' social protection.

Regarding training programmes, the action plan will carry out an exhaustive inventory of marine careers training courses, support vocational integration, encourage the adjustment of training courses to cover skills in demand in the fishing sector as well as in the shipbuilding and nautical industries. Besides, efforts will be devoted to strengthening the visibility of careers at sea, make apprenticeship available for maritime careers and facilitate access to information on vocational training.

Other actions relate to the fishing industry and the Brexit context: local resource management governance will be reinforced, business creation and transfer will be facilitated, training courses will be designed to enhance the understanding of biodiversity (how biodiversity is affected by human practices and how to avoid impacts).

¹⁸ It is a network of maritime economy stakeholders gathering high schools, vocational training centres, higher education institutions, public entities and private sector companies.

Find out more:

Seafarers hold a variety of professions that fit into four different fields: merchant navy (ships carrying cargo and passengers or service boats), recreational boating, fishing and aquaculture. To learn about these occupations, you can read the [guide](#) published by ONISEP (the French Office for Information on Teaching and Professions) that explores the different career options of sailors by presenting profiles of professionals.

The Direction interrégionale de la Mer is the public entity that supervises maritime training. Therefore, you will find more information on the subject, on the [dedicated section of DIRM NAMO's website](#) (in French).



2.2 The sustainable utilization of marine resources

► What is the context?



Oyster farming barge in an oyster park at low tide in Bréhat island.
Photo credit: Laurent Mignaux/Terra.

The blue economy is based on the utilization of natural marine resources – both traditional and emerging resources. Some marine resources are renewable (fisheries, marine energy), while others are not (marine aggregates). In any case, for their exploitation not to cause irreversible damage to the marine and coastal ecosystems, resource extraction (volume removed and extraction methods) must be governed by a strategy for the sustainable management of resources.

► What are the existing actions?

Objectives

DE-OSE-IX: Stabilizing the supply of marine aggregates

DE-OSE-X: Accelerating the development of marine biotechnologies

Do3: Promote the exploitation of fish, mollusc and crustacean stocks at maximum sustainable yield

In every coastal department, a marine farm structuring plan¹⁹ is adopted by the government. This document outlines the local planning policy for aquaculture development. In addition to that policy instrument, there is another planning tool for shellfish aquaculture in the department of Morbihan (named *Charte conchylicole*). This charter explains the issues faced by shellfish aquaculture (including the decline in the number of marine farms), produces recommendations and expresses the commitments undertaken by the contracting parties. In turn, the Gulf of Morbihan Sea Enhancement Scheme (updated in 2020) bolsters the land-use policy of the *Charte conchylicole* designed to maintain the potential for aquaculture exploitation at sea and on land: the SMVM defines areas whose primary use should be marine aquaculture, facilitates the execution of light construction works on land for marine farming purposes and plans a public land-banking scheme in anticipation of climate change.

¹⁹ Schéma des structures des exploitations de cultures marines.

The departmental council of Loire-Atlantique is committed to supporting traditional maritime sectors. Its actions are oriented towards local fish auction markets – by managing these facilities and adjusting their activity to the needs of the sector – and SMIDAP (the Joint Association for the Development of Aquaculture and Fishing sectors): by granting financial aid to this entity so that it can keep supporting the sustainability of the sector.

Chapter 10 of the SDAGE of Loire-Brittany (2022-2027) is dedicated to coastal preservation. It offers guidelines on the quality of shellfish waters (restoration and protection). It also lays down provisions aiming at the achievement of the goals set therein.

In NAMO region, marine aggregate extraction is subject to the provisions set up in a specific guidance and management document ("Document d'orientation et de gestion des granulats marins" hereinafter DOGGM). The DOGGM was adopted by the coordinating prefects on 24 September 2019, since it was attached to the DSF NAMO as Annex 9. It was drawn up based on figures set out in the regional quarry master plans of Brittany and Pays de la Loire representing the supply needs of marine aggregate required to provide for its several uses. It points out that, at the moment of its adoption, the existing licences for marine aggregate extraction activities (silica and shell-based aggregates) can respond to all sectoral demands of said materials. Section 10l of the SDAGE ("Specify the extraction conditions of certain marine materials"), included in Chapter 10, recalls the regulatory framework of this activity as well as the environmental issues and economic interests at stake. That Section also expresses the need to draw up a spatial management plan for this activity that would take into account global marine environment considerations, thus referring to the DOGGM adopted in NAMO sea basin.

Concerning biotechnology, Pôle Mer Bretagne Atlantique gathers a large number of marine research and innovation stakeholders. It is a business cluster that facilitates networking and contributes to the development of its members. Likewise, AlgoSolis is a platform designed by the University of Nantes and the Centre national de la recherche scientifique dedicated to microalgae research and development. The region of Pays de la Loire is, indeed, at the forefront of innovation in the field since it also hosts the Atlantic Microalgae Programme²⁰ and the Microalgae Valley, both located in Sant-Nazaire.

Regarding the management of fisheries resources, the programme of measures of the PAMM (the French marine Strategy required under the MSFD) includes provisions to better align volumes removed through fishing with commercial fish stocks to maintain, increase or rebuild stocks.

► What is included in the action plan?

The action plan contains four actions addressing these objectives:

Marine aggregates	DE-OSE-IX-1-AF1	DE-OSE-IX-1-AF2
Biotechnologies	DE-OSE-X-2-AF1	
Fisheries	Do3-OE02-AN1	

In this section, efforts focus on reinforcing the sustainability of natural resources utilization (marine aggregate extraction, commercial sea fishing), and exploiting other resources (alternative sources of sediment and marine biotechnologies).

When the DOGGM was adopted, it was pointed out that a more precise estimate of the demand for calcareous materials (for soil amendment purposes) was necessary. Therefore, an updated assessment of calcareous sand needs will be carried out under the action plan. A study will be undertaken on the possible use of recycled aggregates (dredged material or construction waste) as an alternative to siliceous sand.

Regional fisheries committees will be supported to improve stock management. Management plans for priority stocks, not subject to fishing quotas, will be formulated. These plans take into account the conservation status, economic value, fishing practices and existing management measures of the stocks.

²⁰ Programme AMI.

Marine biotechnologies have yet to be explored in depth to unlock the potential of marine resources. The action plan specifies two particular sectors of study: microorganisms and fisheries and aquaculture byproducts. Besides, the action plan will also strive for better coordination of innovation and industry stakeholders in pre-commercial demonstration prototypes, and more globally in earlier stages of research to take their needs into account.

Find out more:

Marine biological resources have strong innovation potential and can generate substantial economic benefits in several fields: nutrition, health, agriculture, aquaculture, energy, environment and cosmetics. Their strategic relevance is acknowledged at the European, national and regional level. The working group on marine biotechnologies of Europôle Mer, a scientific interest group about oceanic and coastal areas, produced a [report](#) on skills, stakeholders and facilities associated with marine biotechnologies in Brittany and Pays de la Loire. The purpose of this document is to point out the strengths and weaknesses of the sector and to propose strategies to stimulate its development.

Like Europôle Mer, other groups, clusters and institutions seek to gather marine research and innovation stakeholders located in Western France (Pôle Mer Bretagne Atlantique, Campus mondial de la mer, etc.).



2.3 Blue economy and ecological transition

► What is the context?

According to the [National Strategy of Ecological Transition towards Sustainable Development 2015-2020](#), the ecological transition means shifting towards an economic and social model based on new consumption and production patterns as well as new working approaches and ways of living together. The objective is to address major environmental issues (climate change, biodiversity loss, resource scarcity and environmental health risks). Responding to these challenges will open up new economic opportunities and improve social harmony for a more sustainable and equitable development.

► What are the existing actions?

Objectives

DE-OSE-I: Supporting and promoting research and innovation in all the domains of the maritime economy

DE-OSE-III: Promoting and accompanying the development of the maritime circular economy

DE-OSE-V: Accelerating the energy and ecological transition of the ports on the coastline

DE-OSE-VI: Accompanying and promoting sustainable shipbuilding and nautical industries

DE-OSE-VIII: Encouraging sustainable and resilient fisheries and aquaculture

Do8: Reduce or remove chemical contaminant input to the marine environment, whether from land or sea-based sources, chronic or accidental

D10: Reduce input and presence of litter at sea and on the coast from land or sea-based sources

Shipbuilding and nautical industries are engaged in designing the ship of the future: a connected vessel with a low carbon footprint. Sailing boat prototypes are under construction or being tested (Grain de Sail, Néoline and SILENSEAS cruise ships are a few examples of these companies. For a detailed list, refer to: http://www.dirm.nord-atlantique-manche-ouest.developpement-durable.gouv.fr/IMG/pdf/industrie_navale_cle185964-3.pdf).

The circular economy is one of the pillars of the ecological transition. It seeks to preserve resources by reducing waste, promoting reuse and recycling, improving resource efficiency and engaging stakeholders' towards ecological transition. Switching from a linear to a circular economy is one of the principles embraced by the SRADDET of Brittany and Pays de la Loire. Both regions formulated roadmaps for a circular economy that include direct and indirect references to coastal and marine activities. The circular economy is mentioned in the section on Industrial and territorial ecology of the roadmap of Pays de la Loire and the roadmap of Brittany outlines two dedicated actions.

NAMO stakeholders are already working on resource reuse. For instance, the use of dredged sediment from shipping channels is mentioned in the SMVM of the Gulf of Morbihan and two projects (SEDIDEPOT and SEDIRADE) of Pôle Mer Bretagne Atlantique are studying the utilization of dredged sediment. Waste reduction is also one of the goals of the PAMM. Its programme of measures includes reinforcing waste prevention and improving waste management in line with the circular economy at the scale of Celtic seas and Bay of Biscay marine subregions (action identified as Mo15 in the document).

To prompt local stakeholders to change their consumption habits, sensitisation is a valuable tool. For example, the regional authorities of Pays de la Loire regularly conduct a local food awareness and action campaign²¹ by providing meals to high school students prepared with local seafood products.

Moreover, financing tools can support the development of innovative projects and engage actors on a bigger scale: in 2018 a call for proposals in Pays de la Loire²² dealt with innovative projects in the circular economy; in 2020, the open calls of ADEME [Ecological Transition Agency] in Brittany and Pays de la Loire welcomed proposals relating to resource-efficient territories and circular economy; there was also a call for proposals on short distribution channels in Loire-Atlantique. However, the share of these proposals covering ocean or coastal topics is unknown.

Providing assistance is a key step in the implementation of an environmental approach: the Chamber of Commerce of Saint-Nazaire designed a toolkit for businesses to assess the compliance of their practices with the principles of circular economy²³; likewise, Pôle Mer Bretagne Atlantique assists project owners in implementing innovative actions with environmental value in the field of seaports, logistics and maritime transport. Adopting greener practices in ports is an important issue for a successful ecological transition. In fact, the regional strategy document of Pays de la Loire mentions a call for proposals with a component dedicated to energy transition in marinas ("zero waste port"). And the French national port strategy for 2020-2025 intends to bring innovative environmental businesses to the industrial port zone and to create a green label for port logistics.

► What is included in the action plan?

The action plan contains 11 new actions addressing these objectives:

Fisheries	DE-0SE-VIII-3-AN1		
Circular economy	DE-0SE-III-1-AF1	DE-0SE-III-1-AF2	
Contaminants	Do8-OEo6-AN1		
Marine litter	D10-OEo2-AN1	D10-OEo2-AN2	D10-OEo1-AN5
Ports	DE-0SE-V-2-AF2	DE-0SE-V-3-AF1	
Maritime transport	DE-0SE-I-1-AF1		
Shipbuilding and nautical industries	DE-0SE-VI-1-AF1		

Efforts to decarbonise the blue economy, in particular activities related to maritime transport and port facilities, are pursued by the action plan.

21 This campaign is called "menu Loire Océan".

22 The call for proposals was called "Concours Résolutions".

23 EVAL'Economie Circulaire.

To do so, the action plan will support the development of sailing projects to improve the viability of their business model. A full-scale test of coastal navigation will be launched. While offshore wind farms are already being deployed, the manufacturing industry for ocean energy maintenance vessels is still to be set up. This industry will have to propose a set of environmentally-friendly technical solutions: hydrogen or wind power, bio-based materials, devices to reduce air pollutants/noise output and collision risks. For fishing vessels, the primary objective is to cut down on fuel consumption.

The action plan will also support the strategic project of the Grand Port Maritime Nantes Saint-Nazaire through the promotion of industrial ecology, the use of alternative fuels and dock electrification. Ports will globally adopt greener practices in NAMO region in terms of facility cleaning (e.g. boat ramps); environmental certifications will also be widely used (European certification, ISO 14001 standard and EcoPorts certification).

Going beyond sectoral visions and tackling environmental issues at the regional level is also useful. Territorial approaches will therefore be studied to incorporate the particularities of coastal areas and propose ecological transition agreements²⁴ adapted to these areas. The action plan also encourages regional authorities to increase circular economy efforts by adding a specific component for coastal and marine issues in circular economy funding calls.

Source reduction and waste management (in particular, through recycling) is also a strong orientation of the action plan. It can be implemented in the fisheries and aquaculture sector (e.g. replacing plastic equipment with biodegradable alternatives), in port facilities or the dredging industry – by pulling together the output of dredging operations at the departmental level, there will be enough sediment to be of interest for the building industry.

Find out more:

The “Blue Economy Act” [loi n° 2016-816 du 20 juin 2016 pour l’économie bleue] aims at contributing to the improvement of the competitiveness of blue economy enterprises and updating the legislative framework related to maritime activities.

The different sections of this act, their topic and the reference to the implementing decrees are available at: <https://www.legifrance.gouv.fr/dossierlegislatif/JORFDOLE000031978450/?detailType=ECHEANCIER&detailId=>

²⁴ The *contrats de transition écologique* are territorial planning tools developed by local representatives (local authorities, firms, NGOs, etc.) with the financial and technical support of the government (government offices, public entities) with an environmental approach.

3

Caring for our natural assets

Beyond the crucial function played by oceans in sustaining human life on Earth (through oxygen production and atmospheric carbon dioxide absorption, among other ecosystem services) and the beauty of coastal landscapes, the sea has intrinsic value: it is a precious capital that we must protect. The North Atlantic-Western Channel sea basin, and more broadly the Bay of Biscay and the Celtic Seas marine subregions, possesses outstanding natural assets. In this marine area, a large number of human activities coexist, and their concentration increases near the coast.

Rivers' and coastal streams' freshwater, filled with nutrients, encounter saline deep ocean water carrying abundant and varied food supply for ecosystems. Nutrient availability and habitat diversity account for this remarkable biodiversity.

This extensive zone is home to numerous species that take shelter, feed and breed in habitats that are essential to their growth. But this environment is exposed to multiple pressures associated with climate change, land pollution and human activities.

Achieving good environmental status while keeping pressures of human activities within acceptable limits lies at the heart of the maritime integrated policy, and as such it is laid down in the sea basin strategy document. Just as the state of the environment is influenced by human activities, most activities are dependent on resource conservation status and water quality.

3.1 Protecting species and their habitats

► What is the context?

NAMO sea basin provides shelter to sensitive and emblematic species. Such biological diversity receives all the attention, which is why a wide coastal and marine surface is covered by marine protected areas. Because of the knowledge gaps challenging our understanding of these ecosystems, the available information makes it difficult to carry out a thorough assessment of their conservation status. However, it is acknowledged that unexplored places, like the abyssal plain, hold tremendous wealth.

Ecosystem richness and balance rely on water quality and hydrographic conditions, which are highly dependent on riverine inputs from water catchment areas.

Marine coastal ecosystems, in particular low-lying areas, are vulnerable to climate change impacts and the introduction of alien species, that may outcompete native species and become invasive.

► What are the existing actions?

Objectives

DE-OSE-VII: Encouraging sustainable water sports and tourism that are accessible to all

TE-OSE-II: Promoting resilient and balanced maritime, island and coastal territories

D1-HB: Limit or avoid anthropogenic physical disturbances affecting the good environmental status of coastal benthic habitats, the continental shelf, and deep-sea habitats, particularly special habitats

D1-OM: Reduce or avoid pressures generating direct fatalities, disturbance and loss of functional habitats important for the life cycle of seabirds and foreshores, in particular for vulnerable and endangered species

D1-PC: Limit pressures on vulnerable or endangered fish species, or promote their recovery, and limit pressure on essential fish habitats

D2: Limit the risks of introducing and disseminating non-indigenous species through human activity

D7: Limit changes in hydrographic conditions (caused by any human activity) detrimental to the functioning of ecosystems

The protection of sensitive species and habitats is governed by a legislative and regulatory framework including European environmental directives, the Biodiversity Act²⁵, the National Strategy for Protected Areas, the management plans of Natura 2000 sites, etc.

In Natura 2000 sites, an ecological and socio-economic assessment is undertaken by managers to list the existing professional and recreational activities and define conservation objectives; then, management plans can be formulated: these plans set management and conservation measures for the preservation of species and habitats, the implementation process and financial arrangements. Management measures can be formalised into an agreement signed by all partners.

The programme of measures of the Plan of Action for the Marine Environment covering NAMO sea basin was adopted by the coordinating prefects in 2016. It contains several actions aimed at reinforcing the protection of the marine environment and the understanding of environmental issues. Several measures regarding species and habitats protection are worth mentioning: an update of the national list of marine protected species and habitats (M007) and of the regional lists of protected plant species (M401).

The programme of measures is also aimed at limiting the spread of invasive exotic species, in particular by contributing to an early warning system, as defined by the European regulation on invasive alien species

25 Loi n° 2016-1087 du 8 août 2016 pour la reconquête de la biodiversité, de la nature et des paysages.

(Mo10) and promoting good fishing practices that reduce spread risk (Mo11). Likewise, it contains actions aimed at ensuring fish stocks are in a sound state through specific management measures for some species, like the sea bass (Mo09).

The ecological balance of coastal ecosystems also relies on the sound management of freshwater inflows. Summer water deficit and, conversely, winterly increase in river discharge (causing a flushing effect) can be harmful to the environment. To reduce such ecological disturbances, guidelines and provisions for quantitative water management are included in the SDAGE of Loire-Brittany.

► What is included in the action plan?

The action plan contains 13 new actions addressing these objectives:

Biodiversity	Do1-HB-OE10-AN2	Do1-OM-OE03-AN1	Do1-OM-OE04-AN1	Do1-OM-OE05-AN1
	Do1-PC-OE01-AN1	Do1-PC-OE02-AN1	Do1-PC-OE03-AN01	Do1-PC-OE05-AN1
Non-indigenous species	Do2-AN1		TE-0SE-II-3-AF4	
Hydrographic conditions	Do7-OE04-AN1			
Water sports	DE-0SE-VII-2-AF3			
Cross-cutting action	AT-o6			

The action plan sets new actions to further protect certain species: in particular, a map will be designed to show functional habitats for seabirds representing a strong conservation interest; local actions will be taken accordingly to combat habitat loss.

About a hundred species of elasmobranchs can be found in metropolitan France and 45% of these stocks are depleted, according to the International Council for the Exploration of the Sea, or are endangered according to the Red List of threatened species. Among them, 13 species are critically endangered at the European level. So far, they are not protected by any kind of management measure under the Common Fisheries Policy. Therefore, the action plan foresees the formulation of a national multi-species action plan for elasmobranchs. And regarding other fisheries, pilot fishing conservation areas will be defined in each sea basin.

To make sure freshwater inputs suit the needs of coastal and marine ecosystems, a prospective study will be carried out to assess the likelihood of unfulfilling such needs. In light of the analysis, additional measures to complement the SDAGE will be designed, if need be.

When non-native species are introduced, islands are particularly vulnerable to the risk of invasion. For this reason, biosecurity education and awareness of alien species will be reinforced. These actions will be directed at municipalities, residents and visitors.

Users of recreational activities can also play a direct part in environmental protection and regeneration. For example, the action plan contains initiatives to be led by nautical centres.

Find out more:

In France, protected areas cover approximately 21% of land and 23.5% of waters. Some protected areas are managed directly by a public agency called **Office français de la biodiversité** (OFB). The OFB brings technical support to protected area managers. Other MPAs are managed by local authorities, federations, associations, etc.



Under the French Environmental Code, there are [11 types of marine protected areas](#). New categories of MPAs can be added by Ministerial Order.

The OFB leads the network of French marine protected areas and contributes to the international effort for the creation and management of MPAs. The [map of the network of French MPAs](#) is available on OFB's website.

3.2 Tackling pollution

► What is the context?

In this section, the concept of pollution refers to inputs associated with human activities. They can take a liquid form (release of waste water, illegal discharge of untreated sewage water carrying micropollutants, bacteria, viruses and excess nutrients) or be solids (riverine litter inputs to the marine waters, waste discarded on the beach). The term pollution also encompasses sound nuisance arising from human practices and offshore engineering.

► What are the existing actions?

Objectives

DE-OSE-VI: Accompanying and promoting sustainable shipbuilding and nautical industries

TE-OSE-I: Knowing, preventing and managing maritime and coastal risks in an integrated way

TE-OSE-II: Promoting resilient and balanced maritime, island and coastal territories

D5: Reduce excessive nutrient inputs and their transfer in the marine environment

D8: Reduce or remove chemical contaminant input to the marine environment, whether from land or sea-based sources, chronic or accidental

D9: Reduce microbiological, chemical and phycotoxin contamination which degrades the hygienic quality of seafood, aquaculture and fishing production areas and bathing areas

D10: Reduce input and presence of litter at sea and on the coast from land or sea-based sources

D11: Limit noise emissions in the marine environment to levels that do not impact marine mammals

The main policy tool to tackle water pollution is the SDAGE. It is an instrument drawn up in each river basin of the country, required under the 1992 Water Act²⁶. It sets guidelines and provisions to ensure the maintenance or the achievement of good water status under the European Water Framework Directive (WFD). The implementation of the water policy contained in the SDAGE is ensured by the Water Development and Management Plans²⁷, which intervene at the level of smaller catchment areas.

Charges arising from the application of the "polluter pays" principle can be ploughed back into water quality improvement measures: sanitation, river and wetland restoration, etc. In addition, the programme

²⁶ Loi n° 92-3 du 3 janvier 1992 sur l'eau.

²⁷ These plans are called *schémas d'aménagement et de gestion de l'eau* or SAGE.

of measures of the SDAGE sets up efforts to fight against pesticides, contaminants, excess nutrients and bacteria.

The PAMM calls for complementary measures on the coastline. For example, some actions are aimed at bringing dry docks up to standards by installing water treatment systems in ports, where appropriate (Mo13), and fostering the implementation of territorial guidelines for dredging operations and sediment management (Mo24).

Eutrophication is characterised by the proliferation of phytoplankton and macro-algae. It is a significant issue in NAMO sea basin. Therefore, several actions are implemented in the river basin of Loire-Brittany to reduce nutrient loads exported by rivers to the sea. IFREMER²⁸ and CEVA²⁹ have carried out several studies to improve the understanding of conditions enabling the growth of macro-algae (in particular, species of the genus *Ulva* that induce green tides) and toxic micro-algae. These studies³⁰ have identified controlling factors (nitrogen for *Ulva*) to set strategies to reduce proliferation events.

An action plan against green tides was launched in Brittany in 2010. It was renewed in 2017 and implemented over several years. It was initiated thanks to a financial partnership between the national government, local authorities (at regional and departmental level – Finistère and Côtes-d’Armor) and the related public water entity³¹.

Tackling marine litter falls within an international, European, and national regulatory framework. The United Nations coordinates international efforts in this field through a dedicated institution: the United Nations Environment Programme (UNEP). UNEP leads the Global Partnership on Marine Litter, an international multi-stakeholder partnership. The International Maritime Organization (IMO) takes actions within its sphere of competence – for example, with the adoption of an action plan to address marine plastic litter from ships. At the European level, each Member State is required to implement the MSFD, which includes a component dedicated to marine litter (descriptor 10). Besides, the European Union is a contracting party to the Convention for the Protection of the Marine Environment of the North-East Atlantic (the “OSPAR” convention signed on 22 September 1992). The OSPAR regional action plan for marine litter (2014-2021) was drawn up and implemented by the contracting parties. Besides, the European Directive of 5 June 2019 on the reduction of the impact of certain plastic products on the environment and the European Plastics Pact (March 2020) will contribute to reducing the presence of plastic packaging and products in the environment. In France, the roadmap for “zero plastic at sea” launched by the Inter-ministerial Committee of the Sea³² (CIMER) aims at reducing the input of macro and micro-debris into the ocean by 2025. There is also a national action plan for waste management and it is implemented through regional plans. These plans are drawn up by the regional authorities and usually contain sensitization actions. For example, local authorities designed initiatives to raise awareness on roadside littering in Vendée.

The PAMM also deals with the issue of waste management for seaside activities. Upon request of the Ministry of the Environment, a study on waste management in ports was carried out by CEREMA³³ (Mo17); the Plan of Action also promoted the adoption of sustainable methods of exploitation in shellfish culture, as well as the introduction of a waste management section in departmental marine farm structuring plans (Mo19). For instance, the regional committee for shellfish culture³⁴ of Pays de la Loire is committed to supporting its members in the achievement of a zero-waste objective: oyster shells and mesh bags are collected and recycled.

28 Institut français de recherche pour l'exploitation de la mer.

29 Centre d'étude et de valorisation des algues.

30 *Étude de connaissance des marées vertes du littoral sous influence de la Loire et de la Vilaine couvrant la zone allant de la Presqu'île de Quiberon à l'île de Ré* (2015, DREAL/CEVA) and *Synthèse des résultats obtenus par le modèle Mars-Ulves sur les sites bretons* (CEVA, 2016).

31 Agence de l'eau.

32 Comité Interministériel de la Mer.

33 Centre d'études et d'expertise sur les risques, l'environnement, la mobilité et l'aménagement.

34 Comité régional de conchyliculture.

Every year, marine pollution events – spillage of oil or any other chemical substance – are detected and handled. They can be originated by an illegal discharge, a damaged ship, a collision or an accident at sea or in an estuary. In light of the risk of marine accidental pollution, the POLMAR³⁵ programme was designed after the *Torrey Canyon* oil spill in 1970. More specifically, such response capabilities were established following the 1978 *Amoco Cadiz* disaster off the coast of Brittany. Since 2005, the POLMAR programme is linked to ORSEC, an organisation in charge of broad risk management³⁶ that is common to all emergency plans. POLMAR is made of two components: POLMAR/Mer is placed under the responsibility of the maritime prefect, who can exercise powers related to different ministries to implement State action at sea; POLMAR/Terre is deployed by departmental prefects and relies on the resources available at the municipality level. In this context, a specialized institution was created: the Centre of Documentation, Research and Experiments on Accidental Pollution (CEDRE)³⁷ studies pollutant types and designs preventive and corrective techniques.

► What is included in the action plan?

The action plan contains 12 new actions addressing these objectives:

Health risks	TE-OSE-I-3-AF1				
Territories	TE-OSE-II-3-AF5				
Shipbuilding and nautical industries	DE-OSE-VI-2-AF1				
Eutrophication	Do5-OE01-AF1				
Contaminants	Do8-OE03-AN1	Do8-OE04-AN1	Do8-OE05-AN1	Do8-OE06-AN1	D09-OE01-AF1
Marine litter	D10-OE01-AN1	D10-OE01-AN2			
Noise	D11-OE01-AN1				

Besides the measures contained in the SDAGE of Loire-Brittany (2022-2027), other actions will be implemented to bring down water pollution: the reduction of contaminants released by recreational boating and shipping industry will be supported; the installation of water treatment systems for dry docks will continue; washwater generated by exhaust gas scrubbers on ships will be adequately treated; an electronic declaration will be initiated concerning chemicals discharged into the sea by chemical tankers.

These initiatives constitute corrective actions, implemented in addition to preventive measures such as limiting the use of antifouling on boat hulls and promoting other types of marine propulsion system. For instance, the use of liquefied natural gas reduces sulfur dioxide and fine particle matter emissions by 99%, nitrogen oxide emissions by 85% and CO₂ emissions by 25%.

To substantially reduce marine and coastal eutrophication, efforts to limit nutrient input (nitrogen, phosphorus) derived from land runoff and soil erosion shall be increased. In this sense, target values for nitrate input will be set jointly by the governing bodies of the relevant basins: the River Basin Committee³⁸ and the Maritime Council for the Coast. Regarding phosphorus input, it is necessary to carry on actions dealing with treated sewage water adversely affecting the marine environment. Phosphorus runoff from agriculture and livestock production transferred to coastal areas also need to be reduced.

Phytoplankton blooms (microalgal blooms) may cause a discolouration of water known as red tide. Some micro-algae produce toxins (named phycotoxins) that can induce food poisoning in humans through the ingestion of contaminated shellfish. These toxins are generally produced by *Dinophysis*, *Alexandrium* and

35 POLMAR stands for MARine POLLution in French.

36 Organisation de la Réponse de Sécurité civile.

37 Centre de documentation, de recherche et d'expérimentations sur les pollutions accidentelles des eaux.

38 Comité de bassin.

Pseudo Nitzschia spp. Further analysis seems necessary to better identify factors influencing these events (in particular, more details about nutrient imbalances).

In addition to existing waste reduction policies, efforts will be made to tackle litter in sewage system and storm drainage system.

Noise nuisance is another source of pollution. It can be originated by leisure or professional activities as well as offshore engineering. To define the nature of the nuisance and assess its impact, it shall be mandatory to collect data on impulsive noise associated with rock blasting, seismic surveys (air gun, boomer and sparker), pile driving, single beam and multibeam echosounders, civilian sonar and sonobuoy.

Find out more:

[The green algae management plan of Brittany \(2017-2021\)](#) is made of:

- a preventive component devoted to reducing nitrogen leaks into the environment (resulting in algae proliferation);
- a corrective component aimed at improving safety with the collection and disposal of washed-up algae;
- a component dedicated to knowledge enhancement.

3.3 Reducing anthropogenic pressures

► What is the context?

This section is closely linked to “The protection of species and their habitats” (3.1): to take effective actions at source and act on disturbance factors of species and habitats, an improved understanding of pressures and impacts is essential. To reconcile the development or continuation of human activities with recreational uses, it is imperative to limit pressures and impacts on coastal and marine ecosystems, including in inland regions.

While any project likely to have significant repercussions on ecosystems is subject to an impact assessment as required by the Environmental Code, evaluating the project effects before it is implemented may not be a straightforward matter; neither is to determine cumulative impacts. As such, it seems appropriate to broaden the knowledge base and produce guidance documents on how to take a better account of pressures and impacts and assess them properly in development consent applications.

► What are the existing actions?

Objectives

DE-OSE-VII: Encouraging sustainable water sports and tourism that are accessible to all

RF-OSE-II: Exploring the sea

D1-HB: Limit or avoid anthropogenic physical disturbances affecting the good environmental status of coastal benthic habitats, the continental shelf, and deep-sea habitats, particularly special habitats

D1-MT: Reduce or avoid pressures generating direct fatalities, disturbance for marine mammals and turtles

D1-OM: Reduce or avoid pressures generating direct fatalities, disturbance and loss of functional habitats important for the life cycle of seabirds and foreshores, in particular for vulnerable and endangered species

D1-PC: Limit pressures on vulnerable or endangered fish species, or promote their recovery, and limit pressure on essential fish habitats

D3: Promote the exploitation of fish, mollusc and crustacean stocks at maximum sustainable yield

D4: Ensure that the environment contains the food web resources necessary for large predators

D6: Avoid loss and physical disturbance to marine habitats linked to maritime and coastal activities

D7: Limit changes in hydrographic conditions (caused by any human activity) detrimental to the functioning of ecosystems

Every new project, programme or plan has to be designed following the “avoid, reduce, offset” approach. It establishes measures aimed at avoiding harm to the environment, reducing the damage that could not be avoided and, if possible, compensating significant negative effects that are unavoidable, or insufficiently reduced. Observing the sequence order is an essential and necessary condition to determine its effectiveness and thus promote an integrated approach.

A report of CGEDD³⁹ about this sequence deals specifically with coastal and maritime issues⁴⁰. There is also a national guidebook⁴¹ that provides guidance on how to set up mitigation and compensatory measures for development projects. It is intended for examining authorities, developers and other stakeholders of the sequence to ease its implementation.

Projects falling within the scope of development consent regulation under the Environmental Code are subject to an environmental impact assessment. This assessment examines the potential effects of the project before it is carried out and proposes measures according to the “avoid, reduce, offset” approach. Based on the findings of the assessment, specific requirements are included in prefect orders giving consent to the projects. They ought to be applied during the construction and the operating stage.

Regarding infrastructure, works and facilities for which development consent is already granted and unforeseen impacts are detected, an additional order can be issued to adjust mitigation and management operation measures. These activities are regularly controlled by government offices (environmental inspection authority, water and biodiversity law enforcement, maritime public property police). They are subject to the departmental monitoring plan of MISEN (Water and Nature Coordination Office) and the monitoring and surveillance plan for the marine environment in NAMO sea basin.

Actions are also being implemented for recreational activities: users are sensitized to good practices reducing environmental impacts. For example, the nautical centres of Loire-Atlantique and the departmental authorities have drawn up an environmental charter; and the work of APER⁴², an eco-friendly boating association, is supported by the authorities of Pays de la Loire. Likewise, the PAMM implements an action related to boating activities: grouping anchoring facilities (by granting a collective temporary occupation permit for mooring areas) and fostering space-saving environmentally friendly mooring systems (eco-moorings) (M403).

As of professional activities, an initiative dedicated to knowledge improvement and commercial fishing practices reducing impacts on marine ecosystems is included in the PAMM (Moo8).

An impact assessment of fisheries is conducted in Natura 2000 sites, with European funding. The aim is to determine if the existing fishing practices represent a risk for the conservation status of the relevant habitats/species. If appropriate, specific management measures to adjust or regulate the fishing practices

39 Conseil général de l'environnement et du développement durable.

40 Vindimian, E., Marendet, F. & Avezard, C. (2017). *Mise en œuvre de la séquence « éviter, réduire, compenser » en mer*. Paris : CGEDD. 66 p. Retrieved from: www.vie-publique.fr/sites/default/files/rapport/pdf/184000034.pdf.

41 CGEDD & CEREMA (2018). *Évaluation environnementale, Guide d'aide à la définition des mesures ERC*. Retrieved from: www.ecologie.gouv.fr/sites/default/files/Théma - Guide d'aide à la définition des mesures ERC.pdf.

42 Association pour la plaisance écoresponsable.

can be set out. These assessments are carried out jointly by regional fishing committees, the OFB and deconcentrated state services following a national methodology.

In each Natura 2000 site and Iroise Marine Nature Park⁴³ (PNMI), efforts are made to limit the impact of activities. The PNMI hosts one of the largest kelp forests in Europe (along Molène Archipelago). A total of 35 ships harvest the seaweed *Laminaria hyperborea* in the area. Since 2015, prompted by the MPA's management committee, the kelp forest exploitation is subject to a new management system designed to ensure a sustainable use of the resource and to preserve ecosystems conservation status. In light of the incredible marine biodiversity of this kelp forest, seaweed harvesters, scientists and the MPA's management team are working closely together to improve the knowledge base (in particular, through the mapping of the seaweed bed) and adopt management measures (permanent fishing closures or adjustments to fallow periods). The efficiency of these measures is assessed through a specific monitoring project (SLAMIR).

► What is included in the action plan?

The action plan contains 18 new actions addressing these objectives:

Biodiversity	D01-HB-OE01-AN1	D01-HB-OE06-AN1	D01-HB-OE06-AN2	D01-MT-OE01-AN1	D01-MT-OE03-AN1
	D01-OM-OE01-AN1	D01-OM-OE06-AN1	D01-OM-OE06-AN2	D01-PC-OE03-AN2	
Commercial fish species	D03-OE03-AN1				
Food webs	D04-OE01-AN1				
Seafloor integrity	D06-OE01-AN2				
Hydrographic conditions	D07-OE03-AN1				
Water sports	DE-0SE-VII-1-AF1				
Cross-cutting actions	RF-0SE-II-1-AF1	RF-0SE-II-1-AF2		AT01	AT04

To act effectively, enhanced knowledge of human impacts on the environment will be acquired through different tools (studies, partnerships or observatories). The impact of activities on benthic habitats and seafloor integrity (abrasion) will be assessed by an interdisciplinary research network (*zone atelier*); fishing effects on the seabed will be further studied; additional analysis will be needed to precisely identify environmental impacts of aquaculture production, including genetic impacts when reseeding and transferring shellfish. Regarding salt meadows, an observatory will be established to promote the sustainable exploitation of natural resources by reducing pressures (grazing and harvest of marsh samphire).

Some environmental issues should receive better consideration by project developers in impact assessments or by government offices when examining development consents. This is why new measures intend to better include sensitivity to human-induced disturbance in marine life; the implementation of the "avoid, reduce, offset" sequence at sea for projects increasing artificial areas will be reinforced.

There are also regulatory actions aimed at strengthening the normative framework of activities interacting with certain species: in line with the ministerial order on marine mammal approach distances, local rules for outdoor sports and whale watching activities will be reinforced.

Local recreational fishing rules will be listed and compared to work towards an alignment of regulations across NAMO sea basin or any relevant geographic scale depending on the resource and its conservation status.

Concerning commercial fishing, a recommendation will be formulated to the European Commission to establish a ban on forage fish catches on the continental slope and beyond. Risk mitigation measures will also be implemented to reduce incidental catches of diadromous fishes in sensitive sectors. And the legal framework for fishing authorisations within the 3-nautical-mile zone will be reviewed to make sure they

⁴³ Parc naturel marin d'Iroise.

are compatible with the environmental objectives contained in the DSF, regarding in particular benthic habitats and essential fish habitats.

Training in biodiversity issues for professional stakeholders (see 2.1) and access to information contribute to disseminating sustainable practices. To further reduce the impacts of activities, additional measures will be carried out. For instance, a whale monitoring system will be developed to avoid collisions between ships and cetaceans.

The action plan will keep working on the implementation of PAMM measure Mo03: "Complete the network of MPAs by introducing strong protections on areas of remarkable marine biodiversity". The contribution of the action plan consists of identifying favourable areas to establish potential strong protection zones. Regulatory measures and areas will be clearly defined by the management committee of each Natura 2000 site or the governing bodies of the PNMI, along with government offices. The Maritime Council for the Coast will follow up on the advancement of this measure and the implementation of the network of strong protection zones in NAMO sea basin. This measure seeks to reduce drastically, or even remove entirely, the main pressures exerted by human activities on remarkable marine biodiversity; however, the designation of "strong protection" does not necessarily preclude human activities in the area.

Find out more:

Seashore fishing is one of the most popular leisure activities on the coastline of the country. That is why a [Life-funded project \(Pilot experiments on sustainable and participatory management of recreational seafood hand harvesting\)](#) was launched on this topic. The network "Littorea" laid the groundwork for this project by implementing sustainable recreational seashore fishing practices.

The French federation of recreational boat fishing has long been providing information to its members on environment preservation and water quality. In this sense, the leaflet [Guide des bonnes pratiques : la pêche en bateau](#) is an example of actions taken by the federation towards good practices.



Sustainability and resilience of coastal and marine territories

Territorial development planning aims at improving people's living environment taking into account social, economic and environmental issues. According to law No 99-533 of 25 June 1999 laying down guidelines for planning and sustainable development⁴⁴, land-use policy tends to create favourable conditions for the development of employment and national wealth, in particular by consolidating the firm-territory nexus and reducing territorial inequalities while preserving the available resources, as well as the quality and diversity of the natural environment. Therefore, sustainability is intrinsic to territorial planning. And to achieve the lasting integration of social, economic and environmental concerns, risk management (and more globally the concept of resilience) has to be part of territorial policies. In the present context, resilience shall refer to a dynamic risk management strategy that enables a given territory to proactively adapt to major adverse events whose effects are hard to predict. Hence, resilience is the capacity to recover from a shock and to mitigate territorial vulnerability to prevent it from happening. Vulnerability can come from different components: demographic vulnerability (population ageing, generational imbalances), social vulnerability (poverty, unemployment, lack of social diversity), economic vulnerability (industrial specialisation and sectoral crisis risk) and environmental vulnerability (natural disasters, climate change). It is important to act on each component to transform risk factors into opportunities for the territory and its inhabitants.

⁴⁴ Loi d'orientation pour l'aménagement et le développement durable du territoire du 25 juin 1999.

4.1 Coastal risk management and safety at sea

► What is the context?



Coastal flooding waves on Sillon Beach in Saint-Malo during the supertide.
Photo credit: Arnaud Bouissou/Terra.

risk.

Risks are characterised by the likelihood of a hazardous event (natural or technological) occurring in a territory and by the level of exposure (material or human assets likely to be affected). Therefore, the vulnerability of a territory is linked to the interaction between hazards and exposure (i.e. assets at risk of being lost if the catastrophic event were to occur). The resulting damages can be loss of human life, damage to property, a decline in the value of economic activities, etc. If no assets are exposed, there can be no risk. Therefore, if a natural event does not cause any repercussion to human populations and ecosystems can recover on their own, it does not qualify as a natural risk.

Falling within the category of coastal natural risks, we can find coastal erosion and coastal flood. However, coastal areas can also be affected by seismic hazards, ground movements and floods due to overflowing rivers.

Natural risks can also be increased by human-induced pressures. For instance, islands and low-lying continental areas (topography below sea level) are exposed to coastal flooding, even more so that this risk is exacerbated by sea-level rise due to climate change. Coastal urban development intensifies the presence of exposed assets on the coastal strip, thus increasing their vulnerability. Consequently, policy actions are oriented towards vulnerability mitigation by preferring removable constructions or soft engineering solutions to preserve the natural environment.

Risks also exist at sea: natural hazards (storms) or man-made threats (collisions) can turn into risks for ships and persons on board (shipwreck), the environment (pollution) or offshore/port facilities. If a wreck blocks traffic, a chain-reaction collision can occur. To reduce accident risk in busy shipping areas, traffic-separation schemes (TSS) have been introduced, like the TSS off Ouessant island.

► What are the existing actions?

Objectives

TE-OSE-I: Knowing, preventing and managing maritime and coastal risks in an integrated way

D1-HB: Limit or avoid anthropogenic physical disturbances affecting the good environmental status of coastal benthic habitats, the continental shelf, and deep-sea habitats, particularly special habitats

Since storm Xynthia (2010) and the winter storms of 2013-2014, risk awareness has increased among NAMO stakeholders. To facilitate the implementation of risk prevention policies, several measures were taken. First, it was important to enhance our understanding of coastal natural hazards such as erosion and flooding and identify the most vulnerable areas. To do so, several studies, models, maps or guidebooks have been produced. For example, in the department of Morbihan a study on shoreline management strategy was carried out by public stakeholders⁴⁵; in Brittany and Pays de la Loire atlases of coastal hazards

⁴⁵ The study was produced by DDTM of Morbihan (Direction départementale des territoires et de la mer) and CEREMA.

were published⁴⁶ and the strategic position of the association of economic and social councils (CESER) on coastal hazards on the Atlantic coast is explained in a publication⁴⁷. Litt3D project is a national programme by SHOM⁴⁸ (the French Naval Hydrographic and Oceanographic Service) and IGN⁴⁹ (the French Institute for geographic information) that produces a digital elevation model of the coastal area showing the land-ocean continuum. This tool provides visual support to display coastal erosion and flooding. It is also an indispensable knowledge acquisition tool for implementing risk prevention policies.

Once data have been collected and processed, they should be shared with the public, local authorities and businesses exposed to risks – in fact, it is a legal requirement; public information methods are also clearly defined. Data can be accessed through the website “Géorisques” or at certain public facilities (*préfectures* and other public entities). At the local scale, the municipality is in charge of ensuring public access to information on risks. For real estate operations, the owner is required to pass on information to the buyer or the tenant about the risk exposure of the property.

Several initiatives are aimed at raising awareness about coastal risks or developing a cultural change towards these risks by remembering natural disaster events. This is the case of the festival organized every year in Île-Tudy and called “if the sea rises...” [Si la mer monte...]. High-water marks can also easily bear witness to the flood. For this reason, flood marks are becoming more numerous on coastal areas after a coastal flooding event.

Regarding safety at sea, to maintain a high level of maritime safety and security despite an increasing number of activities, yearly information campaign about safety practices in nautical sports are carried out by the relevant public authorities (*préfecture maritime de l'Atlantique* and *directions départementales des territoires*). Training courses on surveillance and rescue scheme are also delivered to technical managers in nautical centres and on first aid at sea to future water sport instructors.

► What is included in the action plan?

The action contains four new actions addressing these objectives:

Coastline	TE-OSE-I-5-AF ₁	
Safety at sea	TE-OSE-I-2-AF ₁	TE-OSE-I-2-AF ₂
Vulnerability reduction	Do1-HB-OEo6-AN ₃	

To prompt coastal authorities to take into account coastal erosion, successful candidates of the call for expression of interest on integrated coastal management in Brittany will be supported in the preparation of a local strategy.

Our understanding of the environmental impacts of coastal infrastructure is still limited. Efforts will be made to better estimate their impact through the use of mathematical models, to take into account the cost-benefit ratio of disaster mitigation operations by favouring soft techniques. The ultimate goal is to seek stronger coordination between the DSF and coastal risk management and prevention tools.

Complementary awareness-raising efforts and training courses on safe autonomous practices for water sports will be directed at users. The action plan acknowledges that for the ocean to remain safe for people, long-term financial support to the French sea rescue association (SNSM) is required and will be pursued. Likewise, the response capability of water sports centres in line with the surveillance and rescue scheme has to be maintained. Safety at sea also relies on DDCSPP⁵⁰'s action: protecting the public and controlling nautical activities.

⁴⁶ The map collections have been produced by the Geological and Mining Bureau (Bureau de recherches géologiques et minières or BRGM).

⁴⁷ CESER de l'Atlantique (2015). Submersion marine et érosion côtière : Connaître, prévenir et gérer les risques naturels littoraux sur la façade atlantique. Rapport CESER de l'Atlantique, 76 p.

⁴⁸ Service hydrographique et océanographique de la Marine.

⁴⁹ Institut national de l'information géographique et forestière.

Find out more:

“Osirisc: towards an integrated observatory of coastal risks” is a research project studying the vulnerability of coastal territories by adopting a systemic approach that takes into account hazards and other components of vulnerability: exposure, management and risk representations. The goal of the project is to develop an interdisciplinary monitoring system capable of informing coastal risk management strategies and encouraging holistic management.

In line with Osirisc, Litto’risques is a partnership between the local authorities of Finistère, the University of Western Brittany (UBO) and CEREMA. This partnership combines multiple expertise to bring methodological, scientific and technical support to local authorities. This assistance will help define a coastal planning project integrating a forward-looking vision. The analysis is based on field observation, data collection, shoreline management and the monitoring of the four components of vulnerability.

In the region of Pays de la Loire, scientific information on coastal risks is shared thanks to a partnership between data owners and local stakeholders gathered within an observatory of coastal hazards: **OR2C** is in charge of monitoring the coastline along 400 km of varied shoreline types.

Protecting people and properties is one of the roles of State action at sea: the regional operational centres for surveillance and rescue (CROSS) coordinate and conduct search and rescue operations at sea. In NAMO sea basin, there are two of these centres – [CROSS Corsen](#) and [CROSS Etel](#) – and they operate under the authority of the [préfet maritime de l’Atlantique](#).



Sea rescue centre at Pointe de Trévignon. Photo credit: Solenne Gaillard.

4.2 Management and resilience strategy

► What is the context?



A sand fence on a coastal path in Gâvres-Quiberon. Photo credit: Laurent Mignaux/Terra

Coastal zones are attractive environments. Although it is a strength for the territory, it also originates a series of imbalances: coastal areas are more densely populated than hinterlands and they host a higher concentration of people over a short period; the increasing number of second homes compared to primary residences; the urbanisation of coastal areas to the detriment of primary activities and natural spaces, etc. Unless corrective actions are taken, such differences can increase territorial vulnerability. To do so, the management strategy must adopt a comprehensive approach that takes into account the natural

environment, the socio-economic context, the legal and administrative framework. A balanced social and generational mix can be recovered thanks to a land acquisition policy. Seasonality effects can be mitigated by adjusting resource management. And to ensure the coexistence of multiple marine usages, concerted planning must be applied. Finally, the planning strategy must anticipate climate change effects and take into account coastal risks. Therefore, several tools can be used as levers to regulate land management, ecological carrying capacity and access to the sea to contribute to a sustainable and resilient development strategy for the territory.

⁵⁰ DDCSPP stands for *Directions départementales de la cohésion sociale et de la protection des populations* [departmental directions for social cohesion and protection of the population].

► What are the existing actions?

Objectives

DE-OSE-VIII: Encouraging sustainable and resilient fisheries and aquaculture

TE-OSE-I: Knowing, preventing and managing maritime and coastal risks in an integrated way

TE-OSE-II: Promoting resilient and balanced maritime, island and coastal territories

D6: Avoid losses and physical disturbance to marine habitats linked to maritime and coastal activities

D10: Reduce input and presence of litter at sea and on the coast from land or sea-based sources

To restore social mix and age diversity in society, stakeholders are taking actions or initiating discussions to find solutions. For instance, the social housing policy of Loire-Atlantique also applies to the coastal area. Local authorities are considering how to best provide accommodation to seasonal workers. Based on Community Land Trusts model, several *organismes de foncier solidaire* were launched recently in France: in NAMO sea basin, there are solidarity based-land agencies in Vendée and Loire-Atlantique. They seek to help disadvantaged populations to remain in coastal areas, where land prices are particularly high. In Brittany, regional authorities are implementing specific solutions for islands in terms of access to public services and housing.

Some economic activities are dependent on long-term access to the sea. Maritime spatial planning can facilitate the operation of such activities, which is why it is used in regional development plans (SRADDET of Brittany and Pays de la Loire).

Actions have been implemented in ports: the launch of programmes to support investment in marinas and fishing ports in Loire-Atlantique and Vendée to modernise them and make them more competitive; the creation of a port association in Loire-Atlantique (all maritime and river ports of the department are reunited in one legal entity) to propose a development plan that integrates the ports into the urban and economic fabric and enhances each of their specific features. There are actions in other fields, especially in aquaculture with the above mentioned departmental marine farm structuring plans.

To ensure public access to the coast, cycle routes and walking trails have been developed and are regularly updated by the departmental councils. A part of coastal hiking trails is made accessible to people with impaired mobility. In addition, cycling is encouraged in coastal areas: a free shuttle is available for cyclists to cross the bridge of Saint-Nazaire. The transport policy of the departmental council of Loire-Atlantique also supports carpooling with carpool meeting points and reserved parking spaces.

To protect coastal areas from land development, a public national organization called Conservatoire du littoral [Coastline Protection Agency] was created. Its land acquisition policy is laid down in the strategic plan for 2015-2050 and pursues two major long term goals: contributing to the protection of one-third of coastal areas in France; building up a network of natural sites in "good conditions" and sustainably managed. The implementation of this policy requires complying with operational and thematic guiding principles (agriculture, water, landscapes, biodiversity, visitors, land-sea interface). This policy contributes to a balanced land-use planning with natural spaces offering a green break from developed coastal areas, while allowing access to sustainable human activities. Management partnerships are established with several types of entities, but priority is given to local authorities. For instance, the departmental council of Loire-Atlantique is in charge of several sites owned by the Conservatoire du littoral (Dumet island, the Loire estuary). Land acquisition is a permanent protection tool also used by departmental authorities: they implement a specific policy by purchasing sensitive natural areas.

► What is included in the action plan?

The action plan contains 10 new actions addressing these objectives:

Aquaculture	DE-OSE-VIII-6-AF ₁			DE-OSE-VIII-6-AN ₁	
Coastal risks	TE-OSE-I-1-AF ₁				
Territories	TE-OSE-II-1-AF ₁	TE-OSE-II-2-AF ₁	TE-OSE-II-4-AF ₁	TE-OSE-II-6-AF ₁	TE-OSE-II-6-AF ₂
Sea-floor integrity	D06-OE01-AN ₁				
Marine litter	D10-OE01-AN ₃				

The action plan pushes for a better consideration of the needs of economic activities in urban planning documents: some businesses heavily depend on a secured access to the coastline to operate properly. Aquaculture is one of them and specific actions are planned for this sector. The main challenges faced by the industry are health and epidemiological hazards, diversifying the production, having easy access to production areas and experiment stations. To do so, suitable areas for aquaculture development will be defined, administrative procedures will be simplified (while the level of environmental protection will be maintained), social acceptance will be promoted (by strengthening stakeholders consultation and creating a modelling tool to provide insights on environmental assimilative capacity) and the start-up of young aquaculture farmers will be supported.

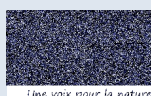
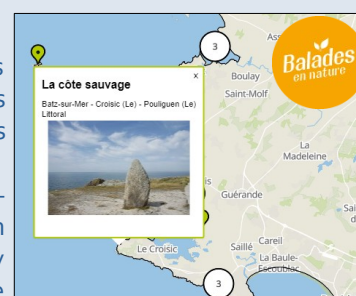
Providing a lasting public access to the shore is part of the action plan: it is important to reflect on coastline evolution to maintain a safe access to coastal paths. Walking on the coast can also be an opportunity to learn more about the environment: sensitization will continue in Natura 2000 sites through educational trails. Access to the beach also depends on transportation: a soft mobility experiment will be conducted to address traffic and seasonality issues while taking advantage of the attractiveness of environmental assets. And because coastal issues are even more acute on islands, the action plan contains a specific measure to re-establish social and age diversity on the Ponant islands. A review of actions undertaken in France by all local authorities in that field will help identify and implement schemes to enhance territorial continuity and facilitate housing access.

The resilience of coastal territories will be strengthened by an enhanced transfer of knowledge on coastal risks and the development of knowledge-building and dissemination tools. Existing awareness-raising measures will be reviewed to determine the need for complementary actions. Besides, since land take can increase the vulnerability of a territory, artificial areas located on the public maritime domain will be reduced: first, areas to be preserved and facilities likely to be removed will be mapped; next, new development projects will be monitored through a planning strategy to control the extension of infrastructures; then, project developers will be guided through this land-take control policy. Finally, to limit the risk of garbage entering oceans, a map of rubbish dumps and coastal waste accumulation zones will be drawn up to look for a solution.

Find out more:

As the beach is a place of leisure and relaxation, public access to the shore is guaranteed by law. However, certain categories of persons miss out on this opportunity. Specific actions are taken to address this gap by awakening the public's interest and understanding of environmental issues.

In collaboration with several associations, the departmental council of Loire-Atlantique proposes nature walks (*balades en nature*): free guided walk tours, open to all. Some of them are located on the coast to raise awareness about the diversity of coastal landscapes and the preservation of biodiversity. Upcoming events can be found on the website of "balades en nature": https://nature.loire-atlantique.fr/jcms/balades-et-sorties-nature-fr-local_56370.



AGIR pour la
BIODIVERSITÉ



Expanding our visibility and influence through research and innovation

Be it exploratory research enhancing our knowledge about a natural or social phenomenon translated into a theory or an explanatory model (fundamental research) or finding solutions to a given problem (applied research), research means acquiring knowledge. These two types of research are intertwined: fundamental findings can lead to an applied solution and outcomes of applied research can open up new possibilities of fundamental research. At the intersection of these two modalities lies innovation: by associating knowledge enhancement to technology advancement, scientific, technical and social progress can arise. Innovation strengthens enterprises' competitiveness and enables society to rise to the major challenges of our times. To do so, partnerships are signed between firms and research laboratories to facilitate the commercialisation of new products and technology.

In addition to contributing to knowledge enhancement and the development of innovative technology, research outcomes can be exploited in different ways. First, they can be used as a guidance tool for evidence-based policymaking. Besides, widespread dissemination of knowledge, while making the latest scientific findings available to a great number of people, also enables them to get a better understanding of specific concerns; in this sense, it is a sensitization tool. Sharing scientific results and raising awareness can be facilitated and stepped up by digital tools. The success of citizen science projects illustrates the array of possibilities opened up by digital technologies for large scale dissemination – now, everyone can contribute to the development of scientific knowledge. Lastly, when associated with the development of dynamic industries, scientific cooperation can forge ties beyond the sea basin. In this way, NAMO region opens up to other regions of France and other countries.

5.1 Research and innovation

► What is the context?



CEDRE research facility: experiment on pollutant behaviour.
Photo credit: Laurent Mignaux/Terra.

In NAMO sea basin, there is a pool of scientific and technical experts in the marine and maritime field. Several universities (UBO, UBS, University of Nantes, etc.) are located in the territory. And some of their laboratories or research projects are specifically dedicated to marine sciences and technologies. In fact, UBO (with the Institut Universitaire Européen de la Mer) and the University of Nantes (with the Institut Universitaire Mer et Littoral) are references for marine interdisciplinary training and research in the West of France; public research institutions (CNRS, IRD, IFREMER, MNHN) and engineering schools (IMT-Atlantique, ENSTA) are also part of this expertise. Researchers and other professionals who work in these institutions contribute to improving the understanding of marine and coastal ecosystems, fisheries resources or the impact of human activities on the environment. They are also searching for efficient innovations in the field of green ship design and marine renewable energy production. Therefore, research also allows us to discover new technologies and experiment with innovative devices that can both look out for private interests and environmental values.

► What are the existing actions?

Objectives

DE-OSE-I: Supporting and promoting research and innovation in all the domains of the maritime economy

DE-OSE-III: Promoting and accompanying the development of the maritime circular economy

DE-OSE-IV: Developing marine renewable energies

DE-OSE-VIII: Encouraging sustainable and resilient fisheries and aquaculture

DE-OSE-X: Accelerating the development of marine biotechnologies

With the wide range of skilled professionals they host, higher education institutions are a breeding ground for innovation. The Blue Train project, designed by the biological station of Roscoff, was selected by the Programme “Investments for the future” (PIA) at a call for proposals to create partnerships for vocational training and employment. It is aimed at building a training offer (basic and ongoing training) supporting the development of marine biotechnology and contribute to the emergence of a group of companies with potential for R&D in Brittany.

Some firms, research laboratories and higher education institutions have gathered within competitiveness clusters, pooling facilities or collaborative research networks. These scientific and technical ecosystems foster innovation. Examples of these are Pôle Mer Bretagne Atlantique, EMC2 (a cluster on advanced manufacturing technologies), Bretagne Pôle Naval, Neopolia, AlgoSolis, Technocampus Ocean platform and Campus mondial de la mer. Besides, to facilitate the commercialisation of research outputs and act as an interface between public applied research and industry, Ouest Valorisation, a Technology Transfer Accelerator Office (SATT) was launched in 2012 in the framework of the PIA.

The emerging sectors of the blue economy are actively working to bring innovation to NAMO sea basin. For instance, FLOATGEN, a floating wind turbine demonstrator, is being tested off the coast of Le Croisic (SEM-REV offshore experimentation site). In Pays de la Loire, the West Atlantic Marine Energy Center (WEAMEC) gathers academic and industrial stakeholders of marine energy research, innovation and

training. In Brittany, Bretagne Ocean Power is an association that aims at fostering the industrial development of marine energy in the region. It is equipped with port facilities and offshore test sites. At the scale of the sea basin and in the framework of the Investments Programme for the future for 2020-2021, the call for proposals by Ademe intends to finance the first commercial exploitation of an innovative project. It will contribute to the reinforcement of marine energy.

► What is included in the action plan?

The action plan contains five new actions addressing these objectives:

Blue economy	DE-OSE-I-2-AF1
Circular economy	DE-OSE-III-1-AF5
Marine energy	DE-OSE-IV-2-AF1
Aquaculture	DE-OSE-VIII-6-AF2
Biotechnologies	DE-OSE-X-1-AF1

Research and innovation can strengthen the competitiveness of some sectors of the blue economy while reducing their environmental impact. For example, by supporting research on the selectivity of fishing gear, the improvement of energy efficiency for ships, the recycling of materials and by promoting innovation to facilitate the transition to the manufacturing stage. With ecodesign, innovation can reconcile competitiveness and environmental issues. Therefore, the action plan will promote the development of ecodesign by identifying the existing ecodesign projects related to marine activities and by supporting calls for proposals in that field.

Other measures target specific sectors: marine energy, biotechnology and aquaculture. Many marine energy projects are underway but they are still at the experimental stage. And for experimentation to continue until they lead to a favourable outcome, innovation must be supported. Beyond that, promoting the acceptability of new technologies is also essential. Optimizing the production of marine energy, by bringing together several technologies on a same site, and fostering their coexistence with other usages will be assessed.

Marine biotechnology is a dynamic field of research within NAMO sea basin. Yet, it is essential to better coordinate and make them known to develop partnerships and business opportunities.

As for aquaculture production, the sector needs tangible and relevant innovations to meet the challenges of maintaining the genetic quality and utilizing co-products and by-products as part of a circular economy approach. To do so, one of the possible avenues is to tighten the links between the industry and research organizations/technical institutes to conduct research projects and experiments on very specific issues.

📌 Find out more:

“Investments for the Future” is a programme granting funding opportunities to innovative investments in France. In 2017, the Interdisciplinary Graduate School for the Blue Planet (ISblue) was among the 29 projects selected by a call for proposals and it was the only one solely dedicated to ocean science and technology.

ISblue is led by UBO with the collaboration of its eight academic partners (UBS, CNRS, IFREMER, IRD, IMT-Atlantique, ENSTA, ENIB, École navale). It intends to foster interdisciplinary marine research concerning five themes: ocean and climate regulation, ocean-Earth interactions, sustainable coastal systems, the living ocean and ecosystem services, and long-term observing systems for ocean knowledge.



5.2 Scientific expertise

► What is the context?

Research enables scientists to produce knowledge. Besides advancing science, this knowledge can have a subsequent value: scientifically-grounded knowledge can be used to support policy decisions and guide public action. Scientists are thus requested by policymakers to provide them with evidence that will help shape policies. On the other side, scientists make their knowledge and skills available to serve the needs of the broader society. Science-policy interactions lead to evidence-based policymaking.

► What are the existing actions?

Objectives

DE-OSE-IV: Developing marine renewable energies

DE-OSE-IX: Stabilizing the supply of marine aggregates

RF-OSE-II: Exploring the sea

D1-OM: Reduce or avoid pressures generating direct fatalities, disturbance and loss of functional habitats important for the life cycle of seabirds and foreshores, in particular for vulnerable and endangered species

D9: Reduce microbiological, chemical and phycotoxic contamination which degrades the hygienic quality of seafood, aquaculture and fishing production areas and bathing areas

Several entities located in NAMO sea basin play a part in supporting maritime policy-making. They are involved in local, national or European legal and regulatory framework (health-related safety regulations, MSFD, MSP Directive, the Common Fisheries Policy, etc.). These institutions are core public entities or organisations performing a public function and they play a role in policy formulation and implementation. For example, several technical and scientific bodies are associated with the fight against marine pollution (CEDRE, CEPPOL⁵¹, CEREMA, IFREMER, Météo France) and they help government authorities in making informed decisions in that domain. This mission is specifically laid down in the Prime Minister's direction of 4 March 2002. It states that CEDRE is in charge, at the national level, of conducting studies and drafting documentation related to pollutants and their effects, as well as delivering training and developing methods and resources to combat them. As for coastal risks, besides the above-mentioned bodies, SHOM and BRGM are also involved. In accordance with the decree n° 59-1205 of 23 October 1959 related to the administrative and financial organisation of BRGM, the French geological survey contributes to public expertise. It is in charge of producing, acquiring and managing data related to the subsurface and environment quality – which includes the management of natural and human-induced risks.

► What is included in the action plan?

The action plan contains four new actions addressing these objectives:

Marine energy	DE-OSE-IV-1-AF1	D01-OM-OE02-AN1
Marine aggregates	DE-OSE-IX-1-AF3	
Research	RF-OSE-II-2-AF1	

⁵¹ Centre d'expertises pratiques de lutte antipollution.

In this section, the action plan contains three thematic actions and one cross-cutting measure. The latter is related to supporting local marine research to integrate researchers in national programmes and enhance knowledge exchange thus facilitating the engagement of scientific expertise.

Those actions directed at particular industries are related to marine aggregate extraction and offshore wind energy. Under the DOGGM, data produced by all marine aggregate extraction sites of Pays de la Loire ought to be examined by a monitoring committee or should be reported to the Standing Committee of the Maritime Council for the Coast. As of offshore wind energy, in line with the recommendation issued in 2019 by the Inter-ministerial Committee of the Sea, several monitoring bodies will be set up at the scale of NAMO sea basin: a monitoring committee will produce standardised measures for the implementation of the “avoid-reduce-offset” sequence and standardised monitoring procedures; a scientific committee will be tasked with issuing opinions on scientific protocols, monitoring findings and propositions for changes in the “avoid-reduce-offset” sequence. Likewise, a national supervising entity will be in charge of reviewing the work done by the scientific committee in each sea basin and coordinate knowledge acquisition programmes.

Find out more:

SHOM is in charge of mapping marine waters under French jurisdiction, which represent tens of millions of km². New technologies can enhance the efficiency of this task. Besides its survey ships, [SHOM conducted a test campaign with drones](#) (surface and underwater drones) to study the performance and added value of each survey tool and adapt the French Navy’s hydrographic and oceanographic capacities accordingly.

5.3 Awareness raising and knowledge sharing

► What is the context?



Benthic fauna observation in Saint-Brieuc Bay nature reserve. Photo credit: Solenne Gaillard.

NAMO scientists contribute to advancing the general state of understanding on local issues. This body of knowledge is then shared with a broader audience, beyond the scientific community, so that the public can get acquainted with particular aspects and explore them to better understand their living environment – and therefore take ownership of the territory. In this sense, knowledge sharing is tightly connected to awareness-raising, and it is of interest to everyone: children and adults, tourists and residents, recreational users and professionals, as well as policymakers and government offices. This approach means that developing valuable knowledge about marine biodiversity and its threats can eventually lead to the adoption of eco-friendly behaviours. When awareness-raising results in a better

understanding of local opportunities and challenges, it also reinforces the identity of inhabitants.

► What are the existing actions?

Objectives

DE-OSE-I: Supporting and promoting research and innovation in all the domains of the maritime economy

DE-OSE-II: Developing a pool of skilled and competent labour for NAMO blue economy

DE-OSE-III: Promoting and accompanying the development of the maritime circular economy

Since stakeholders know the important role played by awareness-raising in the environmental sustainability of a territory, it is no surprise that there is a good deal of existing initiatives providing all types of on-site activities. They are aimed at helping the public getting to know local gems and informing it about the need to preserve the environment: nature walks (free walking tours on the coast) and Multi-Sport Days (hikes and bike rides on remarkable coastal sites) are organised by the local authorities of Loire-Atlantique. Other actions are implemented to bring into light the value of protected areas and preserve them (marine park, Natura 2000 sites, etc.): the Iroise Marine Park gives talks, Loire Océane Permanent Centre for Environmental Initiatives organises outreach campaigns on recreational seashore fishing.

Environmental education focused on marine issues is present in schools: the PNMI conducts educational activities in nearby schools. Besides, with the creation of a network of educational marine areas, schoolchildren can build a marine knowledge and conservation project, with the help of their teacher and an environmental mentor. For example, the primary school "René Daniel" in Trégunc has started an educational marine area project with Bretagne Vivante.

Those who need guidance and inspiration from existing good practices in environmental education can count on REEB [réseau d'éducation à l'environnement]. It is a network for environmental educators in Brittany. It published a handbook (*Éduquer à la mer et au littoral*) that presents existing educational approaches in the region.

There is no shortage of citizen science programmes in NAMO sea basin. Not all of them are initiated by public institutions. For instance, Océanopolis (a marine aquarium) is part of Objective Plankton: samples of marine water are collected in Brest, Lorient and Concarneau, with the help of local boaters, to study the shifts in plankton population in coastal ecosystems.

The nautical sector seeks to raise users' awareness about the good practices that reduce their environmental footprint. The federation of nautical industries runs an open online course on sustainable boating and water sports. An environmental charter was drawn up by the departmental council of Loire-Atlantique and signed by local nautical centres.

► What is included in the action plan?

The action plan contains six new actions addressing these objectives:

Blue economy	DE-OSE-I-3-AF1	DE-OSE-II-2-AF1
Circular economy	DE-OSE-III-1-AF3	
Eutrophication	TE-OSE-I-4-AF1	
Marine litter	D10-OE01-AN4	
Educational marine area	AT-02	

Awareness-raising activities on environmental vulnerability and human-induced impacts will carry on with the help of citizen science. Indeed, this approach will be used to point out the impacts of eutrophication on the foreshore. Further awareness-raising and prevention activities will be conducted in line with the implementation of the charter "a beach without plastic": local associations and a citizen science platform ("zéro déchet sauvage") will encourage behavioural change in users of the sea. Lastly, a collaborative sensitization tool will be developed to build a circular economy locally.

Children play a key role in the future of the territory. Therefore, educational activities directed at the younger generation will continue with educational marines areas. The objective is to expand the network

to include a broader public (secondary and high school students) and forge stronger ties between educational marine areas and marine protected areas.

The dissemination of information on the state of the environment is an important matter, but so is information on human activities: they are part of the strengths or concerns of the territory. That is why several observatories will contribute to broadening the public understanding of different sectors of the blue economy: a platform will be dedicated to the blue economy as a whole to determine the benefits it can bring to the environment. Research projects undertaken by Pôle Mer Bretagne Atlantique, and other stakeholders initiatives, will be presented. Likewise, all the existing data on maritime activities will be centralised to create a regional observatory that will include the emerging sectors of the blue economy. This information will help adapt the training offer to the evolving blue industries.

Find out more:

In NAMO sea basin, there are numerous citizen science programmes open to all and dealing with marine and coastal biodiversity. For example, [Plages Vivantes](#) by the National Museum of Natural History (MNHN). It is a participatory monitoring programme of beach wrack ecosystem. The public conducts a scientific protocol and collects data on the composition of the wrack zone. And it is a fun experience to learn how to distinguish seaweeds washed ashore. These data will then be processed by scientists to understand backshore dynamics, in particular in the context of global changes.

IFREMER invites you to play [Deep Sea Spy](#) (available in English). In this game, you will be tasked with identifying marine life living in waters down to approximately 2.000 m in the Atlantic and Pacific oceans. You get to know hydrothermal vents fauna and at the same time, you help researchers analyse data.

To find out more about these projects and other initiatives, check out [OPEN](#). This platform gathers all citizen science programmes involving biodiversity observation in France.



Schoolchildren on the beach. Photo credit: Pauline Poisson MNHN.

5.4 Information access facilitated by digital technologies

► What is the context?

Technical innovation is key to digital transformation. It means integrating digitisation into every aspect of society in order to optimise process efficiency, boost productivity and improve product and service quality: going digital delivers economic value. But dematerialisation alone does not make digital technologies environmentally sustainable; they do have environmental impacts that should not be left unattended (use of resources, electronic devices short life cycle, electronic waste, greenhouse gas emissions, etc.). If we want the digital transformation to converge with the ecological transition, we ought to consider digital technologies as an enabler to support the green transition, not an end in itself. This is the case when technical innovations are used to collect, produce and share data, ideas and knowledge.

► What are the existing actions?

Objectives

DE-OSE-V: Accelerating the energy and ecological transition of the ports on the coastline

DE-OSE-VI: Accompanying and promoting sustainable shipbuilding and nautical industries
 DE-OSE-VII: Encouraging sustainable water sports and tourism that are accessible to all
 RF-OSE-II: Exploring the sea

Digital technologies can support the shift towards a greener economy, contribute to the development of industries and disseminate information. In this sense, digital technologies can be a handy tool for local economic development planning, such as port operation: a platform dedicated to digital logistics management solutions will be created, as laid down in the French Port strategy for 2020-2025.

Besides, digital transformation is also helpful when it comes to sharing information. Examples of information exchange facilitated by digital technologies are the marine aggregate database hosted within SEXTANT; SURICATE, a mobile application developed by the Ministry of Youths and Sports to report problems experienced when practising outdoor sports. Similarly, SNOSAN [Système National d'Observation de la Sécurité des Activités Nautiques] is a system that centralises all data on rescue operations led by CROSS and SNSM to understand the main characteristics of accidents involving water sport users and boaters.

Digital technologies can also be useful to help stakeholders to connect. This is what NINA [Nautisme-Innovation-Numérique-Atlantique] does, an association that promotes innovation and digital transformation in the nautical industry in the Atlantic region.

While undergoing digital transformation, stakeholders need to be supported. Several actions in this sense are currently implemented, as mentioned in section 2.1 "Job creation in the blue economy".

In the end, although the digital transformation of maritime activities has initiated, it is an ongoing process that requires renewed efforts.

► What is included in the action plan?

The action plan contains five new actions addressing these objectives:

Ports	DE-OSE-V-2-AF ₁	
Shipbuilding and nautical industries	DE-OSE-VI-1-AN ₁	
Water sports and boating	AT-03	DE-OSE-VII-2-AF ₂
Cross-cutting action	RF-OSE-II-1-AF ₃	

These new actions focus on reinforcing the environmental sustainability of activities. To do so, digital tools (a mobile application, data-sharing tools) will be used to gather and disseminate information related to marine sports and activities to encourage good practices.

The development of activities thanks to digital tools is another field of action: handling marinas occupancy and managing merchant vessels' facility needs will be made easier with digital solutions. The digital single-window system will also simplify administrative procedures for shipowners. On the other hand, smart and autonomous ships and, in general, the integration of digital technologies are an emerging field for research and innovation that will improve shipbuilding and design. And to reinforce shipbuilding productivity, it is crucial to take action involving the entire production line to guide SMEs towards digital transformation.

Digital tools can also be useful to enhance the knowledge of the marine environment. Users can contribute to data acquisition on recreational shore fishing, have access to updated digital information (regulations, zoning, information from the national observatory on the sea and the coast).

Find out more:

Nav&Co is a tool developed by SHOM and OFB to improve boaters' understanding of marine biodiversity, inform them of the related regulation and provide eco-friendly boating tips. Whenever a sailor enters a marine protected area, or any zone subject to specific environmental rules, she/he is notified thereof by Nav&Co. All the relevant information is presented on the map through clickable symbols. Back in port, it is possible to keep a record of the route in the logbook to share it or save it for the next trip.

Nav&Co is first being implemented for a trial period in the navigation area between Mont-Saint-Michel and Le Croisic.



5.5 An outward-looking strategy

► What is the context?

With its centres of excellence fostering interdisciplinary research, competitiveness and innovation clusters, technology platforms and core facilities, NAMO sea basin is equipped with a solid science and technology ecosystem, as well as a dynamic industrial fabric; all these are assets encouraging the development of research and innovation. Cooperation within maritime industries and scientific networks puts NAMO sea basin in a privileged position in the French and European arena.

► What are the existing actions?

Objectives

DE-OSE-I: Supporting and promoting research and innovation in all the domains of the maritime economy

DE-OSE-III: Promoting and accompanying the development of the maritime circular economy

DE-OSE-V: Accelerating the energy and ecological transition of the ports on the coastline

RF-OSE-III: Exporting our maritime expertise

Local authorities bring their support to innovative projects in order to reinforce the competitiveness of industries and promote their development at the European level. To this end, the regional council of Pays de la Loire launched a scheme to assist maritime project developers in applying to European funding calls (Hub Europe). A consultant helps them in filing the application and finding partners. There is a similar scheme in Brittany (Boost'Europe).

The development of emerging sectors can be supported by local authorities through direct funding. The regional councils of Brittany and Pays de la Loire joined other national and regional public agencies to apply to a transnational call for proposal in marine energy: OCEANERA-NET COFUND, Supporting Collaborative Innovation in the Ocean Energy Sector. This project is co-funded by the European Union's Horizon 2020 research and innovation programme. OCEANERA-NET COFUND is a collaborative project that helps to bring emerging technologies closer to commercial deployment.

As of the conquest of global markets by local industries, the regional council of Pays de la Loire supports the nautical sector so that it pursues its international ambitions (business needs study: planning, financing, training and recruiting, marketing intelligence, etc.).

► What is included in the action plan?

The action plan contains four new actions addressing these objectives:

Research	DE-OSE-I-1-AN ₁
Circular economy	DE-OSE-III-1-AF ₄
Ports	DE-OSE-V-1-AF ₁
Blue economy	RF-OSE-III-1-AF ₁

Efforts for inter-regional and national skill coordination and resource pooling shall be pursued. In this respect, a national coordination framework gathering marine research stakeholders will be created. It will contribute to developing maritime research and innovation, securing resource efficiency and keeping up with skills update. Coordination can also serve industry competitiveness. In this sense, the coordination of ports operations within NAMO sea basin and with other basins will be promoted.

To develop local action in connection with a European strategic framework, applying to European funding calls will be promoted: circular economy projects eligible for European funding will be identified to support the successful filing of these applications.

Cutting-edge industries will be further supported to speed up skills export. Assistance (identifying constraints to growth, sharing good practices, etc.) will be provided to blue economy businesses to improve their strategic position in the world market.

Find out more:

[CAPITEN \(Atlantic Cluster for Technological and Economic Innovation in the Nautical Sector\)](#) is a European collaborative project that brings together 16 partners from Scotland, Ireland, France, Portugal and Spain. The regional council of Brittany is the project leader while Nautisme en Bretagne and the regional council of Pays de la Loire are among the French partners of the project.

It is supported by the INTERREG Atlantic Area regional development programme. It aims to foster the tourism economy, promote a sustainable approach in the nautical industry and create jobs in the various sectors of this industry. In particular, the project focuses on designing new products for water tourism, creating a coastal navigation circuit and identifying innovative, green and cost-efficient solutions in the nautical supply chain.

