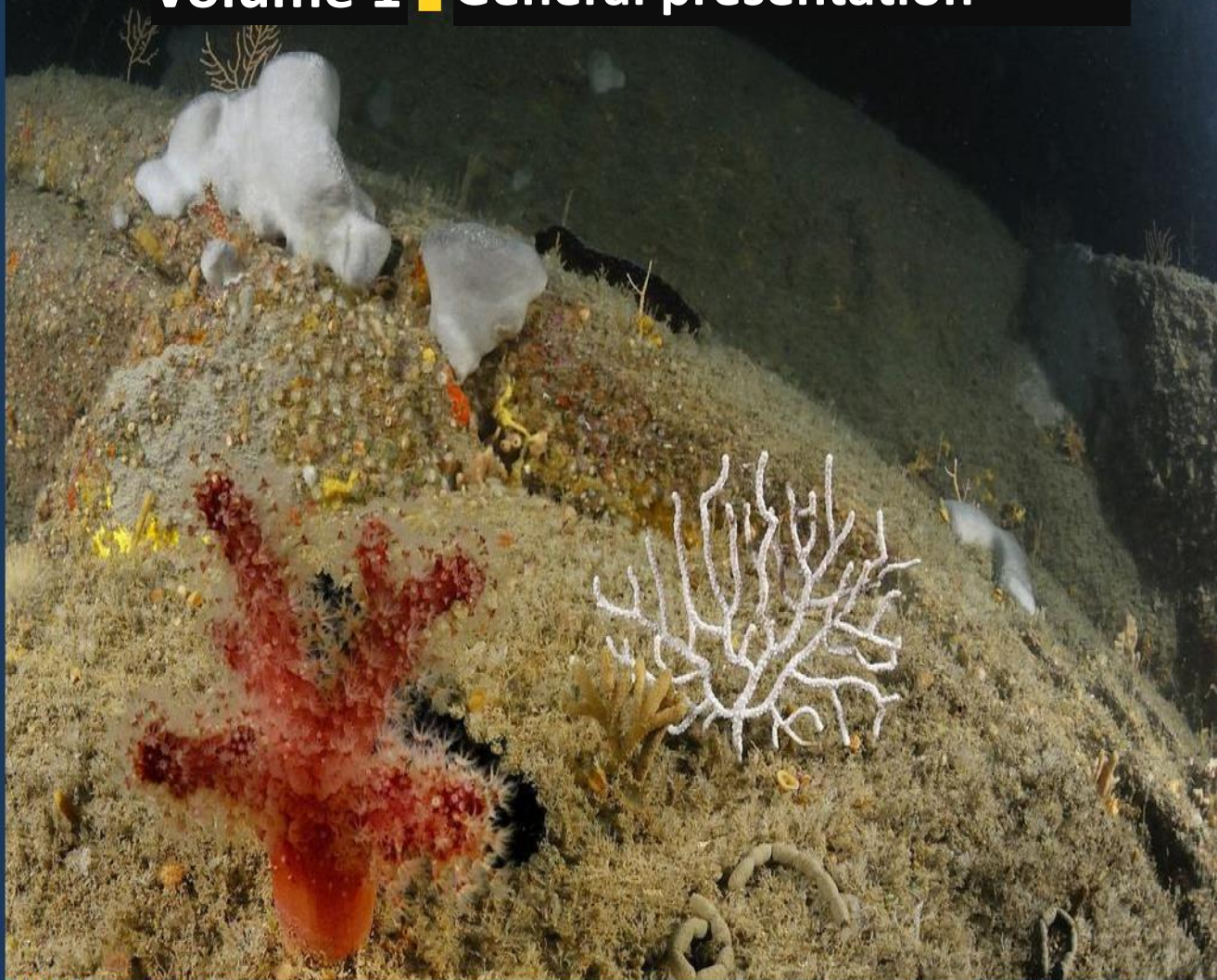


# MONITORING FRAMEWORK

## Volume 1 ■ General presentation



SEA BASIN  
STRATEGY DOCUMENT  
**SOUTH-ATLANTIC**





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# 1 - Introduction

## General framework of the monitoring framework in the sea basin strategy document

For each of the sea basins in mainland France, a planning document, the sea basin strategy document (SBSD), must specify and complement the guidelines of the national strategy with regard to the economic, social and ecological issues specific to each sea basin. France has chosen to organise the transposition of two European framework directives within these documents:

- The Marine Strategy Framework Directive (2008/56/EC, MSFD), which aims to achieve or maintain good environmental status in the marine environment for a healthy, clean and productive sea
- The Maritime Spatial Planning Directive (2014/89/EU, MSPD) which establishes a framework for maritime planning and requires Member States to ensure coordination of different activities at sea.

The sea basin strategy document consists of four parts (see diagram below), each of which is intended to be expanded and amended in order to improve available knowledge. They will be updated in the revisions of the document, which are planned every six years.

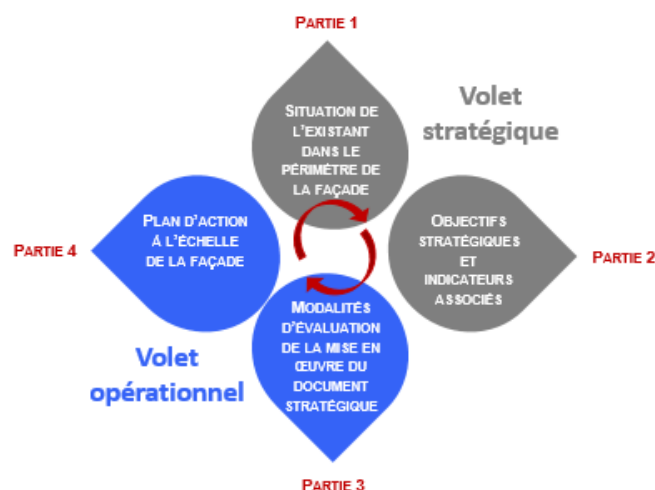


Figure 1-Presentation of the SBSD - Source: DML (2021)

The monitoring framework is the 3<sup>rd</sup> part of these documents. It therefore follows on from the first two parts, which represent the strategic part of the SBSDs adopted in 2019 (status of the existing situation; strategic targets and maritime spatial planning). Together with the action plan (4<sup>th</sup> part), it makes up the operational part of the SBSDs. The multi-stage development of the SBSD requires that the monitoring framework considers compliance with the main guidelines and principles set out in the strategic part.

As a reminder, the enforceability of the SBSDs is governed by Article L.219-4 of the Environmental Code. The scheme is twofold:

- Compatibility for plans, programmes and blueprints relating to activities exclusively located at sea
- Consideration for plans and programmes likely to have significant impacts on the sea.

## **Monitoring Framework Objective**

The development of this monitoring framework enables France to meet its transposition and implementation obligations of the two EU framework directives on Marine Strategy (MSFD) and Maritime Spatial Planning (MSPD), in particular with regard to:

- articles 5, 11, 17 and 18 of the MSFD, relating to the obligation to develop a monitoring programme for the continuous assessment of the environmental status of marine waters and the periodic updating of environmental targets; and the obligation to update and revise marine strategies, and to report on the progress made to the European Commission;
- articles 10 and 14 of the MSPD, relating respectively to the use and sharing of environmental, social and economic data necessary for the development of maritime spatial planning documents; and to the implementation of the monitoring of these documents, which must allow progress to be reported to the European Commission.

More specifically, the SBSD monitoring framework defines the monitoring strategy to be implemented in order to meet the following objectives:

- Update and clarify the progression of the existing situation within the sea basin perimeter;
- Evaluate the achievement of the strategic targets of each sea basin.

To meet these two objectives, this document is based on a set of data collection and monitoring frameworks. These systems may be common to the four sea basins (Eastern Channel - North Sea, North Atlantic - Western Channel, South Atlantic, Mediterranean), or, if necessary, specific to a coastline or a subset of coastlines. With time the monitoring framework aims to include systems that meet three criteria:

- Recurrence: data collected on a regular basis
- Reliability: data that meet quality and objectivity requirements
- Accessibility: ways to access data verified with producers.

These principles have guided the work initiated with this first cycle, which is intended to be improved in future planning cycles.

Information on the environmental status of marine environments, maritime activities and public policies on marine environments is produced by various systems. This document aims to facilitate access to information on the marine environment. The monitoring framework is part of an overall process consisting of:

- Encourage the creation of frames of reference,
- Bank or ensure the traceability of the data collected in response to the need to evaluate public policies,



- Make data accessible and reusable, in keeping with the provisions laid down in the texts.

Nevertheless, the monitoring framework is targeted at the issues identified during the development of the sea basin strategies and at the indicators selected to monitor the strategic targets. It is therefore not intended to be a complete inventory of all possible existing data sources. In this sense, any source of information should be considered for the purpose of the initial assessment exercise carried out at the beginning of each planning cycle, including the outcome of one-off or local studies not included in the monitoring framework.

## Management and sharing of the monitoring framework data

In order to reference the data collection and monitoring frameworks, the monitoring framework is based on several existing data infrastructures:

- "Sextant" (Ifremer): a data portal which aims to document, circulate and promote a catalogue of data relating to the marine environment. Sextant provides tools that promote and facilitate the archiving, consultation and availability of geographical data resulting from the research work and scientific programmes of Ifremer's laboratories and its partners.
- "Géolittoral" (Cerema): a data portal on the sea and coastline of the Ministries of Ecological Transition and the Sea. In particular, it disseminates geographical data produced in the context of implementing public policies and has information and documents available to explain these policies and their implementation and to facilitate consultation.
- The "sea and coastline" section of the portal on the environment in France (CGDD): formerly known as the national sea and coastline monitoring centre, this portal offers a set of analysis sheets based on all these data sources on most of the themes of the sea basin strategy document.

Once collected, the data listed under the SBSD monitoring framework are integrated into the MSPD and MSFD information systems (referencing of metadata in particular). They are also made available (subject to distribution rights) via the Marine Environment Information System (SIMM). The information system aims to facilitate the sharing and dissemination of data on the marine environment. To do this, it is based on the databases and information systems already prepared in this area and creates new ones. More broadly, the SIMM federates the public data players on the marine environment (State and local authority services, public establishments, etc.).

## Structuring the monitoring framework

The SBSD monitoring framework defines the integrated monitoring strategy for environmental, social and economic issues. The minimum scope of the themes of the monitoring strategy is defined by the decree of 20 September 2019: it includes *"maritime and coastal activities, marine and coastal ecosystems, sites, landscapes and cultural heritage, risks, knowledge, research, innovation and training, local initiatives for planning or integrated management of the sea and coastline, interactions between activities and between activities and the environment"*. For this first implementation cycle, the presentation of the monitoring strategy responds to the inclusive aim of the SBSDs through a main document and 5 annex documents.

The main document, which is non-technical in nature, presents the main elements necessary for the implementation of the two framework directives in two complementary parts:

- Part 1: "Marine Ecosystems: State and Pressures": includes the fourteen monitoring programmes under the second cycle of the MSFD (subject to reporting to the European Commission). It aims to define the monitoring required for the regular assessment of the environmental status of marine waters and the periodic updating of the Environmental Targets (ETs).
- Part 2 "Activities, uses and public policies": deals with the activities, uses and public policies (including the costs incurred by the degradation of the marine environment) of maritime and coastal areas. On these themes, it aims to define the monitoring necessary for the periodic updating of the Socio-Economic Objectives (SEOs) and Environmental Targets (ETs), and for the regular assessment of the environmental status of marine waters and of the economic and social analysis.

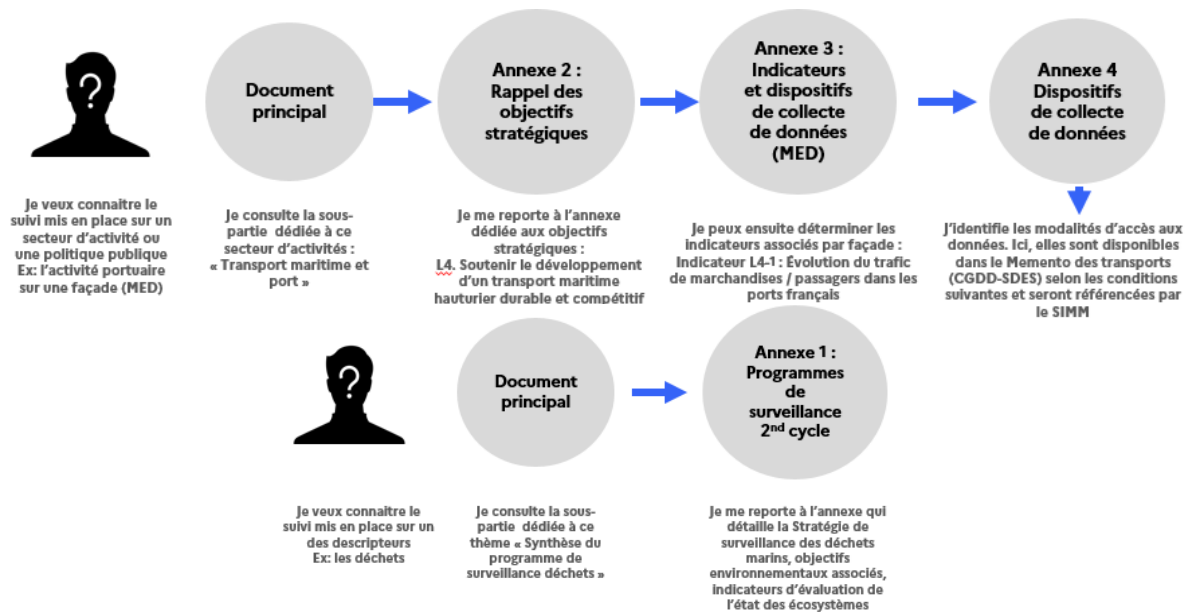
Each of these two parts has a standard structure which is broken down into 3 subsections. The latter successively presents what is covered by the affected area of activity/public policy/monitoring programme; the variables of interest linked to them; and the monitoring and data collection frameworks that allow these variables to be reported.

More detailed information on strategic targets, indicators, monitoring and data collection frameworks is provided in the annexes. In particular, they make it possible to identify the need to develop these systems and/or to assess the level of harmony between indicators and frameworks:

<b>Annex 1</b>	Monitoring programmes under the second cycle of the MSFD - Part 1
<b>Annex 2</b>	Reminder of strategic targets and criteria - Part 2
<b>Annex 3</b>	Indicators and data collection frameworks by sea basin - Part 2 3a - Focus on Socio-Economic Objectives (SEOs) 3b- Focus on Environmental Targets (ETs), Good Environmental Status (GES) criteria and Economic and Social Analysis (ESA)
<b>Annex 4</b>	Data collection frameworks - Part 2
<b>Annex 5</b>	Glossary

The diagram below sets out two use cases for interpreting the monitoring framework:





## 2 - Marine ecosystems: status and pressures

### 2.1 - "Sea birds (biodiversity)" Monitoring Programme

#### What does this monitoring programme cover?

The "Sea Birds" Monitoring Programme defines the monitoring required for the continuous assessment of the environmental status of marine waters and the periodic updating of Environmental Targets (ETs) under:

- descriptor 1 "Biodiversity" of the MSFD for the component "Sea Birds", described as: *"Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions."* (Directive 2008/56/EC).
- descriptor 4 "Food webs" of the MSFD, described as: *"All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity."* (Directive 2008/56/EC).

The objective of this programme is to acquire data to assess both:

- The status of sea bird populations (abundance, distribution and demographic characteristics) and their functional habitats.
- The pressures exerted on these populations and their impacts (both land-based pressures and those directly linked to human activities at sea).

The "Sea Birds" monitoring programme is organised into five sub-programmes, according to a geographical division (water birds *versus* sea birds):

- Sub-programme 1 - Foreshore birds
- Sub-programme 2 - Breeding sea birds
- Sub-programme 3 - Birds at sea
- Sub-programme 4 - Beached birds
- Sub-programme 5 - Interactions between sea birds and human activities at sea

These sub-programmes address both the environment status and the pressures and impacts of human activities on the marine environment.

Information on this monitoring programme is detailed in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

#### **What are the identified elements and the elements to be reported?**

#### **Good environmental status**

Assessment of the achievement of Good Environmental Status (GES) of marine waters under Descriptor 1 "Biodiversity" for the component "Sea birds" is based on two primary criteria (D1C1 and D1C2) and three secondary criteria (D1C3, D1C4 and D1C5) according to Decision 2017/848/EU:

- D1C1 - Mortality rate for incidental catches: The mortality rate per species from incidental by-catch is below levels which threaten the species, such that its long-term viability is ensured.
- D1C2 - Population abundance: The population abundance of the species is not adversely affected due to anthropogenic pressures, such that its long-term viability is ensured.
- D1C3 - Demographic characteristics of populations: The population demographic characteristics (e.g. body size or age class structure, sex ratio, fecundity, and survival rates) of the species are indicative of a healthy population which is not adversely affected due to anthropogenic pressures.
- D1C4 - Spatial distribution of populations: The species distributional range and, where relevant, pattern is in line with prevailing physiographic, geographic and climatic conditions.
- D1C5 - Species habitat: The habitat for the species has the necessary extent and condition to support the different stages in the life history of the species.

It should be noted that the "Sea Birds" monitoring programme also provides data for the following criteria: D8C4 (Effects of significant acute pollution episodes), D10C3 (Ingested litter) and D10C4 (Adverse effects of litter). (See "Contaminants" and "Marine litter" monitoring programmes).

The GES criteria for descriptor 4 depend on cross-referencing data from several monitoring programmes to reconstruct the whole food web, in accordance with Decision 2017/848/EU, and will therefore require a dedicated strategy to be put in place. The methodological standards relating to these criteria will be completed following additional studies and the list of trophic guilds considered will be specified at a later date, as provided for in Article 6 of the Decree of 9 September 2019.

According to the Decree of 9 September 2019 on the definition of good environmental status (GES) of marine waters and the methodological standards for assessment, five GES indicators can be used to assess criteria D1C2, D1C3 and D1C4. Two of these indicators are common to the indicators defined under the OSPAR Convention, while the other three have been developed at national level. Some of these indicators are operational but still require some adaptation in the next cycle and threshold definitions. This is the case, for example, for the indicators "Growth rate of wintering coastal shorebird populations" and B1 OSPAR, which feed into criterion D1C2 on the abundance of bird populations. However, other indicators still need to be improved to be more robust and operational, such as the "Abundance of sea birds observed at sea" indicator, the "Distribution of sea birds observed at sea" indicator and the B3 OSPAR indicator on breeding success of breeding sea birds.

## Environmental targets

The "Sea birds" monitoring programme relates to seven environmental targets regarding incidental catches (D01-OM-OE01), collisions with offshore infrastructure (D01-OM-OE02), a loss of functional habitats (D01-OM-OE03, D01-OM-OE05), introduced and domesticated species (D01-OM-OE04), physical, noise and light disturbance (D01-OM-OE06), or extraction, from the public maritime domain, of species identified under the International Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) and threatened at European level (D01-OM-OE07).

Twelve operational ET indicators have been defined for the second cycle and apply to all marine sub-regions of the MSFD:

- Five ET indicators are reported only by sub-programmes 1 and 2 of the 'Sea Birds' monitoring programme.
- One indicator (D01-OM-OE05-ind1) is reported by the sub-programme data collection frameworks of the "Activities, uses and public policies" part of the sea basin strategy document monitoring framework (see annex 3b).
- Two indicators (D01-OM-OE01-ind1 and D01-OM-OE06-ind3) are reported by both the sub-programmes of the "Sea birds" monitoring programme and the "Activities, uses and public policies" part (see annex 3b).
- Four indicators do not require monitoring to be reported because the obligation to ensure that offshore authorisations and SDAGEs are compatible with the environmental targets (defined in Article L. 219-4 of the Environmental Code) is sufficient to guarantee that the target associated with these indicators is achieved (D01-OM-OE02-ind1 and ind2, D01-OM-OE03-ind1, and D01-OM-OE07-ind1).

### What are the data collection frameworks?

Information on the operationality of the monitoring frameworks and their link with the ET/GES indicators and the sea basins is set out in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

MONITORING FRAMEWORK	SP	DESCRIPTION
Suivi des limicoles côtiers (reposoirs)/OPNL	SP1	Monitoring of coastal shorebird numbers to characterise resting areas.
Suivi des oiseaux hivernants (programme Wetlands international)	SP1	Monitoring of wintering coastal shorebirds and anatidae in coastal wetlands.
Enquête nationale des limicoles et anatidés nicheurs	SP1	Monitoring of breeding numbers of shorebirds and anatidae.
Suivi national des effectifs d'oiseaux marins nicheurs	SP2	Monitoring of breeding sea bird numbers, based on the number of breeding pairs of sea birds for each colony sampled.
Suivi national de la production en jeunes des oiseaux marins nicheurs	SP2	Monitoring the average number of fledged young per breeding pair, in order to assess the reproductive success of breeding sea birds.
Suivi des macro-déchets dans les nids de Cormorans huppés	SP2	Monitoring of the amount of macro-litter in European shag nests, carried out at several sites and colonies (Iroise Natural Marine Park, Breton colonies, Norman colonies, Corsican colonies and Channel-North Sea colonies).
Suivi des oiseaux en mer depuis la côte	SP3	Count of the number of birds over a given time interval, on moving birds (monitoring of ford flows at sea) or on sites known to host large numbers of stationing birds (rafts, significant groups) visible from the coast.
Campagnes aériennes de suivi de la mégafaune marine et des macro-déchets flottants à large échelle (SAMM, SCANS, ASI)	SP3	Fly overs of the metropolitan maritime area and its bordering zones for the observation of sea birds, marine mammals, other species of pelagic megafauna and human activities (floating litter).
Campagnes halieutiques DCF optimisées – Mégafaune marine et macro-déchets flottants (programme Megascopie)	SP3	Monitoring of marine megafauna, floating litter and human activities by observers on board Ifremer vessels during the annual benthic-demersal fishing campaigns (IBTS, PELGAS, PELMED, CGFS and EVHOE).
Suivi des oiseaux échoués sur les littoraux normands et Hauts de France	SP4	Monitoring of beached birds on the Normandy and Hauts de France coasts according to 2 protocols: monitoring the proportion of beached birds of all species and monitoring the proportion of

		oil-covered beached Guillemots and beached Fulmars having ingested micro-plastics.
Observation des captures en mer (OBSMER)	<b>SP5</b>	Programme to place observers on voluntary fishing vessels to record captures and releases, including incidental catches of marine mammals, sea turtles and sea birds.

## 2.2 - "Marine Mammals - Sea Turtles (biodiversity)" Monitoring programme

### What does this monitoring programme cover?

The "Marine Mammals - Sea Turtles" monitoring programme defines the monitoring required for the continuous assessment of the environmental status of marine waters and the periodic updating of Environmental Targets (ET) under:

- descriptor 1 "Biodiversity" of the MSFD for the components "Marine Mammals" and "Sea Turtles", described as: "Biological diversity is maintained. *The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions.*" (Directive 2008/56/EC).
- descriptor 4 "Food webs" of the MSFD, described as: "All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity." (Directive 2008/56/EC).

The objective of this monitoring programme is to acquire data that will make it possible to:

- Assess the environmental status of marine mammal and sea turtle populations (abundance, demographic characteristics, spatial distribution, habitat use).
- Assess the impact of pressures on populations.
- Understand the structure and functioning of marine ecosystems and the food web.

The "Marine Mammals - Sea Turtles" monitoring programme is organised into five sub-programmes, divided geographically (coast versus offshore) and by subject (state of the environment, pressures and impacts of activities on the environment):

- Sub-programme 1 - Coastal cetacean populations
- Sub-programme 2 - Grey seal and harbour seal populations
- Sub-programme 3 - Marine mammals and sea turtles offshore
- Sub-programme 4 - Beaching of marine mammals and sea turtles
- Sub-programme 5 - Interactions between human activities, marine mammals and sea turtles

Information on this monitoring programme is detailed in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

### What are the identified elements and the elements to be reported?

## Good environmental status

Assessment of the achievement of Good Environmental Status (GES) of marine waters under Descriptor 1 "Biodiversity" for the components "Marine Mammals" and "Sea Turtles" is based on four primary criteria (D1C1, D1C2, D1C4 and D1C5) and one secondary criterion (D1C3) according to Decision 2017/848/EU:

- D1C1 - Mortality rate from incidental by-catch: The mortality rate per species from incidental by-catch is below levels which threaten the species, such that its long-term viability is ensured.
- D1C2 - Population abundance: The population abundance of the species is not adversely affected due to anthropogenic pressures, such that its long-term viability is ensured.
- D1C3 - Population demographic characteristics: The population demographic characteristics (e.g. body size or age class structure, sex ratio, fecundity, and survival rates) of the species are indicative of a healthy population which is not adversely affected due to anthropogenic pressures.
- D1C4 - Population distributional range and pattern: The species distributional range and, where relevant, pattern is in line with prevailing physiographic, geographic and climatic conditions.
- D1C5 – Habitat for the species: The habitat for the species has the necessary extent and condition to support the different stages in the life history of the species.

It should be noted that the "Marine Mammals - Sea Turtles" monitoring programme also provides data for this criterion: D10C3 (Ingested litter) (see "Marine litter" monitoring programme).

The GES criteria for descriptor 4 depend on cross-referencing data from several monitoring programmes to reconstruct the whole food web, in accordance with Decision 2017/848/EU, and will therefore require a dedicated strategy to be put in place. The methodological standards relating to these criteria will be completed following additional studies and the list of trophic guilds considered will be specified at a later date, as provided for in Article 6 of the Decree of 9 September 2019.

According to the Decree of 9 September 2019 on the definition of good environmental status (GES) of marine waters and the methodological standards for assessment, eleven GES indicators can be used to assess criteria D1C1, D1C2, D1C3 and D1C4:

- Eight GES indicators allow criteria D1C1, D1C2, D1C3 and D1C4 to be reported for the component "Marine Mammals". Four of these indicators are common to the indicators defined under the OSPAR Convention (common indicators M3, M4-a, M4-b and M6), while the other four have been developed at national level. All of these indicators have been used to assess whether or not certain species have achieved the GES for certain marine sub-regions, with the exception of OSPAR indicator M6 due to the lack of a threshold. Adaptations of some indicators are underway in order to assess other species or other marine sub-regions, in particular in the western Mediterranean marine sub-region where no marine mammal species could be quantitatively assessed in the GES assessment.

- Three GES indicators are defined to input into criteria D1C1 (provisional indicator), D1C2 and D1C4 for the component "Sea Turtles". However, due to too much fragmented data and lack of thresholds, the achievement or non-achievement of GES for sea turtle species could not be determined in the 2018 assessment.
- No GES indicator could be defined for criterion D1C5 (Species habitat) for either marine mammals or sea turtles. Consideration is being given to the development of indicators for this criterion for the next assessment.

## Environmental targets

In the second cycle of implementing the environmental targets (ETs), three ETs were defined to achieve good environmental status (GES) for marine mammals and sea turtles. In particular, they concern anthropogenic disturbance, incidental catches and collisions.

Six operational ET indicators have been defined for the second cycle and apply to all marine sub-regions of the MSFD, with the exception of indicator D01-MT-OE01-ind2, which only applies to the MEMN marine sub-regions. It should be noted that two ET indicators (D01-MT-OE02-ind1 and ind3) are reported both by the "Marine Mammals - Sea Turtles" programme monitoring frameworks and by the sub-programme data collection frameworks of the "Activities, uses and public policies" part of the sea basin strategy document monitoring framework (see annex 3b).

## What are the data collection frameworks

Information on the operability of the monitoring frameworks and their link with the ET/GES indicators and the sea basins is set out in Annex 1 "Monitoring programmes under the second cycle of the MSFD"

MONITORING/DATA COLLECTION FRAMEWORKS	SP	DESCRIPTION
Suivi des populations côtières de grands dauphins par les associations et gestionnaires d'AMP	SP1	Monitoring the environmental status of coastal groups of bottlenose dolphins by visual observation from small vessels, inputting information and photo identification into the OBSenMER app, carried out by MPA associations and managers (GECC, AI Lark, PNMI, MIRACETI).
Suivi des colonies de phoques par les associations et gestionnaires d'AMP	SP2	Monitoring the environmental status of grey and harbour seal groups or colonies by ground counts and photo identification, carried out by MPA associations and managers.
Campagnes aériennes de suivi de la mégafaune marine et des macro-déchets flottants à large échelle (SAMM, SCANS, ASI)	SP3	Fly overs of the metropolitan maritime area and its bordering zones for the observation of sea birds, marine mammals, other species of pelagic megafauna and human activities (floating litter).
Campagnes halieutiques DCF optimisées – Mégafaune marine et macro-déchets flottants (programme Mégascope)	SP3	Monitoring marine megafauna, floating litter and human activities by observers on board Ifremer vessels during the annual benthic-demersal fishing campaigns (IBTS, PELGAS, PELMED, CGFS and EVHOE).



Campagnes de suivi de la mégafaune marine et des macro-déchets flottants depuis des navires d'opportunité	<b>SP3</b>	Monitoring marine megafauna, floating litter and human activities by observers on board maritime platforms of opportunity (commercial passenger lines (ferries) or government ships at sea), according to the Megascopé protocol or an equivalent protocol.
Réseau National Échouage des mammifères marins (RNE)	<b>SP4</b>	Monitoring marine mammal beaching on the French coastline, by RNE correspondents, coordinated at national level by the PELAGIS monitoring centre.
Réseaux de suivi des échouages des tortues marines (RTMAE, RTMMF)	<b>SP4</b>	Monitoring sea turtle stranding on the French coastline, by RTMMF correspondents in the western Mediterranean, coordinated by the Société Herpétologique de France, and by the RTMAE in the Atlantic, coordinated by the La Rochelle Aquarium.
Observation des captures en mer (OBSMER)	<b>SP5</b>	Programme to place observers on voluntary fishing vessels to record captures and releases, including incidental catches of marine mammals, sea turtles and sea birds.

## 2.3 - "Fish and cephalopods (biodiversity)" monitoring programme

### What does this monitoring programme cover?

The "Fish and Cephalopods" monitoring programme defines the monitoring required for the continuous assessment of the environmental status of marine waters and the periodic updating of environmental targets (ETs) under:

- descriptor 1 "Biodiversity" of the MSFD for the components "Fish" and "Cephalopods", described as: "Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions." (Directive 2008/56/EC).
- descriptor 4 "Food webs" of the MSFD, described as: "The known components of the marine food chain must be present in normal abundance and diversity, and at levels that can ensure the full retention of the reproductive capacity of the species in the long term." (Directive 2008/56/EC).

This programme aims to determine the distribution of fish and cephalopod species, the size of populations, the environmental status of species and their habitats and the effects of pressures on them. It should also enable an understanding of the structure and functioning of ecosystems and the food web.

It should be noted that this monitoring programme is partly based on systems common to the "Commercial Species" monitoring programme.

The "Fish and Cephalopods" monitoring programme is divided into four sub-programmes, organised according to a triple environmental gradient: distance from the coast (coastal environments vs continental shelf and offshore environments), position in the water column (benthic-demersal species vs pelagic species), and the nature of the seabed (loose substrates vs hard substrates and/or biogenic habitats):

- Sub-programme 1 - Benthic-demersal fish and cephalopods on coastal hard substrates and biogenic habitats

- Sub-programme 2 - Benthic-demersal fish and cephalopods on coastal loose substrates
- Sub-programme 3 - Pelagic fish and cephalopods in coastal environments
- Sub-programme 4 - Pelagic and benthic-demersal fish and cephalopods on the continental shelf and offshore

Information on this monitoring programme is detailed in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

### **What are the identified elements and the elements to be reported?**

#### **Good environmental status**

Assessment of the achievement of good environmental status (GES) of marine waters under Descriptor 1 for the components "Fish" and "Cephalopods" is based on five criteria, according to Decision 2017/848/EU:

- D1C1– Mortality rate from incidental by-catch: The mortality rate per species from incidental by-catch is below levels which threaten the species, such that its long-term viability is ensured.
- D1C2– Population abundance: The population abundance of the species is not adversely affected due to anthropogenic pressures, such that its long-term viability is ensured.
- D1C3– Population demographic characteristics: The population demographic characteristics (e.g. body size or age class structure, sex ratio, fecundity, and survival rates) of the species are indicative of a healthy population which is not adversely affected due to anthropogenic pressures.
- D1C4– Population distributional range and pattern: The species distributional range and, where relevant, pattern is in line with prevailing physiographic, geographic and climatic conditions.
- D1C5– Habitat for the species: The habitat for the species has the necessary extent and condition to support the different stages in the life history of the species.

The GES criteria for descriptor 4 depend on cross-referencing data from several monitoring programmes to reconstruct the whole food web, in accordance with Decision 2017/848/EU, and will therefore require a dedicated strategy to be put in place. The methodological standards relating to these criteria will be completed following additional studies and the list of trophic guilds considered will be specified at a later date, as provided for in Article 6 of the Decree of 9 September 2019.

According to the Decree of 9 September 2019 on the definition of good environmental status (GES) of marine waters and the methodological standards for assessment, the GES indicators that inform the criteria of descriptor 1 for the "Fish" and "Cephalopod" components are:

- restoration of the abundance of populations of continental shelf benthic-demersal species sensitive to fishing pressure (corresponding to the OSPAR common indicator "FC1") which is used to assess criterion D1C2 for some species.
- for commercially exploited fish and cephalopod stocks, the assessment of criteria D3C1 and D3C2 (see "Commercial species" monitoring programme) contributes to the assessment of criterion D1C2.
- for commercially exploited fish and cephalopod stocks, the assessment of criterion D3C3 (see "Commercial species" monitoring programme) contributes to the assessment of criterion D1C3; in the absence of an indicator, this criterion is not currently assessed.

For the other species and criteria, the indicators are currently being developed methodologically and threshold and/or reference values are being defined

## Environmental targets

In the second cycle of implementation of the environmental targets (ETs), five ETs were defined for better management of populations and limitation of incidental catches concerning elasmobranchs (D01-PC-OE01; D01-PC-OE02), diadromous species (D01-PC-OE03) and vulnerable and endangered Mediterranean species (D01-PC-OE04). The aim is also to reduce all pressures on important functional fishing areas (D01-PC-OE05).

Seven operational indicators have been defined for the second cycle and are reported by the sub-programme data collection frameworks of the "Activities, uses and public policies" part of the sea basin strategy document monitoring framework (see annex 3b).

## What are the data collection frameworks

Information on the operability of the monitoring frameworks and their link with the ET/GES indicators and the sea basins is given in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

MONITORING/DATA COLLECTION FRAMEWORK	SP	DESCRIPTION
Suivis des poissons dans les marais salés – Réseau RNF-OPNL	<b>SP1</b>	This system is aimed at monitoring fish in loose intertidal vegetated environments (salt marshes).
Campagnes d'observation halieutique : nourriceries	<b>SP2</b>	Network of campaigns in coastal nursery areas for benthic-demersal fish, which are essential habitats for many marine species.
Campagnes d'observation halieutique : évaluation des stocks	<b>SP2 SP4</b>	Network of standardised scientific campaigns* aimed at characterising the status and medium-term evolution of exploited species, populations (of fishing interest or not) and the marine environment. Each campaign provides a quantitative representation of all pelagic, demersal and benthic species in the study area at a given time.  *By marine sub-regions: Western Mediterranean PELMED, MEDITS Bay of Biscay N/S: PELGAS, ORHAGO, EVHOE Channel-North Sea (MMN): IBTS, CGFS Celtic Sea: CGFS, EVHOE
Campagnes d'observation halieutique : évaluation des stocks)	<b>SP2 SP4</b>	A system that collects capture data (voluntary and incidental) on board voluntary commercial fishing vessels.
Campagne aérienne de suivi du thon rouge	<b>SP4</b>	Aerial bluefin tuna monitoring campaign deployed in the Gulf of Lion with the objective of counting schools of bluefin tuna in order to construct an abundance index used in stock assessments.

## 2.4 - "Benthic habitats (biodiversity)" Monitoring programme

### What does this monitoring programme cover?

The "Benthic Habitats" Monitoring Programme defines the monitoring required for the continuous assessment of the environmental status of marine waters and the periodic updating of Environmental Targets (ETs) under:

- descriptor 1 "Biodiversity" of the MSFD for the component "Benthic habitats", described as: "Biological diversity is maintained. The quality and occurrence of habitats, and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions." (Directive 2008/56/EC).
- descriptor 6 "Seabed Integrity" of the MSFD, described as: "Sea-floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected." (Directive 2008/56/EC).

The objective of this programme is to determine the distribution, extent and environmental status of benthic habitats from the coast to the bathyal zone. To do this, it is based on the monitoring of state parameters describing the benthic habitats of metropolitan waters (structural, functional and surface parameters). Parameters of anthropogenic pressures (biological, chemical and physical) and pressure-generating activities are monitored within other MSFD monitoring programmes to study the impacts of these pressures on marine ecosystems. Linking status parameters and pressure parameters provides a better understanding of the status of benthic habitats and allows relevant management measures to be taken to limit these pressures and their impacts.

The 'Benthic Habitats' monitoring programme is organised into seven sub-programmes, relating to groupings of broad habitat types listed in Decision 2017/848/EU, according to the physical nature of the habitat and their gradient of distance from the coast:

- Sub-programme 1 - Mediolittoral biogenic rocks and reefs
- Sub-programme 2 - Mediolittoral sedimentary habitats
- Sub-programme 3 - Coastal infra- and circalittoral biogenic rocks and reefs
- Sub-programme 4 - Coastal infra- and circalittoral sedimentary habitats
- Sub-programme 5 - Offshore circalittoral biogenic rocks and reefs
- Sub-programme 6 - Offshore circalittoral sedimentary habitats
- Sub-programme 7 - Upper and lower bathyal biogenic rocks and reefs and sedimentary habitats

Information on this monitoring programme is detailed in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

### What are the identified elements and the elements to be reported?

#### Good environmental status

Assessment of the achievement of good environmental status (GES) of marine waters under Descriptor 1 and in relation to Descriptor 6 for the component "Benthic habitats" is based on two primary criteria (D6C4 and D6C5), according to Decision 2017/848/EU:

- D6C4 - Extent of loss of the type of benthic habitat: The extent of loss of the habitat type resulting from anthropogenic pressures, does not exceed a specified proportion of the natural extent of the habitat type in the assessment area.
- D6C5 - Extent of adverse effects on the condition of the benthic habitat type: The extent of adverse effects related to anthropogenic pressures on the condition of the habitat type, including alteration to its biotic and abiotic structure and its functions (e.g. typical species composition and their relative abundance, absence of particularly sensitive or fragile species or species providing a key function, size structure of species), does not exceed a specified proportion of the natural extent of the habitat type in the assessment area.

During the second cycle of the GES assessment in 2018, it was not possible to assess whether or not the GES for "Benthic Habitats" had been achieved, mainly due to ongoing methodological development work on the indicators and the absence of threshold values. Criterion D6C5 could nevertheless be partially reported for some broad types of benthic habitats of loose substrates by the BenthVal indicator which quantifies the loss of species abundance (in time or space). This indicator was calculated on the basis of stationary data on benthic invertebrate macrofauna, acquired within the framework of the Benthic Macroinvertebrates Water Framework Directive (WFD-MIB) between two years of the 2012-2018 cycle. However, this indicator is not yet operational and cannot in this state be deployed on a large scale and for all habitat types. Further research is envisaged to improve its application and consideration will be given to the use of other indicators.

## Environmental targets

The "Benthic Habitats" monitoring programme should make it possible to input into environmental targets (ET) concerning the reduction of anthropogenic pressures (loss of habitats, physical disturbances, abrasion, smothering, coastline artificialization, blooms of filamentous macroalgae) on salt marshes, intertidal rocky habitats, Sabellaria bioconstructions (honeycomb worm), eelgrass beds, subtidal and circalittoral sedimentary habitats, Mediterranean spermatophytes beds, coralligenous, vulnerable marine ecosystems and hydraulic dunes.

The majority of the operational indicators defined for the second cycle are based on surface-based habitat data. It should be noted that five indicators (D01-HB-OE02-Ind1; D01-HB-OE05-Ind1; D01-HB-OE07-Ind1; D01-HB-OE09-Ind3; D01-HB-OE11-Ind2) are reported by the sub-programme data collection frameworks of the "Activities, uses and public policies" part of the sea basin strategy document monitoring framework (cf. annex 3b) and that five other indicators (D01-HB-OE05-Ind2, D01-HB-OE09-Ind1; D01-HB-OE11-Ind1; D01-HB-OE11-Ind3; D01-HB-OE11-Ind4) do not need to be monitored in order to be reported, as the obligation to ensure that offshore authorisations and River Basin Management Plans (SDAGEs) are compatible with environmental targets (defined in Article L. 219-4 of the Environmental Code) is sufficient to guarantee that the target associated with these indicators is achieved. It should also be noted that the "Benthic Habitats" and "Seabed Integrity" monitoring programmes are complementary and provide input to the ET indicators of both programmes.

## What are the data collection frameworks?

Information on the operability of the monitoring frameworks and their link with the ET/GES indicators and the sea basins is given in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

MONITORING/DATA COLLECTION FRAMEWORK	SP	DESCRIPTION
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DCE Benthos – Macroalgues intertidales	<b>SP1</b>	Monitoring of algal belts and directory of intertidal macroalgal species.
REBENT Bretagne stationnel – Macroalgues intertidales	<b>SP1</b>	Monitoring of intertidal macroalgae and directory of macroalgal species within each algal belt, with sampling of associated macrofauna, carried out within the framework of the REBENT Brittany site Phase II.
REEHAB – Réseau national de suivi des bioconstructions intertidales à Sabellaridés	<b>SP1</b>	Monitoring of reef bioconstructions with <i>Sabellaria alveolata</i> selected following field surveys and analysis of larval connectivity on the Atlantic and Channel coasts.
DCE Benthos – Macroalgues (méthode CARLIT)	<b>SP1</b>	Monitoring of macroalgae using the CARTografia LITtoral (CARLIT) method which combines exhaustive mapping of the distribution of upper mediolittoral communities and their abundance with the geomorphology of the coast.
DCE Benthos – Angiospermes – stationnel – <i>Zostera noltei</i>	<b>SP2</b>	Stationary monitoring network for sea grass beds with <i>Zostera noltei</i> .
DCE Benthos – Angiospermes – surfacique – <i>Zostera noltei</i>	<b>SP2</b>	Surface monitoring network for sea grass beds with <i>Zostera noltei</i> .
DCE Benthos – Macroinvertébrés benthiques (DCE-MIB)	<b>SP2</b> <b>SP4</b>	Stationary monitoring network of loose substrate habitats from the mediolittoral to the coastal circalittoral zone conducted under the WFD.
REBENT Bretagne stationnel – Macroinvertébrés benthiques	<b>SP2</b> <b>SP4</b>	Stationary monitoring of loose substrate habitats from the mediolittoral to the coastal circalittoral zone carried out within the framework of REBENT Brittany stationary Phase II.
DCE Benthos – Macroalgues subtidales	<b>SP3</b>	Stationary monitoring network for subtidal macroalgae conducted under the WFD.
REBENT Bretagne stationnel – Macroalgues subtidales	<b>SP3</b>	Monitoring of subtidal macroalgae conducted within the framework of the REBENT Brittany stationnal Phase II.
RÉseau CORalligène (RECOR)	<b>SP3</b>	Monitoring the spatio-temporal evolution of coralligenous assemblages (description of the state and functioning) on the French Mediterranean coastline.
SURFSTAT – Suivi surfacique du coralligène	<b>SP3</b>	Network to complete the existing 2D seabed mapping and to establish the 3D link of habitats, with a focus on coralligenous habitats. It also allows the measurement of different variables that can be used as surface indicators of coastal water quality based on continuous mapping of marine habitats.
DCE Benthos – Angiospermes – stationnel – <i>Zostera marina</i>	<b>SP4</b>	Stationary monitoring network for <i>Zostera marina</i> sea grass beds conducted under the WFD.
REBENT Bretagne stationnel – <i>Zostera marina</i>	<b>SP4</b>	Station monitoring of sea grass beds with <i>Zostera marina</i> and the macrofauna associated with the bed carried out within the framework of the REBENT Brittany stationnal Phase II.
DCE Benthos – Angiospermes – surfacique – <i>Zostera marina</i>	<b>SP4</b>	Surface monitoring network of <i>Zostera marina</i> sea grass beds.
REBENT Bretagne stationnel - Maërl	<b>SP4</b>	Monitoring of maerl beds in the Celtic sea and Northern Bay of Biscay conducted within the framework of the REBENT Brittany stationnal

		Phase II.
TEMPO – Suivi des herbiers de Posidonie (includes DCE-Posidonie)	<b>SP4</b>	Posidonia sea grass beds monitoring network aimed at collecting descriptive data on the state and functioning of Posidonia sea grass beds and monitoring their spatio-temporal evolution.
SURFSTAT – Suivi surfacique des herbiers de Posidonie	<b>SP4</b>	Network to complete the existing 2D mapping of the seabed and establish the 3D link of habitats, with a focus on Posidonia sea grass beds. It also allows the measurement of different variables that can be used as surface indicators of coastal water quality based on continuous mapping of marine habitats.

## 2.5 - "Pelagic habitats (biodiversity)" monitoring programme

### What does this monitoring programme cover?

The "Pelagic Habitats" Monitoring Programme defines the monitoring required for the continuous assessment of the environmental status of marine waters and the periodic updating of Environmental Targets (ETs) under:

- descriptor 1 "Biodiversity" of the MSFD for the component "Pelagic habitats", described as: "Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions." (Directive 2008/56/EC).
- descriptor 4 "Food webs" of the MSFD, described as: "The known components of the marine food chain must be present in normal abundance and diversity, and at levels that can ensure the full retention of the reproductive capacity of the species in the long term." (Directive 2008/56/EC).

This programme aims to characterise the spatial distribution, temporal evolution and ecological status of pelagic habitats. To do this, it is based on joint monitoring:

- of environmental (or contextual) conditions through the acquisition of "base" parameters describing the hydrological and physico-chemical conditions of the environment (e.g. temperature, salinity, nutrients, turbidity, dissolved oxygen, etc.)
- of planktonic communities, making it possible to obtain parameters on the state of the environment in terms of both structure (composition, diversity) and stock (abundance, biomass), these two parameters conditioning in particular the structure and functioning of the food web.

The "Pelagic Habitats" monitoring programme is organised into four sub-programmes:

- Sub-programme 1 - Hydrology and Physical Chemistry
- → description of the environment/environmental conditions.
- Sub-programme 2 - Phytoplankton
- → includes autotrophic vegetable plankton, i.e. those that produce their organic matter by photosynthesis.
- Sub-programme 3 - Zooplankton
- → groups together heterotrophic multicellular animal plankton, i.e. which feed by digesting organic matter already produced.
- Sub-programme 4 - Microorganisms



- → the term 'microorganisms' here includes heterotrophic and mixotrophic phytoplankton (capable of feeding either autotrophically or heterotrophically) such as nanoflagellates, dinoflagellates, bacteria, viruses and single-celled zooplankton (e.g. ciliates).

Information on this monitoring programme is detailed in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

### **What are the identified elements and the elements to be reported?**

#### **Good environmental status**

Assessment of the achievement of good environmental status (GES) of marine waters under Descriptor 1 "Biodiversity" for the component "Pelagic habitats" is based on a sole primary criterion, according to Decision 2017/848/EU:

- D1C6 - Pelagic habitat type characteristics: The condition of the habitat type, including its biotic and abiotic structure and its functions, is not adversely affected due to anthropogenic pressures.

The GES criteria for descriptor 4 depend on cross-referencing data from several monitoring programmes to reconstruct the whole food web, in accordance with Decision 2017/848/EU, and will therefore require a dedicated strategy to be put in place. The methodological standards relating to these criteria will be completed following additional studies and the list of trophic guilds considered will be specified at a later date, as provided for in Article 6 of the Decree of 9 September 2019.

According to the Decree of 9 September 2019 on the definition of good environmental status (GES) of marine waters and the methodological standards for assessment, three indicators can be used to assess criterion D1C6 at marine sub-region level:

- changes in plankton functional groups
- changes in phytoplankton biomass and zooplankton abundance
- changes in plankton biodiversity

They correspond to common indicators developed under the OSPAR Convention (PH1/FW5, PH2 and PH3 respectively) and need to be adapted for the western Mediterranean marine sub-region.

Changes in plankton communities over time via the GES "Pelagic Habitats" indicators reflect the effects of prevailing environmental conditions (e.g. climatic, hydrological, physico-chemical). Depending on the context, a change in the state of plankton communities may reflect an evolution linked to natural phenomena or an evolution towards a degraded state. Therefore, these indicators act as warning signals from which management actions (precautionary principle) and/or research actions (state-pressure link studies) can be undertaken. They are calculated from quantitative data acquired at monthly intervals and over long time series (at least 10 years).

In the absence of threshold values, the achievement or non-achievement of the "Pelagic Habitats" GES could not be assessed in 2018 under the second GES assessment cycle. For the next assessment cycle, methodological development

work will continue, in conjunction with European level working groups (e.g. ICG-COBAM-PH; see 2.3.1), with the aim of producing operational GES indicators.

### Environmental targets

There are no environmental targets (ETs) for the "Pelagic Habitats" monitoring programme. The issues related to this programme are covered by the "Hydrographical changes" and "Eutrophication" monitoring programmes.

### What are the data collection frameworks?

Information on the operability of the monitoring frameworks and their link with the ET/GES indicators and the sea basins is given in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

MONITORING/ DATA COLLECTION FRAMEWORK	SP	DESCRIPTION
Suivis DCE - REPHY Surveillance, PHYTOBS et réseaux régionaux/ locaux	<b>SP1</b> <b>SP2</b>	Phytoplankton and phycotoxin monitoring network + SOMLIT stations labelled in the framework of PHYTOBS (national network for the observation of microphytoplankton).
Suivis stationnels REPHY Observation (hors DCE)	<b>SP1</b> <b>SP2</b>	Phytoplankton and phycotoxin observation network, outside the WFD.
Modèle ECO-MARS3D	<b>SP1</b> <b>SP2</b>	Hydrodynamic/biogeochemical coupled model in the Atlantic/Channel. Allows the simulation of hydrodynamic and state variables to describe the biogeochemical cycles of nitrogen, phosphorus and silicon.
Réseaux de satellites opérés par la NASA et l'ESA	<b>SP1</b> <b>SP2</b>	Surface monitoring of hydrological and physico-chemical parameters (turbidity, surface temperature), phytoplankton biomass (concentration of chlorophyll <i>a</i> ), and phytoplankton functional groups (under development).
Service d'Observation en Milieu Littoral (SOMLIT)	<b>SP1</b> <b>SP2</b> <b>SP4</b>	National Coastal and Marine Ecosystem Observation Service. It allows the monitoring of phytoplankton, certain micro-organisms and the acquisition of hydrological and physico-chemical data.
REseau des Stations et Observatoires MARins (RESOMAR-Pelagos)	<b>SP1</b> <b>SP2</b> <b>SP3</b> <b>SP4</b>	Collaborative work by the French Marine Stations and Observatories Network (REseau des Stations et Observatoires MARins) on marine plankton (phytoplankton, zooplankton, micro-organisms) and associated environmental parameters (hydrology, physical chemistry).
Impacts des Grands Aménagements (IGA)	<b>SP1</b> <b>SP2</b> <b>SP3</b>	Monitoring of the marine environment (hydrology, physical chemistry, phytoplankton, zooplankton, bacteriology) related to emissions from coastal nuclear power plants.
Suivi STARESO – Baie de Calvi	<b>SP1</b> <b>SP2</b> <b>SP3</b>	Long-term monitoring of the Calvi STation de REcherche océanographique et SOus-marine (hydrology, physical chemistry, phytoplankton, zooplankton). Little anthropogenic pressure, WFD reference.
Suivis du milieu pélagique des AMPs	<b>SP1</b> <b>SP2</b> <b>SP3</b>	Monitoring of Marine Protected Areas (hydrology, physical chemistry, phytoplankton, zooplankton).
Mediterranean Ocean Observing System for the Environment (MOOSE)	<b>SP1</b> <b>SP2</b> <b>SP3</b>	Multi-platform (fixed stations (1), gliders (2), large-scale sea campaigns (3)) and multi-site observation system in the Mediterranean.

	<b>SP4</b>	
Continuous Plankton Recorder Survey (CPR Survey) - Marine Biological Association	<b>SP1 SP2</b>	Long-term monitoring of plankton communities (phytoplankton, zooplankton) by continuous sampling via the CPR, an instrument towed at 10 m depth by commercial vessels, operated by the Marine Biological Association.

## 2.6 - "Non-indigenous species" monitoring programme

### What does this monitoring programme cover?

The "Non-indigenous species" monitoring programme defines the monitoring required for the continuous assessment of the environmental status of marine waters and the periodic updating of Environmental Targets (ETs) under descriptor 2 "Non-indigenous species" of the MSFD. Descriptor 2 is described as: Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems." (Directive 2008/56/EC).

This programme aims to monitor and assess the pressure of non-indigenous species from its source, i.e. the introduction of NIS into their new area, to the impacts it may have on marine ecosystems.

The "Non-indigenous species" monitoring programme is organised in three sub-programmes:

- Sub-programme 1 - Introduction of non-indigenous species through the main mediums: ballast water and sediments, biofouling, transfer of living organisms
- Sub-programme 2 - Dedicated monitoring in risk areas and areas sensitive to bio-pollution
- Sub-programme 3 - Characterising the status and impacts of non-indigenous species

Information on this monitoring programme is detailed in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

### What are the identified elements and the elements to be reported?

#### Good environmental status

Assessment of the achievement of Good Environmental Status (GES) of marine waters under descriptor 2 "Non-indigenous species" is based on one primary criterion (D2C1) and two secondary criteria (D2C2 and D2C3), according to Decision 2017/848/EU:

- D2C1 - Newly introduced non-indigenous species: The number of non-indigenous species which are newly introduced into the natural environment through human activities per assessment period (six years) is reduced to a minimum and eventually to zero.
- D2C2 - Established non-indigenous species: Abundance and spatial distribution of established non-indigenous species, particularly of invasive species, which contribute significantly to adverse effects on particular species groups or broad habitat types.

- D2C3 - Adverse effects due to the presence of non-indigenous species: Proportion of the species group or spatial extent of the broad habitat type which is adversely affected by the presence of non-indigenous species, especially invasive non-indigenous species.

According to the Decree of 9 September 2019 on the definition of good environmental status (GES) of marine waters and the methodological standards for assessment, only one GES indicator is sufficiently developed: the indicator "Trends in new introductions of non-indigenous species", which makes it possible to report criterion D2C1. This GES indicator corresponds to the OSPAR NIS3 indicator. The threshold used for this indicator, on a provisional basis, is a trend: the GES is achieved when there is a significant decrease in the number of new introductions of non-indigenous species over at least two consecutive cycles. However, the lack of data and the uncertainty of the available data did not allow for a quantitative assessment of the achievement or non-achievement of the GES in the second cycle of the GES assessment. It should be noted that, according to the Decree of 9 September 2019, unicellular species are not considered in the assessment of criterion D2C1. The GES indicators for the D2C2 and D2C3 criteria are not currently operational.

### Environmental targets

The "Non-indigenous species" monitoring programme relates to four environmental targets (ETs) relating to the limitation of introduction (D02-OE01; D02-OE03) transfer (D02-OE02) and release of NIS (D02-OE03; D02-OE04).

Four ET indicators have been defined for the second cycle. Indicators D02-OE01-Ind1 and D02-OE04-Ind2 are operational but lack data and dedicated monitoring. It should be noted that indicator D02-OE01-Ind1 requires sub-programme data collection frameworks of the "Activities, uses and public policies" part of the sea basin strategy document monitoring framework (see annex 3b). Finally, indicators D02-OE03-Ind1 and D02-OE04-Ind1 are operational and do not require monitoring to be reported, as the obligation to ensure that offshore authorisations and SDAGEs are compatible with environmental targets (defined in Article L. 219-4 of the Environmental Code) is sufficient to guarantee that the target associated with these indicators is achieved.

### What are the data collection frameworks

The "Non-indigenous species" monitoring programme is under development. The monitoring frameworks of sub-programme 2 relating to the monitoring of NIS in ports, shellfish areas and areas sensitive to bio-pollution are being set up for operational monitoring at the end of the second cycle.

## 2.7 - "Commercial species" monitoring programme

### What does this monitoring programme cover?

The "Commercial Species" Monitoring Programme defines the monitoring required for the continuous assessment of the environmental status of marine waters and the periodic updating of Environmental Targets (ETs) under:

- descriptor 3 "Commercial species" of the MSFD, described as: "Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock." (Directive 2008/56/EC).

- descriptor 4 "Food webs" of the MSFD, described as: "The known components of the marine food chain must be present in normal abundance and diversity, and at levels that can ensure the full retention of the reproductive capacity of the species in the long term." (Directive 2008/56/EC).

The objective of this programme is to enable the assessment of the environmental status of stocks of exploited species taken as a reference for the definition of good environmental status (descriptor 3, relating to commercially exploited species). To this end, it describes the collection of data relating to the exploited stocks under consideration and the harvesting of these species. The programme also integrates monitoring the location of fishing activity (professional/recreational) in order to contribute to the assessment of the pressures and impacts of this activity on habitats, species and the food web as a whole. This includes the preservation of forage species (e.g. anchovies, sardines), which are an essential link in the food chain, to ensure the maintenance of top predators of commercial interest.

The "Commercial Species" monitoring programme is organised into six sub-programmes:

- Sub-programme 1 - Professional fishing
- Sub-programme 2 - Recreational fishing
- Sub-programme 3 - Catch sampling and biological parameters
- Sub-programme 4 - Fishing monitoring campaigns
- Sub-programme 5 - Interactions between birds and fishing activities
- Sub-programme 6 - Interactions between marine mammals and sea turtles and fishing activities

Information on this monitoring programme is detailed in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

### **What are the identified elements and the elements to be reported?**

#### **Good environmental status**

Assessment of the achievement of good environmental status (GES) of marine waters under Descriptor 3 "Commercial species" is based on three primary criteria (D3C1, D3C2 and D3C3), according to Decision 2017/848/EU:

- D3C1 - Fishing mortality rate: The fishing mortality rate of populations of commercially-exploited species is at or below the level which can produce the maximum sustainable yield. Appropriate scientific bodies shall be consulted in accordance with Article 26 of Regulation (EU) No 1380/2013.
- D3C2 - Spawning stock biomass: The spawning stock biomass of populations of commercially-exploited species is above the level capable of producing maximum sustainable yield. Appropriate scientific bodies shall be consulted in accordance with Article 26 of Regulation (EU) No 1380/2013.
- D3C3 - Population structure by age/size: The age and size distribution of individuals in the populations of commercially-exploited species is indicative of a healthy population. This shall include a high proportion of old/large individuals and limited adverse effects of exploitation on genetic diversity.

The GES criteria for descriptor 4 depend on cross-referencing data from several monitoring programmes to reconstruct the whole food web, in accordance with Decision 2017/848/EU, and will therefore require a dedicated strategy to be put in place. The methodological standards relating to these criteria will be completed following additional studies and the list of trophic guilds considered will be specified at a later date, as provided for in Article 6 of the Decree of 9 September 2019.

According to the Decree of 9 September 2019 on the definition of good environmental status (GES) of marine waters and the methodological standards for assessment, operational GES indicators are used to report criteria D3C1 and D3C2 and are calculated from assessment models using information on the exploitation of fishery resources and the biology of species:

- The GES indicator used to report criterion D3C1 is the fishing mortality rate. If it cannot be assessed for the stock in question, then the ratio between capture and biomass index can be used.
- The GES indicator used to report criterion D3C2 is the spawning stock biomass. If it cannot be assessed for the stock in question, then a spawning biomass index can be used.
- The indicators and threshold values associated with criterion D3C3 are to be developed and will be specified at a later date as provided for in Article 6 of the Decree of 9 September 2019.

Each population (or stock) of a given species shall be assessed at an environmentally relevant geographical level, by the institutions mentioned in Decision 2017/848/EU: the International Council for the Exploration of the Sea (ICES), the General Fisheries Commission for the Mediterranean (GFCM), the Food and Agriculture Organisation of the United Nations (FAO) for the Macaronesian biogeographical region, and the International Commission for the Conservation of Atlantic Tunas (ICCAT).

It should be noted that the assessment of criteria D3C1 and D3C2 contributes to the assessment of criterion D1C2 relating to the abundance of populations (see "Fish and Cephalopods" monitoring programme). Similarly, the assessment of criterion D3C3 may eventually contribute to the assessment of criterion D1C3 relating to the demographic characteristics of the populations (see the "Fish and Cephalopods" monitoring programme).

## Environmental targets

The "Commercial species" monitoring programme relates to seven environmental targets (ETs):

- An environmental target of Descriptor 1 "Biodiversity" for the component "Benthic habitats": D01-HB-OE08, on the sustainable use of kelp fields.
- Three environmental targets of Descriptor 3 "Commercial species": D03-OE01, D03-OE02 and D03-OE03, relating to the adjustment of fishing mortality for: 1/ achieving a maximum sustainable yield (D03-OE01); 2/ ensuring sustainable management of local stocks (D03-OE02) and adapting recreational fishing catches to achieve or maintain good stock status (D03-OE03).
- Three environmental targets of Descriptor 4 "Food Webs": D04-OE01, D04-OE02, D04-OE03, concerning the restoration, maintenance and preservation of fishing resources. These ETs relate respectively to limiting damage

to sensitive links in the food chain, adapting fishing mortality on forage species and maintaining a zero-harvest level on oceanic micronekton.

Six operational indicators have been defined for the second cycle. These are mortality rates (D03-OE01-Ind1; D04-OE01-Ind2; D04-OE02-Ind1), biomass calculations (D04-OE01-Ind1; D04-OE02-Ind1), harvesting rates (D04-OE03-Ind1) and tonnage harvested per year (D01-HB-OE08-Ind1). All of these indicators are reported both by the monitoring frameworks of the "Commercial species" monitoring programme and by the sub-programme data collection frameworks of the "Activities, uses and public policies" part of the sea basin strategy document monitoring framework (see annex 3b).

#### **What are the data collection frameworks?**

Information on the operability of the monitoring frameworks and their link with the ET/GES indicators and the sea basins is given in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

MONITORING/DATA COLLECTION FRAMEWORK	SP	DESCRIPTION
Observation des captures en mer (OBSMER)	<b>SP1</b> <b>SP3</b> <b>SP5</b> <b>SP6</b>	A system that collects capture data (voluntary and incidental) on board voluntary commercial fishing vessels.
Observation des ventes en criées (OBSVENTES)	<b>SP1</b> <b>SP3</b>	System which develops a sampling plan for the supply, with the aim of producing catch size structures of the main commercial species.
Réseau de mesure de l'activité de pêche spatialisé et de données environnementales (RECOPECA)	<b>SP1</b> <b>SP3</b>	A system to equip volunteer professional vessels with sensors to estimate the spatial distribution of fishing efforts and catches, and to characterise the fishermen's working areas from an environmental point of view.
Système d'Informations Halieutiques (SIH)	<b>SP1</b>	Ifremer's data collection system centralises data relating to the observation of fishing resources and associated uses. Its mission is to organise data acquisition (collection or integration of data from external flows), data banking, qualification/validation of data, production of indicators and the dissemination of data and indicators to end users.
Système d'Information de la Pêche et de l'Aquaculture (SIPA)	<b>SP1</b>	Data collection system developed within the framework of the application of maritime fisheries and aquaculture policies by the DPMA (Directorate of Maritime Fisheries and Aquaculture), which is the project manager. The SIPA covers, inter alia, the management of fishing rights, data collection, fisheries control, data processing and dissemination.
Enquêtes pêche récréative	<b>SP2</b>	Monitoring of recreational fishing through telephone surveys and monitoring of volunteer panels of fishermen.
Campagnes d'observation halieutique : évaluation des stocks	<b>SP3</b> <b>SP4</b>	Network of standardised scientific campaigns* aimed at characterising the status and medium-term evolution of exploited species, populations (of fishing interest or not) and the marine environment. Each campaign provides a quantitative representation of all pelagic, demersal and benthic species in the study area at a given time.  *By marine sub-regions:



		<u>Western Mediterranean</u> : PELMED, MEDITS <u>Bay of Biscay N/S</u> : PELGAS, ORHAGO, LANGOLF-TV, EVHOE <u>MMN</u> : IBTS, CRUSTAFLAM, CGFS <u>Celtic Sea</u> : CGFS, EVHOE
Campagnes d'observation halieutique : nurseries	<b>SP3</b> <b>SP4</b>	Network of campaigns in coastal nursery areas for benthic-demersal fish, which are essential habitats for many marine species.
Suivi des gisements locaux	<b>SP3</b> <b>SP4</b>	Monitoring of local deposits, which concern resources with a limited spatial coverage, often not shared with neighbouring Member States, and which are subject to specific assessment methods.
Campagne aérienne de suivi du thon rouge	<b>SP4</b>	Aerial bluefin tuna monitoring campaign deployed in the Gulf of Lion with the objective of counting schools of bluefin tuna in order to construct an abundance index used in stock assessments.

## 2.8 - "Eutrophication" monitoring programme

### What does this monitoring programme cover?

The "Eutrophication" monitoring programme defines the monitoring required for the continuous assessment of the environmental status of marine waters and the periodic updating of Environmental Targets (ETs) under descriptor 5 "Eutrophication" of the MSFD. Descriptor 5 is described as: "Human-induced eutrophication, especially in terms of its adverse effects, such as the loss of biodiversity, ecosystem degradation, toxic algal growth and deoxygenation of seabed waters is minimised." (Directive 2008/56/EC).

The aim of this programme is to monitor the evolution of the eutrophication process by evaluating both the pressures linked to eutrophication (i.e. monitoring of nutrient concentrations and river and atmospheric inputs of nutrients), and the direct and indirect impacts of these phenomena on the functioning of marine ecosystems and, in particular, on the biological compartments (phytoplankton, macroalgae and phanerogam beds). To do this, it is based on joint monitoring:

- base parameters describing environmental conditions (hydrology and physical chemistry);
- environmental pressure parameters describing the sources of eutrophication (river and atmospheric inputs) and their direct and indirect impacts on pelagic (phytoplankton) and benthic (extent and loss of benthic habitats) habitats.

The "Eutrophication" monitoring programme is organised into six sub-programmes:

- Sub-programme 1 - Hydrology and Physical Chemistry
  - abiotic characteristics of the environment
- Sub-programme 2 - Phytoplankton
  - includes vegetable plankton
- Sub-programme 3 - Macroalgae and phanerogam beds
  - includes macrophytes (algae and sea grass beds visible to the naked eye)
- Sub-programme 4 - Green tides
  - opportunistic algal blooms
- Sub-programme 5 - River nutrient inputs

- → nutrient inputs from rivers
- Sub-programme 6 - Atmospheric nutrient inputs
- → nutrient inputs from atmospheric deposition

Information on this monitoring programme is detailed in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

### **What are the identified elements and the elements to be reported?**

#### **Good environmental status**

Assessment of the achievement of Good Environmental Status (GES) of marine waters under descriptor 5 "Eutrophication" is based on three primary criteria (D5C1, D5C2, D5C5) and five secondary criteria (D5C3, D5C4, D5C6, D5C7, D5C8), according to Decision 2017/848/EU:

- D5C1 - Nutrient concentration: Nutrient concentrations are not at levels indicating adverse eutrophication effects.
- D5C2 - Chlorophyll a concentration: Chlorophyll-a concentrations are not at levels indicating adverse effects of nutrient enrichment.
- D5C3 - Harmful algal blooms: The number, spatial extent and duration of harmful algal blooms are not at levels that indicate adverse effects of nutrient enrichment.
- D5C4 - Photic limit (transparency) of the water column: The photic limit (transparency) of the water column is not reduced by an increase in the amount of suspended algae, to a level that indicates adverse effects related to nutrient enrichment.
- D5C5 - Dissolved oxygen concentration: Dissolved oxygen concentration is not reduced by nutrient enrichment to levels indicating adverse effects on benthic habitats (including associated biota and mobile species).
- D5C6 - Abundance of opportunistic macroalgae: The abundance of opportunistic macroscopic algae is not at a level indicating adverse effects of nutrient enrichment.
- D5C7 - Macrophyte communities of benthic habitats: The species composition and relative abundance or distribution in the depth of macrophyte communities achieves values indicating no adverse effects due to nutrient enrichment, including reduced water transparency.
- D5C8 - Macrofaunal communities of benthic habitats: The species composition and relative abundance of macrofaunal communities achieve values indicating an absence of adverse effects due to nutrient and organic enrichment.

It should be noted that criterion D5C8 is not currently assessed within the "Eutrophication" monitoring programme.

According to the Decree of 9 September 2019 on the definition of good environmental status (GES) of marine waters and the methodological standards for assessment, the indicators used to assess the state of eutrophication at the coastal zones of the French marine sub-regions correspond, for the most part, to the existing indicators under the WFD. Beyond coastal waters, the WFD indicators have been adapted (e.g. median nitrate concentrations beyond the nautical mile, P90 Chlorophyll a and P90 turbidity) and thresholds, for the time being provisional, have been defined at national level. Work on these thresholds is currently being carried out within the framework of the Regional Seas Conventions (RSCs) within the OSPAR intersessional correspondence groups and the technical groups responsible for defining the common procedure.

#### **Environmental targets**

The "Eutrophication" monitoring programme provides information on four environmental targets (ETs), relating to the reduction and/or maintenance of river nutrient inputs depending on the sensitivity of the involved areas to eutrophication, and the reduction of atmospheric nutrient inputs.

Eight indicators have been defined for the second cycle and apply to all the marine sub-regions of the MSFD, with a breakdown according to the issues and pressures identified.

Indicators 1 and 2 of ETs D05-OE01, D05-OE02 and D05-OE03 on river nutrient inputs in each marine sub-region are expected to be operational in the third assessment cycle (stabilised methods). It should be noted that ET indicators D05-OE3-Ind1 and D05-OE3-Ind2, which are concerned with not increasing nutrient inputs to areas with little or no eutrophication, are consistent with the oligotrophic character of the western Mediterranean marine sub-region.

ET indicators D05-OE01-ind3 and D05-OE02-ind3 relate to wastewater treatment before discharge into the sea. The aim is to equip coastal agglomerations with wastewater treatment plants (WWTPs) in accordance with the Urban Wastewater Treatment Directive (UWWTD), which regulates the collection, treatment and discharge of wastewater in order to limit the pollution of water by suspended solids, organic matter and nutrients of anthropogenic origin. These two ET indicators are reported by the sub-programme data collection frameworks of the "Activities, uses and public policies" part of the sea basin strategy document monitoring framework (see annex 3b).

### **What are the data collection frameworks?**

Information on the operability of the monitoring frameworks and their link with the ET/GES indicators and the sea basins is given in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

MONITORING/DATA COLLECTION FRAMEWORK	SP	DESCRIPTION
Suivis DCE - REPHY Surveillance, PHYTOBS et réseaux régionaux/ locaux	<b>SP1</b> <b>SP2</b> <b>SP5</b>	Phytoplankton and phycotoxin monitoring network + SOMLIT stations labelled within the framework of PHYTOBS (national network for observation of microphytoplankton) + regional monitoring networks (especially for nutrients).
REseau des Stations et Observatoires MARins (RESOMAR-Pelagos)	<b>SP1</b> <b>SP2</b>	Collaborative work by the French Marine Stations and Observatories Network (REseau des Stations et Observatoires MARins) on marine plankton, particularly phytoplankton, and associated environmental parameters (hydrology, physical chemistry).
Réseaux de satellites opérés par la NASA et l'ESA	<b>SP1</b> <b>SP2</b>	Surface monitoring of hydrological and physico-chemical parameters (turbidity, surface temperature), phytoplankton biomass (concentration of chlorophyll <i>a</i> ), and phytoplankton functional groups (under development).
Service d'Observation en Milieu LITtoral (SOMLIT)	<b>SP1</b> <b>SP2</b>	National Coastal and Marine Ecosystem Observation Service. In particular, it allows the monitoring of phytoplankton (chlorophyll <i>a</i> ) and the acquisition of hydrological and physico-chemical data.
Suivis stationnels REPHY Observation (hors DCE)	<b>SP1</b> <b>SP2</b>	Phytoplankton and Phycotoxin Observation Network, outside the WFD.
Modèle ECO-MARS3D	<b>SP1</b> <b>SP2</b>	Hydrodynamic/biogeochemical coupled model in the Atlantic/Channel. Allows the simulation of hydrodynamic variables and physico-chemical (nitrogenous nutrients, phosphates and silica) and biological (chlorophyll <i>a</i> concentrations) state variables. Some modules can be added to simulate the dynamics of certain harmful and/or toxic algae such as <i>Phaeocystis globosa</i> <i>Karenia mikimotoi</i> and <i>Pseudo-nitzschia</i> sp.
Modèle 3DVAR-OGSTM-BFM	<b>SP1</b> <b>SP2</b>	Biogeochemical model that can be coupled with the Med-current hydrodynamic model to acquire data on physico-chemical (nutrients, dissolved oxygen) and biological (chlorophyll <i>a</i> , phytoplankton groups) parameters.

Réseau de bouées instrumentées de capteurs multiparamétriques	<b>SP1 SP2</b>	Automated systems deployed on fixed systems ( <i>e.g.</i> buoys). This system is based on the network of buoys equipped with multi-parameter sensors (IR-ILICO Coast-HF network, SOMLIT buoy network, MOOSE network).
Impacts des Grands Aménagements (IGA)	<b>SP1 SP2</b>	Monitoring of the marine environment (hydrology, physical chemistry, phytoplankton) related to emissions from coastal nuclear power plants.
STARESO monitoring - Calvi Bay	<b>SP1 SP2</b>	Long-term monitoring of the Calvi STATION de REcherche océanographique et SOus-marine (hydrology, physical chemistry, phytoplankton). Little anthropogenic pressure, WFD reference.
Suivis du milieu pélagique des AMPs	<b>SP1 SP2</b>	Monitoring of Marine Protected Areas (in particular hydrology, physical chemistry and phytoplankton composition/biomass).
Mediterranean Ocean Observing System for the Environment (MOOSE)	<b>SP1 SP2</b>	Multi-platform (fixed stations (1), gliders (2), large-scale sea campaigns (3)) and multi-site observation system in the Mediterranean. Allows the acquisition of hydrological, physico-chemical (nutrients, turbidity, dissolved oxygen) and biological (chlorophyll a concentration) data.
DCE Benthos – Macroalgues intertidales	<b>SP3</b>	Monitoring of algal belts and directory of intertidal macroalgal species.
DCE Benthos – Macroalgues subtidales	<b>SP3</b>	Stationary monitoring network for subtidal macroalgae conducted under the WFD.
DCE Benthos – Angiospermes – stationnel – <i>Zostera marina</i>	<b>SP3</b>	Stationary monitoring network for <i>Zostera marina</i> sea grass beds conducted under the WFD.
DCE Benthos – Angiospermes – stationnel – <i>Zostera noltei</i>	<b>SP3</b>	Stationary monitoring network for sea grass beds with <i>Zostera noltei</i> .
DCE Benthos – Angiospermes – surfacique – <i>Zostera noltei</i>	<b>SP3</b>	Surface monitoring network for sea grass beds with <i>Zostera noltei</i> .
DCE Benthos – Angiospermes – surfacique – <i>Zostera noltei</i>	<b>SP3</b>	Surface monitoring network of <i>Zostera marina</i> sea grass beds.
Suivi DCE marées vertes	<b>SP4</b>	Monitoring of green tides in the Channel and the Atlantic through aerial fly overs and surveys of municipalities, carried out by CEVA (Centre d'Etude et de Valorisation des Algues) for the WFD.
Réseau des stations de mesures de débits fluviaux de la banque HYDRO	<b>SP5</b>	(HYDRO) database populated by the State, flood forecasting services, departmental directorates of agriculture and forestry, water agencies, but also by Electricité de France, research organisations and development companies.
Suivi DCE des eaux de surface continentales	<b>SP5</b>	Aims to draw up a coherent and complete picture of the state of the water in each river basin by monitoring hydrological (temperature, salinity) and physico-chemical (nutrients, oxygen balance) parameters
European Monitoring and Evaluation Program (EMEP)	<b>SP6</b>	Cooperative Programme for Monitoring and Assessing the Long-range Transmission of Air Pollutants in Europe. Nitrogen fluxes from atmospheric deposition are calculated from emission data coupled with an atmospheric chemical transport model.
Mediterranean Ocean Observing System for the Environment (MOOSE) - monitoring atmospheric deposits	<b>SP6</b>	Monitoring of atmospheric deposits (dry (1) and wet (2)) from the Cap Béar, Frioul and Cap Ferrat stations in the western Mediterranean. The challenge for MOOSE is to maintain a network that separates anthropogenic inputs from Europe from natural terrigenous inputs from North Africa (Saharan inputs).

## 2.9 - "Seabed Integrity" Monitoring Programme

### What does this monitoring programme cover?

The "Seabed Integrity" Monitoring Programme defines the monitoring required for the continuous assessment of the environmental status of marine waters and the periodic updating of Environmental Targets (ETs) under:

- descriptor 1 "Biodiversity" of the MSFD for the component "Benthic habitats", described as: "Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions." (Directive 2008/56/EC).
- descriptor 6 "Seabed Integrity" of the MSFD, described as: "Sea-floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected." (Directive 2008/56/EC).

The aim of this programme is to monitor the extent and intensity of physical pressures generated by anthropogenic activities and uses likely to have an effect on the seabed integrity, both on the coast and offshore, in order to characterise the resulting sedimentary and morphological changes. It will also be necessary to determine whether these changes are reversible (known as physical disturbance) or whether they are permanent (known as physical loss) and to assess the potentially adverse effects on benthic habitats.

The anthropogenic activities and uses considered by this monitoring programme are coastal and offshore structures, selective extraction of materials from the sea and beach nourishment, dredging and dumping of materials at sea, anchoring, aquaculture, and professional and recreational fishing. To do this, it relies on joint monitoring:

- of activities and uses of the environment (surface area of the areas exploited, duration and intensity of activities, typical parameters of each activity, etc.),
- of the pressures of these activities on the topography and nature of the seabed.

It should be noted that the implementation of the "Seabed Integrity" monitoring programme is partly shared with the "Activities, uses and public policies" part of the monitoring framework, as set out in the sea basin strategy documents (see annex 3b).

The "Seabed Integrity" monitoring programme is organised into seven sub-programmes corresponding to the main anthropogenic activities that are sources of physical pressure on the seabed:

- Sub-programme 1 - Coastal and seabed artificialization
- Sub-programme 2 - Selective extraction of material from the sea and beach nourishment
- Sub-programme 3 - Dredging and dumping of materials at sea
- Sub-programme 4 - Anchorings
- Sub-programme 5 - Aquaculture
- Sub-programme 6 - Professional fishing
- Sub-programme 7 - Recreational fishing

Information on this monitoring programme is detailed in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

## **What are the identified elements and the elements to be reported?**

### **Good environmental status**

Assessment of the achievement of good environmental status (GES) of marine waters under descriptor 6 is based on five primary criteria according to Decision 2017/848/EU. The "Seabed Integrity" Monitoring Programme defines the monitoring required for the following three primary criteria:

- D6C1 - Physical loss of the seabed; Spatial extent and distribution of physical loss (permanent change) of the natural seabed, including intertidal areas
- D6C2 - Physical disturbance to the seabed; Spatial extent and distribution of physical disturbance pressures on the seabed, including intertidal areas.
- D6C3 - Adverse effects due to physical disturbances: Spatial extent of each habitat type adversely affected through changes in biotic and abiotic structure and function (e.g. changes in species composition and their relative abundance, absence of particularly sensitive or fragile species or species providing a key function, size structure of species) due to physical disturbance.

Criteria D6C4 and D6C5, relating to the surface areas of benthic habitats impacted, are reported by the joint monitoring of the seabed and benthic habitats, implemented respectively in the "Seabed integrity" and "Benthic habitats" monitoring programmes.

According to the Decree of 9 September 2019 on the definition of good environmental status (GES) of marine waters and the methodological standards for assessment, criteria D6C1, D6C2, D6C3 are each assessed by a set of indicators relating to certain activities, depending on whether the activity is a source of physical loss, physical disturbance, and adverse effects due to disturbance.

It should be noted that the indicators related to criteria D6C1 and D6C2 (physical losses and physical disturbances), for material extraction, are only defined for the MMN, Celtic Sea and Bay of Biscay marine sub-regions, due to the absence of this industrial activity in the western Mediterranean marine sub-region.

### **Environmental targets**

The "Seabed Integrity" monitoring programme provides information on a number of environmental targets (ETs) for benthic habitats, seabed integrity and sea birds. These objectives concern disturbance and loss of habitats due to artificialization (D06-OE01 and D01-OM-OE03), maritime structures and activities (D06-OE02), foot fishing (D01-HB-OE03), extraction of materials (D01-HB-OE11), anchoring and bottom fishing gear (D01-HB-OE05, D01-HB-OE09 and D01-HB-OE10).

A set of indicators has been defined for the environmental targets (ETs) relating to physical pressures and seabed integrity. All of the frameworks in the "Seabed Integrity" monitoring programme, as well as the sub-programme data collection frameworks of the "Activities, uses and public policies" part of the sea basin strategy document monitoring framework (see annex 3b), can be used to report these Environmental Target (ET) indicators. It should be noted that indicator D06-

OE02-ind1 does not require monitoring to be reported, as the obligation to ensure that offshore authorisations and SDAGEs are compatible with environmental targets (defined in Article L. 219-4 of the Environmental Code) is sufficient to guarantee that the target associated with this indicator is achieved.

### **What are the data collection frameworks?**

Information on the operability of the monitoring frameworks and their link with the ET/GES indicators and the sea basins is given in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

<b>MONITORING/DATA COLLECTION FRAMEWORK</b>	<b>SP</b>	<b>DESCRIPTION</b>
Base de données Artificialisation DCE-DCSMM	<b>SP1</b>	Monitoring of the areas artificially modified by coastal and coastal area structures and developments (Source: BRGM-Cerema)
Côtes MEditerranéennes françaises : inventaire et impact des Aménagements gagnés sur le domaine Marin (MEDAM)	<b>SP1</b>	Inventory of building work at sea for the French Mediterranean coast. The database covers the inventory of structures built at sea and larger than 100 m <sup>2</sup> and provides a map display.
Titres miniers et autorisations de travaux relatifs à l'extraction de granulats	<b>SP2</b>	Collection of data, in map format (GIS), of the perimeters of marine material extraction sites authorised or under instruction and of research permits applied for in metropolitan France. Source/Producer: IFREMER
Cadastre minier numérique ouvert : titres miniers et autorisations (CAMINO)	<b>SP2</b>	Digital services portal including an interactive map of the national mining area and ongoing projects.
Enquête nationale sur les dragages des ports maritimes ("enquête dragage")	<b>SP3</b>	Annual survey aimed at collecting a set of data and information relating to port dredging and sediment dumping operations, such as the quantities of sediments dredged, the techniques used, their destination, the level of contamination of the sediments compared to the reference level Source: CEREMA
Observatoire aérien des usages en Méditerranée (MEDOBS)	<b>SP4</b>	Aerial observatory of uses at sea, information relating to the location and quantification of the pressures of uses at sea (water sports, aquaculture farms, fishing, scuba diving, etc.) and more particularly the anchoring of recreational boats is listed and geolocated.
Zones de mouillage réglementées	<b>SP4</b>	Data on the extent of regulated anchorage areas. Source: DDTM
Cadastres aquacoles	<b>SP5</b>	Surface data of the exploited areas. Source/Producer: Cerema/DDTM-DIRM
Système de surveillance des navires de pêche- données VMS	<b>SP6</b>	Satellite monitoring system for fishing vessels, mandatory for professional fishing vessels over 12 metres in length, under EU flag, since 1 January 2012. It provides data on the position, course and speed of vessels to the fishing authorities at regular intervals. Source/Producer: DPMA/FIS
Suivi de la fréquentation des pêcheurs et suivi des enquêtes pêcheurs à pied de loisir (BD ESTAMP)	<b>SP7</b>	Monitoring of fishermen numbers and monitoring of recreational foot fishermen surveys. The data is stored in the ESTAMP database.



## 2.10 - "Hydrographical changes" monitoring programme

### **What does this monitoring programme cover?**

The "Hydrographical Changes" monitoring programme defines the monitoring required for the continuous assessment of the environmental status of marine waters and the periodic updating of Environmental Targets (ETs) under Descriptor 7 "Hydrographical Changes" of the MSFD. Descriptor 7 is described as: "Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems." (Directive 2008/56/EC).

The objective of this programme is to monitor the extent, distribution and intensity of permanent changes in hydrographical conditions (changes in seabed type, bathymetry, current, tidal and wave systems, temperature, salinity and turbidity) generated by anthropogenic activities and uses on the seabed and water column, both on the coast and offshore. The next step will be to assess whether permanent changes in hydrographical conditions may impact benthic habitats and to determine the extent of the risk of adverse effects by major benthic habitat type.

The anthropogenic activities and uses considered by this monitoring programme are coastal and offshore structures, selective extraction of materials at sea, dredging and dumping of materials at sea, aquaculture, power plants, underwater cables and pipelines, and professional fishing. To do this, it is based on joint monitoring:

- of activities and uses of the environment (areas exploited, duration and intensity of activities, typical parameters of each activity, etc.),
- of the hydrographic modifications generated by these activities.

It should be noted that the implementation of the "Hydrographical Changes" monitoring programme is partly shared with the "Activities, uses and public policies" part of the sea basin strategy document monitoring framework (see annex 3b).

The "Hydrographical Changes" monitoring programme is organised into four sub-programmes:

- Sub-programme 1 - Hydrodynamic and hydrological changes related to anthropic activities
- Sub-programme 2 - Physico-chemical changes related to anthropic activities
- Sub-programme 3 - Morpho-sedimentary changes of the seabed related to anthropic activities
- Sub-programme 4 - Background data on abiotic hydrographical conditions

Information on this monitoring programme is detailed in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

### **What are the identified elements and the elements to be reported?**

## Good environmental status

Assessment of the achievement of good environmental status (GES) of marine waters under descriptor 7 'Hydrographical changes' is based on two sub-criteria, according to Decision 2017/848/EU, one assessing the levels of pressures associated with changing hydrographical conditions (D7C1), and the other (D7C2), the impact of these pressures on benthic habitats:

- D7C1 - Permanent change in hydrographical conditions: Spatial extent and distribution of permanent changes in hydrographical conditions (e.g. changes in wave action, currents, salinity, temperature) on the seabed and in the water column, associated, in particular, with physical loss of the natural seabed.
- D7C2 - Adverse effects due to permanently altered hydrographical conditions: Spatial extent of each benthic habitat type adversely affected (physical and hydrographical features and associated biological communities) due to permanent changes in hydrological conditions.

It should be noted that the "Hydrographical changes" monitoring programme also provides data for criteria D1C6 (Characteristics of the pelagic habitat type) and D6C5 (Extent of adverse effects on the status of the benthic habitat type) (see "Pelagic habitats" and "Benthic habitats" monitoring programmes).

According to the Decree of 9 September 2019 on the definition of good environmental status (GES) of marine waters and the methodological standards for assessment, two GES indicators have been defined to assess criteria D7C1 and D7C2. In the second cycle of the GES assessment, seven pressures relating to hydrographical conditions were considered (changes in the type of seabed and current, tidal, wave, temperature, salinity and turbidity systems) and initial estimates were provided of the exposure indices of spatial extents potentially subject to hydrographical pressures and the spatial extent of benthic habitats potentially subject to cumulative risks of alteration. However, the incompleteness and uncertainties of the input data (unavailable data, insufficient time series or insufficient data quality, incompleteness of data, etc.), the ongoing methodological developments of the indicators and the lack of thresholds did not allow the assessment of criteria D7C1 and D7C2.

## Environmental targets

In the second cycle of implementation of the environmental targets (ETs), four ETs were defined to avoid anthropogenic changes in hydrographical conditions.

Eight operational ET indicators have been defined for the second cycle. Three ET indicators are only reported by the sub-programme data collection frameworks of the "Activities, uses and public policies" part of the sea basin strategy document monitoring framework (see annex 3b) and the other five ET indicators do not need to be monitored in order to be reported, as the obligation to ensure that offshore authorisations and SDAGEs are compatible with environmental targets (defined in Article L. 219-4 of the Environmental Code) is sufficient to guarantee that the target associated with these indicators is achieved.

### What are the data collection frameworks?

Information on the operability of the monitoring frameworks and their link with the ET/GES indicators and the sea basins is given in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

MONITORING/DATA COLLECTION FRAMEWORK	SP	DESCRIPTION
REPHY Surveillance	SP1 SP2	Phytoplankton and phycotoxin monitoring network. This system also collects data on temperature, salinity, turbidity, dissolved oxygen, chlorophyll, nutrients (N, P, Si).
Base de données Artificialisation DCE-DCSMM	SP1 SP2 SP3	Monitoring of the areas artificially modified by coastal and coastal area structures and developments (Source: BRGM-Cerema)
Côtes MEditerranéennes françaises : inventaire et impact des Aménagements gagnés sur le domaine Marin (MEDAM)	SP1 SP2 SP3	Inventory of building work at sea for the French Mediterranean coast. The database covers the inventory of structures built at sea and larger than 100 m <sup>2</sup> and provides a map display.
Titres miniers et autorisations de travaux relatifs à l'extraction de granulats	SP1 SP2 SP3	Collection of data, in map format (GIS), of the perimeters of marine material extraction sites authorised or under instruction and of research permits applied for in metropolitan France. Source/Producer: IFREMER
Cadastres aquacoles	SP1 SP2 SP3	Surface data of the exploited areas. Source/Producer: Cerema/DDTM-DIRM
Enquête nationale sur les dragages des ports maritimes ("enquête dragage")	SP1 SP2 SP3	Annual survey aimed at collecting a set of data and information relating to port dredging and sediment dumping operations, such as the quantities of sediments dredged, the techniques used, their destination, the level of contamination of the sediments compared to the reference level Source: CEREMA
Implantation des centrales électriques (Source : EDF-ENGIE)	SP1 SP2 SP3	Location of power plants, type of plants (nuclear, gas, etc.) and total area (spatial extent) of power plants in the coastal zone. Source: EDF-ENGIE
Zones de protection des centrales nucléaires (Source/Producteur : IAEA)	SP1 SP2 SP3	Security perimeters around nuclear power plants. Source: International Atomic Energy Agency (IAEA)
Câbles et conduites sous-marins (Source : Shom)	SP1 SP2 SP3	Geographical position, nature, nationality and name of the cables
Système de surveillance des navires de pêche - données VMS	SP2 SP3	Satellite monitoring system for fishing vessels, mandatory for professional fishing vessels over 12 metres in length, under EU flag, since 1 January 2012. It provides data on the position, course and speed of vessels to the fishing authorities at regular intervals. Source/Producer: DPMA/FIS

Modèle numérique de circulation de l'océan (HYCOM)	<b>SP4</b>	The HYCOM is a numerical model of ocean evolution (current, temperature, salinity, water level).
Post-production données d'océanographie côtière opérationnelle (OCO)	<b>SP4</b>	Results from the Hybrid Coordinate Ocean model (HYCOM).
Réseaux de satellites opérés par la NASA et l'ESA	<b>SP4</b>	Surface monitoring of hydrological and physico-chemical parameters (turbidity, surface temperature), phytoplankton biomass (concentration of chlorophyll <i>a</i> ), and phytoplankton functional groups (under development).

## 2.11 - "Contaminants" monitoring programme

### What does this monitoring programme cover?

The "Contaminants" monitoring programme defines the monitoring required for the continuous assessment of the environmental status of marine waters and the periodic updating of Environmental Targets (ETs) under descriptor 8 "Contaminants" of the MSFD. Descriptor 8 is described as: "Concentrations of contaminants are at levels not giving rise to pollution effects." (Directive 2008/56/EC).

The "Contaminants" monitoring programme is organised into five sub-programmes:

- Sub-programme 1 - Chemical contaminants in marine organisms
- Sub-programme 2 - Chemical contaminants in the environment
- Sub-programme 3 - Effects of contaminants on marine organisms
- Sub-programme 4 - River inputs of contaminants
- Sub-programme 5 - Acute pollution events

Information on this monitoring programme is detailed in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

### What are the identified elements and the elements to be reported?

#### Good environmental status

Assessment of the achievement of Good Environmental Status (GES) of marine waters under descriptor 8 "Contaminants" is based on two primary pressure criteria (D8C1 and D8C3) and two secondary impact criteria (D8C2 and D8C4), according to Decision 2017/848/EU:

- D8C1 - Contaminants in the environment: Within coastal, territorial and offshore waters, contaminant concentrations do not exceed threshold values.
- D8C2 - Effects of contaminants on species and habitats: The health of species and the condition of habitats are not adversely affected by contaminants, including cumulative and synergistic effects.
- D8C3 - Significant events of acute pollution: The spatial extent and duration of significant acute pollution events are minimised.

- D8C4 - Effects of significant acute pollution events: The adverse effects of significant acute pollution events on the health of species and on the condition of habitats (such as species composition and relative abundance) are minimised and, where possible, eliminated.

According to the Decree of 9 September 2019 on the definition of good environmental status (GES) of marine waters and the methodological standards for assessment:

- Three types of GES indicators can be used to assess criterion D8C1 depending on the matrix used (bivalve molluscs, fish and sediment). It should be noted that in the coastal zone, work is underway to standardise the parameters, thresholds and assessment methods for criterion D8C1 between the WFD and the MSFD
- Three GES indicators are used to report criterion D8C2 depending on the species considered (health status of gastropods, health status of bivalves, health status of fish). Work is underway on the methodological development of these GES indicators, on thresholds in particular, integration methods and assessment levels
- A GES indicator is defined to input into criterion D8C4, but could not be assessed in the second cycle of the GES assessment due to lack of representativeness and disparity of data
- No GES indicator could be defined for criterion D8C3 mainly due to the incompatibility of data from POLREP reports and the definition of this criterion in Decision 2017/848/EU.

## Environmental targets

In the second cycle of implementing the environmental targets (ETs), seven ETs were defined to enable the reduction of contaminant inputs into the marine environment.

Thirteen operational ET indicators have been defined for the second cycle and apply to all marine sub-regions of the MSFD:

- Four ET indicators (D08-OE02-ind1, ind2 and ind3; D08-OE07-ind3) are reported by sub-programmes 3 and 5 of the "Contaminants" monitoring programme.
- Seven ET indicators (D08-OE01-ind1; D08-OE03-ind1 and ind2; D08-OE04-ind1; D08-OE06-ind1 and ind2; D08-OE07-ind2) are reported by the sub-programme data collection frameworks of the "Activities, uses and public policies" part of the sea basin strategy document monitoring framework (see annex 3b).
- Two ET indicators (D08-OE05-ind1 and ind2) do not require monitoring to be reported as the obligation to ensure that offshore authorisations and SDAGEs are compatible with environmental targets (defined in Article L. 219-4 of the Environmental Code) is sufficient to guarantee that the target associated with these indicators is achieved.

## What are the data collection frameworks?

Information on the operability of the monitoring frameworks and their link with the ET/GES indicators and the sea basins is given in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

MONITORING/DATA COLLECTION FRAMEWORK	SP	DESCRIPTION
Réseau d'Observation de la Contamination CHimique - Matière Vivante (ROCCH-MV)	SP1	Coastal monitoring stations for chemical contaminants (metals, organochlorines and polycyclic aromatic hydrocarbons) in bivalve molluscs.

MONITORING/DATA COLLECTION FRAMEWORK	SP	DESCRIPTION
Réseau INTégrateurs BIOlogiques (RINBIO)	SP1	Coastal monitoring stations for chemical contaminants (metals, organochlorines and polycyclic aromatic hydrocarbons) in active bivalve molluscs.
Campagnes halieutiques DCF optimisées - Contaminants dans les réseaux trophiques (CoRePh plateau/ Contamed)	SP1	Offshore monitoring of contaminants (metals and organochlorines) in fish and cephalopods.
Réseau d'Observation de la Contamination Chimique – Sédiment (ROCCH-sédiment)	SP2	Monitoring stations for chemical contaminants (metals, organochlorines, TBT and polycyclic aromatic hydrocarbons) in sediment.
RÉseau national de surveillance de la qualité des eaux et des sédiments des PORTS Maritimes (REPOM)	SP2	Monitoring of contaminants (metals, organochlorines, TBT and polycyclic aromatic hydrocarbons) in the sediment of maritime ports.
Réseau Imposex	SP3	Monitoring the effect of TBT on coastal gastropods ( <i>Nucella lapilus</i> ) at selected coastal monitoring stations of the ROCCH network.
Réseau de Mesure de la Toxicité (REMTOX)	SP3	Monitoring the toxic potential of sediments on the embryo-larval development of marine bivalves ( <i>Crassostrea gigas</i> ).
Banque HYDRO de débits fluviaux	SP4	(HYDRO) database populated by the State, flood forecasting services, departmental directorates of agriculture and forestry, water agencies, but also by Electricité de France, research organisations and development companies.
Suivi DCE des eaux de surface continentales	SP4	Monitoring stations for mainland surface water quality within each river basin.
Données issues des rapports de pollution POLREP des CROSS	SP5	CEDRE database bringing together information from POLREP reports of the Regional Monitoring and Rescue Operational Centres (CROSS): date, position and extent of the pollution, wind strength and direction, sea status, pollution features, and source of the pollution when known
Suivi des oiseaux échoués sur les littoraux normands et Hauts de France	SP5	Monitoring of dead beached birds during winter on the coasts of Nord-Pas-de-Calais, Picardie and Normandy respectively by the associations Groupe Ornithologique et Naturaliste du Nord-Pas-de-Calais (GON), Picardie Nature (PN) and Groupe Ornithologique Normand (GONm)

## 2.12 - "Health issues" monitoring programme

### What does this monitoring programme cover?

The "Health Issues" monitoring programme defines the monitoring required for the continuous assessment of the environmental status of marine waters and the periodic updating of Environmental Targets (ETs) under descriptor 9 "Health Issues" of the MSFD. Descriptor 9 is described as: "Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards" (Directive 2008/56/EC).

The "Health Issues" monitoring programme is organised into three sub-programmes:

- Sub-programme 1 - Chemical contaminants in marine organisms

- Sub-programme 2 - Phycotoxin contamination of shellfish
- Sub-programme 3 - Microbiological contamination

Information on this monitoring programme is detailed in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

### **What are the identified elements and the elements to be reported?**

#### **Good environmental status**

Assessment of the achievement of good environmental status (GES) of marine waters under descriptor 9 "Health issues" is based on the sole primary criterion, according to Decision 2017/848/EU:

- D9C1 - Contaminants in seafood for human consumption: The level of chemical contaminants in edible tissues (muscle, liver, roe, flesh or other soft parts, as appropriate) of seafood (fish, crustaceans, molluscs, echinoderms, algae and other marine plants) caught or harvested in the natural environment (excluding fish from aquaculture) does not exceed the thresholds for good environmental status.

This criterion provides information on the levels of chemical contaminants listed in Regulation (EC) No 1881/2006 setting maximum content levels for certain contaminants in foodstuffs. Furthermore, in the Decree of 9 September 2019 on the definition of good environmental status (GES) of marine waters and the methodological standards for assessment, France has included phycotoxins in the assessment of criterion D9C1 and added a national criterion:

D9C2 - Pathogenic microbiological contamination: The level of pathogenic microbiological contaminants in molluscs caught or collected in the natural environment and in swimming waters does not exceed the regulatory thresholds.

This choice is based, on the one hand, on the health risk represented by microbiological and phycotoxic contamination and, on the other hand, on the (partly) anthropogenic origin of these various contaminations.

According to the Decree of 9 September 2019 on the definition of good environmental status (GES) of marine waters and the methodological standards for assessment, four GES indicators can be used to assess criteria D9C1 and D9C2. The thresholds for exceeding these GES indicators are set by different European regulations, however, consideration is being given to the threshold for concluding on GES (i.e. the permitted frequency of exceeding the regulatory threshold). During the second cycle of the GES assessment, the GES threshold was set at 0% exceedance of the maximum regulatory limits for each of the indicators, which means that the GES is not achieved in the marine sub-region for a single exceedance out of several dozen or even hundreds of measurements.

#### **Environmental targets**

In the second implementation cycle of the environmental targets (ETs), ET D09-OE01 was defined to reduce direct transfers of microbiological pollutants, in particular to swimming areas and shellfish production areas.

To meet this environmental target, two indicators (D09-OE01-ind1 and D09-OE01-ind2) have been defined for the second cycle and apply to all marine sub-regions. The monitoring frameworks of sub-programme 3 relating to microbiological contamination (REMI and sea swimming water quality reviews) and the sub-programmes of the data collection frameworks of the "Activities, uses and public policies" part of the sea basin strategy document monitoring framework (see annex 3b) are used to provide information on these ET indicators.



### What are the data collection frameworks?

Information on the operationality of the monitoring frameworks and their link with the ET/GES indicators and the sea basins is given in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

MONITORING/DATA COLLECTION FRAMEWORK	SP	DESCRIPTION
Réseau d'Observation de la Contamination CHimique - Matière Vivante (ROCCH-MV)	<b>SP1</b>	Coastal monitoring stations for chemical contaminants (metals, organochlorines and polycyclic aromatic hydrocarbons) in bivalve molluscs.
Campagnes halieutiques DCF optimisées - Contaminants dans les réseaux trophiques (CoRePh plateau/ Contamed)	<b>SP1</b>	Offshore monitoring of contaminants (metals and organochlorines) in fish and cephalopods.
Les Plans de surveillance et plans de contrôle (PSPC) de la Direction Générale de l'Alimentation (DGAI)	<b>SP1</b> <b>SP2</b> <b>SP3</b>	Monitoring of chemical, phycotoxin and microbiological contamination in unprocessed seafood.
Réseau de surveillance des phycotoxines dans les organismes marins (REPHYTOX)	<b>SP2</b>	Coastal monitoring stations for phycotoxins in shellfish (diarrhoeal toxins (DSP), paralytic shellfish poison (PSP) and amnesic shellfish poison (ASP)).
REseau de contrôle MIcrobiologique (REMI)	<b>SP3</b>	Microbiological monitoring of shellfish production areas to control the level of contamination of the bacterium <i>Escherichia coli</i> in bivalve molluscs.
Bilans de la qualité des eaux de baignade en mer	<b>SP3</b>	Sanitary control of swimming waters, implemented by the Regional Health Agencies, to monitor contamination of <i>Escherichia coli</i> and intestinal enterococci in the water.

## 2.13 - "Marine litter" monitoring programme

### What does this monitoring programme cover?

The "Marine Litter" monitoring programme defines the monitoring required for the continuous assessment of the environmental status of marine waters and the periodic updating of Environmental Targets (ETs) under descriptor 10 "Marine Litter" of the MSFD. Descriptor 10 is described as: "Properties and quantities of marine litter do not cause harm to the coastal and marine environment" (Directive 2008/56/EC).

The aim of this programme is to acquire data to assess the composition, quantity and spatial distribution of the litter present in the environment and its evolution, as well as its impact on marine fauna. To do this it is based on joint monitoring:

- of pressures on the environment (macro-litter on the coastline including estuaries, floating macro-litter, macro-litter on the seabed, micro-litter in the water column and in coastal sediments),
- of the impacts of litter on sea birds, marine mammals and sea turtles (ingestion, entanglement, strangulation).

The "Marine Litter" monitoring programme is organised into nine sub-programmes grouped into three themes:

- Coastal and river basin litter (sub-programmes 1 to 3)
  - o Sub-programme 1 - Macro-litter on the coast

- Sub-programme 2 - Macro-litter from river basins
- Sub-programme 3 - Micro-litter on the coast
- Litter at sea (sub-programmes 4 to 6)
  - Sub-programme 4 - Floating macro-litter
  - Sub-programme 5 - Macro-litter on the seabed
  - Sub-programme 6 - Floating micro-litter
- Interactions between marine fauna and marine litter (sub-programmes 7 to 9).
  - Sub-programme 7 - Litter ingested by birds
  - Sub-programme 8 - Litter ingested by marine mammals and sea turtles
  - Sub-programme 9 - Fauna entanglement by litter

Information on this monitoring programme is detailed in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

### **What are the identified elements and the elements to be reported?**

#### **Good environmental status**

Assessment of the achievement of good environmental status (GES) of marine waters under descriptor 10 "Marine litter" is based on two primary criteria (D10C1 and D10C2) and two secondary criteria (D10C3 and D10C4), according to Decision 2017/848/EU:

- D10C1 - Litter (excluding micro-litter): The composition, amount and spatial distribution of litter on the coastline, on the surface of the water column and on the seabed are at levels that do not harm the coastal and marine environment.
- D10C2 - Micro-litter: The composition, amount and spatial distribution of micro-litter on the coastline, at the surface of the water column and in the seabed sediments are at levels that do not harm the coastal and marine environment.
- D10C3 - Ingested litter: The amount of litter and micro-litter ingested by marine animals is at a level that does not harm the health of the species concerned.
- D10C4 - Adverse effects of litter: Number of individuals of each species which are adversely affected due to litter (entanglement and other types of injury or mortality) or health problems.

According to the Decree of 9 September 2019 on the definition of good environmental status (GES) of marine waters and the methodological standards for assessment, six GES indicators can be used to assess criteria D10C1, D10C2 and D10C3. These indicators have been developed in the framework of the European MSFD Working Group on Marine Litter (TG Marine Litter) and are shared with other Member States. Work on the definition of thresholds for exceeding these GES indicators is still ongoing in this working group, in order to propose a common definition of thresholds.

It should be noted that the indicator for criterion D10C3 on litter ingested by birds is currently only defined for the MMN marine sub-region. For the other marine sub-regions, the methodological standards for this indicator will be specified following further studies.

The indicator for criterion D10C4 for assessing the adverse effects of litter is not yet operational and is undergoing methodological developments.

#### **Environmental targets**

The "Marine litter" monitoring programme provides information on two environmental targets (ETs), concerning both terrestrial litter found at sea and on the coast (D10-OE1) and litter at sea from maritime activities, uses and developments (D10-OE2).

Three indicators have been defined for the second cycle and apply to all marine sub-regions. The monitoring frameworks of sub-programmes 1 and 5, relating respectively to macro-litter on the coast ("National Monitoring Network for Macro-Litter on the Coast") and macro-litter on the seabed ("Optimised DCF Fishing Campaigns - Seabed Litter"), provide information for indicators D10-OE01-ind1 and D10-OE02-ind1. Indicator D10-OE02-ind2 is reported by the sub-programme data collection frameworks of the "Activities, uses and public policies" part of the sea basin strategy document monitoring framework (see annex 3b).

### **What are the data collection frameworks?**

Information on the operability of the monitoring frameworks and their link with the ET/GES indicators and the sea basins is given in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

MONITORING/DATA COLLECTION FRAMEWORK	SP	DESCRIPTION
Réseau National de Surveillance des Macro-Déchets sur le Littoral (RNS-MD-L)	SP1	Macro-litter monitoring network, with sites spread over the entire coastline of Metropolitan France
Campagnes aériennes de suivi de la mégafaune marine et des macro-déchets flottants à large échelle (SAMM, SCANS, ASI)	SP4	Fly overs of the metropolitan maritime area and its bordering zones for the observation of sea birds, marine mammals, other species of pelagic megafauna and human activities (floating litter).
Campagnes halieutiques DCF optimisées – Mégafaune marine et macro-déchets flottants (programme Megascope)	SP4	Monitoring marine megafauna, floating litter and human activities by observers on board Ifremer vessels during the annual benthic-demersal fishing campaigns (IBTS, PELGAS, PELMED, CGFS and EVHOE).
Campagnes de suivi de la mégafaune marine et des macro-déchets flottants depuis des navires d'opportunité	SP4	Monitoring of marine megafauna, floating litter and human activities by observers on board maritime platforms of opportunity (commercial passenger lines (ferries) or government ships at sea), according to the Megascope protocol or an equivalent protocol.
Campagnes halieutiques DCF optimisées – Déchets de fond	SP5	Monitoring of seabed macro-litter via the annual benthic-demersal fishing campaigns (IBTS, CGFS, MEDITS, EVHOE) collected by trawling.
Campagnes halieutiques DCF optimisées – Micro-déchets	SP6	Monitoring of floating micro-litter in the sub-surface, using a Manta net following the annual fishing campaigns (IBTS, CGFS, EVHOE).
Campagnes DCE triennales en Méditerranée occidentale – Micro-déchets	SP6	Monitoring of floating micro-litter at the surface, using a Manta net following the WFD multidisciplinary campaigns.
Suivi des oiseaux échoués sur les littoraux normands et Hauts de France	SP7	Monitoring of micro-litter present in the stomachs of northern fulmars beached on the MMN coastline (Picardy, Normandy, Nord) according to the OSPAR protocol.
Réseaux de suivi des échouages des tortues marines (RTMAE, RTMMF)	SP8 SP9	Monitoring sea turtle stranding on the French coastline, by RTMMF correspondents in the western Mediterranean, coordinated by the Société Herpétologique de France, and by the RTMAE in the Atlantic, coordinated by the La Rochelle Aquarium.
Réseau National Echouage des mammifères marins (RNE)	SP8 SP9	Monitoring marine mammal beaching on the French coastline, by RNE correspondents, coordinated at national level by the PELAGIS monitoring centre.
Suivi des macro-déchets dans les nids de cormorans huppés	SP9	Monitoring of the amount of macro-litter in European shag nests, carried out at several sites and colonies (Iroise Natural Marine Park, Breton colonies, Norman colonies, Corsican colonies and Channel-North Sea colonies).

## 2.14 -

## 2.15 - "Underwater noise" monitoring programme

### **What does this monitoring programme cover?**

The "Underwater Noise" monitoring programme defines the monitoring required for the continuous assessment of the environmental status of marine waters and the periodic updating of Environmental Targets (ET) under the descriptor 11 "Underwater noise" of the MSFD. Descriptor 11 is described as: "The introduction of energy, including underwater sound sources, shall be at levels that do not harm the marine environment." (Directive 2008/56/EC).

The aim of this programme is to acquire the data needed to monitor the noise status of metropolitan waters (spatial and temporal distribution of the main anthropogenic noise pressures as well as their intensity) and to assess the impacts of anthropogenic noise on underwater fauna.

The "Underwater Noise" monitoring programme is therefore based on a threefold strategy:

- collect data from noise-generating activities (continuous and impulsive) in order to model underwater noise in terms of spatial and temporal distribution taking into account noise levels;
- measuring underwater noise in situ;
- quantify noise disturbance and study its effects on sensitive species.

The "Underwater Noise" monitoring programme is organised into four sub-programmes broken down by theme:

- Sub-programme 1 - Continuous emissions
  - collection of data on maritime traffic and continuous noise modelling
- Sub-programme 2 - Impulsive emissions
  - collection of data on activities generating impulsive emissions and estimation of the spatial and temporal distribution of these emissions
- Sub-programme 3 - In situ underwater noise measurements
  - in situ underwater noise measurement (continuous and impulsive emissions)
- Sub-programme 4 - Effects of noise disturbance on sensitive species
  - quantification of noise disturbance and study of its effects on sensitive species

Information on this monitoring programme is detailed in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

### **What are the identified elements and the elements to be reported?**

#### **Good environmental status**

Assessment of the achievement of good environmental status (GES) of marine waters under descriptor 11 "Underwater noise" is based on two primary criteria, according to Decision 2017/848/EU:

- D11C1 - Anthropogenic impulsive noise: The spatial distribution, temporal extent and levels of anthropogenic impulsive sound sources do not exceed levels that adversely affect populations of marine animals.
- D11C2 - Low-frequency anthropogenic continuous noise: The spatial distribution, temporal extent and level of anthropogenic continuous sound do not exceed levels that adversely affect populations of marine animals.

In the second cycle of the GES assessment in 2018, due to the lack of consensus among Member States on the definition of quantitative thresholds, the achievement or non-achievement of GES under descriptor 11 could not be assessed. Nevertheless, according to the Decree of 9 September 2019 on the definition of good environmental status (GES) of marine waters and the methodological standards for assessment, a methodology is proposed based on indicators characterising three types of risk for marine mammals:

- acoustic discomfort (risk of disturbance)
- masking of baleen whale communications (risk of masking)
- excessive mortality rate from noise exposure (risk of excessive mortality rate).

Consultation at European level, in particular within the TG Noise (see 2.3.2), is necessary to establish relevant thresholds and to enable a quantitative assessment of GES under descriptor 11.

### **Environmental targets**

During the second cycle of implementing the environmental targets (ETs), two ETs were defined to reduce noise levels from impulsive emissions and to maintain or reduce continuous noise levels.

Three operational indicators were defined for the second cycle: indicator D11-OE01-Ind1 on the spatial extent of impulsive emissions, indicator D11-OE02-Ind1 on the maximum level and spatial extent of continuous noise, and indicator D11-OE01-Ind2, which does not require any monitoring to be reported as the obligation to ensure that offshore authorisations and SDAGEs are compatible with the environmental targets (defined in Article L. 219-4 of the Environmental Code) is sufficient to guarantee that the target associated with these indicators is achieved.

### **What are the data collection frameworks?**

Information on the operability of the monitoring frameworks and their link with the ET/GES indicators and the sea basins is given in Annex 1 "Monitoring programmes under the second cycle of the MSFD".

MONITORING/DATA COLLECTION FRAMEWORK	SP	DESCRIPTION
Campagnes halieutiques DCF optimisées – données AIS d'opportunité des navires hauturiers collaboratifs (AISOP)	SP1	This system is based on the systematic collection of AIS situations observed during fishing campaigns (CGFS, EVHOE, IBTS, MEDITS, PELGAS and PELMED) conducted under the common fisheries policy on the Ifremer research fleet. The AIS data is archived at SISMER. Source: Ifremer
Service d'analyse ENVironnementale par Système d'Identification Automatique – données AIS (ENVISIA)	SP1	System created and operated by CEREMA and designed to process all AIS data from European maritime monitoring (SafeSeaNet) collected by the Member States. At national level, these data are based on the SPATIONAV programme under the joint supervision of the Directorate General of Armaments (DGA) and the Direction of Maritime Affairs (DMA). CEREMA is the national operator in charge of archiving AIS data flows from the national network of land stations. The data is stored internally on a database. Source: CEREMA
Lloyd's List Intelligence - maritime traffic data (LLI)	SP1	Data collected from all over the world from three observation sources: <ul style="list-style-type: none"> <li>land-based AIS data from a network of stations operated by Lloyd's</li> <li>satellite AIS data from market operators (ORBCOM)</li> <li>declarative data on the movements of ships affiliated to Lloyd's collected by the company's port agents.</li> </ul> Source: Lloyd's List Intelligence
Système de surveillance des navires de pêche– données VMS	SP1	Satellite monitoring system for fishing vessels, mandatory for professional fishing vessels over 12 metres in length, under EU flag, since 1 January 2012. It provides data on the position, course and speed of vessels to the fisheries authorities, at regular intervals Source/Producer: DPMA/FIS
Registre des émissions impulsives (SIRENE)	SP2	System compiling data on impulsive emissions of a level potentially disturbing to underwater fauna. Source: Shom
BOuée Multimodale pour la Biodiversité et l'océanophYsique (BOMBYX)	SP3	Acoustic acquisition station of the University of Toulon. The data are stored in Shom's SAMBA database.
Monitoring Acoustique et Mesures de Bruit sur Opportunités (MAMBO)	SP3	Plant of acoustic stations operated by Shom. The data are stored in Shom's SAMBA database.
Réseau de surveillance pour la Caractérisation Acoustique du Littoral Méditerranéen et de ses Écosystèmes (CALME)	SP3	Observation network dedicated to the measurement and exploitation of Mediterranean underwater acoustic landscapes, created by Chorus in partnership with the Rhône Méditerranée Corse Water Agency. The data are stored in MEDTRIX and Shom's SAMBA database, operated by the Rhône Méditerranée Corse Water Agency and Andromède Océanologie.



## 3 - Activities, uses and public policies

### 3.1 - Sectors of activity

#### 3.1.1 - Common systems

For each sector of activity, whether it is to carry out situational analysis or to monitor the strategic targets, the monitoring process seeks to report on the momentum and economic performance, through data on turnover, added value, employment, the nature and structure of companies. These data are collected as part of general statistics, mainly by INSEE and social security bodies. The data collection frameworks mentioned here will not be gone over again in the presentation of each sector of activity.

In addition, a number of Socio-Economic Objectives (SEOs) indicators relate to administrative decisions, the implementation of projects, plans, charters or events. These indicators relate to the collection of administrative actions and/or the direct implementation of action plans. During the implementation of the first cycle, the central and decentralised departments will study the opportunity and feasibility of working them out.

#### What are the data collection frameworks?

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORK
Central Agency for Social Security Organisations (ACOSS)	Sequoia database
National Institute for Statistics and Economic Studies (INSEE)	Elaboration des Statistiques ANnuelles d'Entreprise (ESANE)
	Flores framework

### 3.1.2 - Exploitation and development of mineral resources

#### What does the sector cover?

Marine material extraction covers the exploitation of marine deposits of siliceous materials or, more specifically, of calcareous materials (shell sands). These extracted materials are used for various activities such as construction and public works, acidic soil improvement, water treatment, or beach nourishment.

These activities represent a socio-economic challenge for the sea basins, insofar as they generate jobs on aggregate extraction vessels, in landing and storage ports, and via the activities using these materials.

The extraction of these materials generates impacts on the marine environment, the main ones being re-suspension of particles, eutrophication, noise disturbance, changes in the nature of the seabed, incidental extraction of species, or changes in the coastline (erosion or fattening).

The challenge for the sea basins is therefore to maintain the sector while supporting it towards practices with limited impacts on the marine environment.

#### What are the identified elements and the elements to be reported?

The monitoring framework integrates socio-economic variables relating to location (location, area of authorised plots and area exploited: area of production actually exploited, AIS data from mining vessels), the productivity of the sector and the distribution of resources unloaded on the coastline. Therefore, the variables of interest concern exploitation authorisations (start and end dates of plots issued, number of research permits issued, volume of marine aggregate extraction, silica sands and shell sands extraction authorised annually), and the actual exploitation of materials (volumes of marine aggregates extracted annually, extracted volume of marine silica sands and marine shell sands). The actual production data as well as the activity's spatialisation data provide information on its impact on marine habitats (distribution of permanent changes in hydrographical conditions, distribution of physical disturbance of natural seabeds).

The monitoring framework also includes variables relating to the unloading and use of materials (volume of marine aggregates broken down by landing spot; number of ports of discharge, number of aggregate landing spots, breakdown by port of discharge of quantities of extracted marine aggregates, breakdown by sector of quantities of extracted aggregates).

#### What are the data collection frameworks?

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORK
French Research Institute for Exploitation of the Sea (Ifremer)	Production of marine materials
	Mining permits and authorisations for aggregate extraction
Ministry of Ecology Transition (MTE) / Directorate-General for Planning, Housing and Nature (DGALN)	Open digital mining land register: mining permits and work permits (CAMINO)

### 3.1.3 - Exploitation and development of biological resources

#### Professional fishing

##### What does the sector cover?

The professional fishing sector refers to all fishing activities that provide an income for fisherman. The marketing of the products is dealt with in the "Marketing and processing of seafood" section. There are two main types of professional fishing: fishing on board and foot fishing.

On-board fishing covers a wide range of practices, depending on the type of vessel used, the duration of the activity and the location of the activity. Four categories of on-board fishing are therefore identified: they are presented in the following summary table.

	Official classification <sup>1</sup>	Other classifications	
Type of on-board fishing	Duration of activity	Type of vessel used	Location of the activity
Large-scale fishing	More than 20 days	Vessels of tonnage > 1000 GRT, including large trawlers and tuna seiners of 70 to 80m	High seas (including off the coast of Africa - Area 34, and in the Indian Ocean - Area 51)
Offshore (or deep-sea) fishing	More than 96 hours	Offshore trawlers (>25m) and offshore small fishing vessels (16 to 25m)	Beyond 12 miles
Coastal (or intensive small-scale) fishing	Between 24 and 96 hours	Ships under 16m	Within the 12-mile zone
Small-scale (or artisanal) fishing	Less than 24 hours	Ships under 16m	Within the 12-mile zone

A historical sector of activity of the sea basins and a generator of employment, professional fishing is facing new challenges: difficulties in the necessary renewal of the fleet (ageing vessels, the sector's energy transition challenge), challenges of transmission of businesses and attractiveness of the sector (difficulties in recruiting and renewing crews and captains, evolution of professional training, improvement of working and safety conditions), or difficulties accessing the sea (especially in a border context) and preservation of access to port areas.

Professional fishing is a sector that depends on the environmental state of the marine environment, so it must adapt its production to the evolution of stocks for the sustainability of the resource (with the objective of achieving the maximum sustainable yield per species), improve its practices to make them more selective (therefore reducing incidental catches of species whose harvesting is prohibited) and reduce its physical pressure on the seabed. Moreover, professional fishing is one of the sectors that generates marine litter: therefore, there is a challenge to change practices on board and to equip fishing ports to collect litter from professional fishing.

Finally, the sanitary quality of the products, partly dependent on the microbiological quality of the coastal waters, is also an important issue for professional fishing, and in particular for professional foot fishing.

For the sea basins, the challenge is to reconcile professional fishing practices with other uses, but also to accompany the evolution of these practices to guarantee both their sustainability and the preservation of the environment on which they

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<sup>1</sup>Official Journal of 29 December 1993

depend. This sector of activity therefore represents an important part of the adopted strategic targets, both socio-economic and environmental.

### **What are the identified elements and the elements to be reported?**

The economic vibrancy of the sector can be documented by variables specific to fishing. Therefore, the monitoring framework includes variables on the average price per kg of professional fishing products, the number of files validated under FEAMP measures (measures 26, 31, 37, 43, 66, 68, 68R and 69 of the 2014-2020 programme of measures), as well as variables relating to fleet entries and exits (number of fishing vessels registered on the coastline, number of incoming fishing vessels including the number of new vessels, number of outgoing vessels) and fleet modernisation (number of modernisation files reviewed in CORESEL and CRGF).

The variables for spatialising the activity make it possible to identify the sectors where conflicts of access to space at sea may arise, as well as the areas of pressure on the marine environment. Therefore, the monitoring framework integrates authorised fishing zones (for the French fishing fleet and for foot fishing), zones where fishing is prohibited in priority fishing sectors, and spatialisation data from on-board fishing (VMS). It also includes variables concerning onshore facilities (references in Local Urbanisation Plans, area) and places dedicated to professional fishing in ports.

The variables characterising fishing effort and production are used to describe both the material resources deployed and the resulting fishing pressure. The fishing fleet is therefore characterised by the use of vessels, the average age of vessels by district, the kind of vessels by coastline (size, power, tonnage, date of entry, vessel registration district, shipping category), the ports of operation, the trades carried out by the vessels (gear/target species combinations), the vessels' period of activity at sea (number of days at sea or fishing), and the types of fishing operations. Production effort is measured by the volume and value of unloaded fish products, by species, or the tonnage harvested, for kelp. For the harvesting of marine plants, the harvested volumes are not always accessible: for example, only the authorised tonnage is accessible for the harvesting of samphire. On the Mediterranean coast, specific fisheries exist, and the monitoring framework therefore includes the number of authorisations for professional fishing of red coral while scuba diving, and the number of vessels eligible for gangui European fishing authorisations.

The main potential impacts of professional fishing on the marine environment are overexploitation of resources, incidental catches of non-target species, degradation of the seabed, noise, litter production and, to a lesser extent, effluent management.

There are many variables to characterise the management of fishing resources, for example: population structure of exploited species (total abundance in the area, total biomass in the area, average weight of an individual, average size of an individual, age), stock assessment (estimated volume of stocks by species, distribution of stocks), as well as fish mortality level (of commercial species, forage species and their spawning stock). The monitoring framework must pay particular attention to three groups of species: elasmobranchs, diadromous fish and micronekton, which are particularly threatened by overfishing. Elasmobranchs and micronekton are all the more important as these groups are located at the two ends of the trophic chain (tertiary consumer and primary consumer respectively). Data are sought on the level of harvesting suffered by these groups, the location of this harvesting, and the possible control of catches through licence quotas and access rights to basins (for fishing in estuaries). On the Mediterranean coastline, red coral fishing is also regulated, and the monitoring framework includes the number of dedicated authorisations.

There are two types of interest variables concerning incidental catches linked to professional fishing: on the one hand, the number of individuals observed or declared with traces of incidental catches, and on the other hand, the measures that have been put in place to avoid or reduce catches (identification of maximum density perimeters for sea birds, number of

vessels equipped with "pingers", number of projects to improve fishing techniques to make them more selective). With regard to seabed degradation, the variables of interest are surface-based (abrasion areas exerted by professional fishing vessels, areas of fishing with seabed towed gear, vulnerable marine ecosystems subject to bottom fishing in the Atlantic). The risks of acoustic masking are also integrated into the monitoring framework via variables of spatial distribution of ambient noise.

Finally, the production of litter by professional fishing is addressed from two angles: the production of litter as such (nature and volume of litter generated by fishing activity and collected in fishing ports or on beaches) and the recycling of this litter (volume of litter reused, number of ports along the coastline equipped with a system for recovering fishing litter or litter collection points, creation of recycling channels, existing "pilot" projects). Some ports are equipped with careening areas with effluent treatment systems and this information is integrated into the monitoring framework.

### **What are the data collection frameworks?**

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORK
Centre for studies and expertise on risks, environment, mobility and development (CEREMA)	Litter management in marinas, fishing ports and commercial ports
National Committee of maritime fisheries and marine fish farming (CNPMM)	Quotas of access rights per basin for fishing in estuaries and for migratory fish
General Fisheries Commission for the Mediterranean (GFCM)	Validated stock assessment forms (SAFs)
International Commission for the Conservation of Atlantic Tunas (ICCAT)	ICCAT stock assessment
International Council for the Exploration of the Sea (ICES)	ICES opinion
Directorate responsible for reporting under the EU Single-Use Plastics Directive	
Interregional Directorates for the Sea (DIRM)	
Regional Directorates of Environment, Land Settlement and Housing (DREAL)	
National Institute for Agricultural Research and the Environment (INRAE)	Sturwild database
Ministry of Agriculture and Food (MAA)/Directorate of Maritime Fisheries and Aquaculture (DPMA)	Fisheries Information System - Annual activity schedules of professional fishing vessels registered in French maritime districts
	Fisheries Information System - Annual data on unloading by fishing vessels in the French fleet
	Fisheries Information System - Regional sheets
	Incidental catches statement

	Fishing vessel monitoring system - VMS data
	Declarative catch and fishing effort data (SACAPT database)
	Sales observation (OBSVENTES)
	Production and fishing effort data (SACROIS)
	List of operations of the national FEAMP programme 2014-2020
	Administrative data from the "Community Fishing Fleet" (FPC) file
	Capacity Report
French Biodiversity Office (OFB)	Summary maps of all risks (of harming conservation objectives through fishing, for each Natura 2000 habitat, at Natura 2000 site level)

## Aquaculture

### What does the sector cover?

Aquaculture activities cover two main types of production: shellfish farming (oysters, mussels, other shellfish), and fish farming (sea bass, sea bream, turbot, salmonids, etc.). They also include more secondary activities such as seaweed or shrimp farming. The marketing of products is dealt with in the section "Marketing and processing of seafood products".

These activities generate employment on the coast, although some of this employment is precarious (many seasonal jobs, particularly in oyster farming). The link between aquaculture and environmental quality is strong, insofar as this sector is very sensitive to water quality, chronic pollution (organic, chemical, microbiological) or accidental pollution (e.g. oil spills), upstream freshwater management, and the presence of invasive exotic species. Conversely, this sector of activity also has the potential to generate negative impacts on the environment on which it depends: introduction of non-indigenous species, modification of habitats, over-exploitation of primary trophic resources (impacts on wild species). In some places, aquaculture activities can lead to siltation and organic enrichment of sediments, or be a source of disturbance for fauna, through the noise generated by scaring techniques.

Through their strategic targets, the sea basins encourage the transition of aquaculture towards sustainable practices with less impact on the environment.

### What are the identified elements and the elements to be reported?

One of the issues for the aquaculture sector is access to the public maritime domain for operators. The monitoring framework therefore includes variables on the location of the activity, providing surface or cadastral information on the plots used for shellfish farming, fish farming and, as far as possible, algaculture. The location variables also include surface information on shellfish wasteland.

The socio-economic variables also concern economic performance (production value, aid obtained under measures 47, 48, 51, 66, 68 and 69 of the FEAMP fund, or co-activity projects within pilot wind farms) as well as the productivity of this

sector (production volumes of each type of aquaculture activity, variables relating to biological productivity: growth rates and mortality rates associated with salinity zones).

Aquaculture is a sector that is both dependent on the sanitary quality of production waters, and therefore on the good environmental status of the marine environment, and a sector that can generate negative impacts. The monitoring framework therefore includes data on the monitoring of the sanitary quality of shellfish waters and the sanitary risks (evolution of the number of areas classified as A over the last 3 years, number of production areas boosting marketing support in the event of a sanitary risk, etc.) and bans on the marketing of products of insufficient sanitary quality (orders prohibiting transfers between aquaculture production basins, duration of the ban on the marketing of aquaculture products).

### **What are the data collection frameworks?**

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORK
French Agency for the Development and Promotion of Organic Agriculture (Agence BIO)	Surveys of economic operators in the organic sector
Centre for studies and expertise on risks, environment, mobility and development (CEREMA)	Aquaculture land register
Ministry of Agriculture and Food (MAA)/Directorate of Maritime Fisheries and Aquaculture (DPMA)	Declarative catch and fishing effort data (SACAPT database)
	Production and fishing effort data (SACROIS)
	List of operations of the national FEAMP programme 2014-2020
	Data Collection Framework (DCF) - Economic performance of aquaculture in the EU
Ministry of Agriculture and Food (MAA)/Directorate General of Food (DGAL or DGAI)	Atlas of shellfish production and relaying areas
Ministry of Agriculture and Food (MAA)/Statistics and Forecasting Service (SSP)	Annual aquaculture survey
	French Shellfish Census
	Census of fish farming, algaculture and cyanobacteria farming
National Institute of Origin and Quality (INAO)	Annual key figures

## ***Marketing and processing of seafood products***

### **What does the sector cover?**

The seafood marketing and processing sector covers the whole seafood industry, from the unloading of the catch or harvest (professional fishing and aquaculture), to the sale of finished products. When the fish is unloaded, there are two possibilities for selling it: direct sale or sale in a fish market.



The fish trade provides fresh fishery products, with initial processing (cleaning, gutting, deheading, filleting, wrapping and packaging). Processing companies provide consumer goods for human consumption by smoking, canning or preparing delicatessen products. It should be noted that the fish trade and processing companies use a significant amount of imported raw materials to supplement the supply from French fisheries for their production of processed products. The finished products are then sold for distribution to fishmongers, as well as to large superstores and supermarkets.

This sector represents an important economic challenge for the sea basins, as it is based on a network of companies that generate employment. Nevertheless, to maintain its competitiveness, the sector must modernise: this is particularly the case for the network of fish markets on the NAMO (North Atlantic Western Channel) coast. Faced with the sustainability constraints of fishing resources, the sector must also diversify, by developing co-products or by offering new species for consumption. The challenge is to reduce fishing pressure on species whose stocks are threatened, without endangering the stocks of newly exploited species. Sustainable fishing practices are therefore promoted, for example by encouraging fisheries labelling schemes.

The sector generates little or no direct environmental impact on the marine environment, but it is closely linked to those of the upstream sector and to the issue of sustainable management of fishing resources: purchase prices, product quality and labelling are strong interacting factors. On the other hand, the sector has negative environmental impacts on air quality: the transport of raw materials and processed products generates greenhouse gas emissions, which is why some coastlines would like to reduce the distance between the unloading site, the processing site and ultimately the marketing site.

The challenge for the coastlines is therefore to encourage the maintenance of the local fabric of companies making up the seafood marketing and processing sector, while promoting sustainable production initiatives.

### **What are the identified elements and the elements to be reported?**

The economic performance indicator variables of the sector make it possible to evaluate the momentum of the sector. They include sales data (volumes of imported and exported products, average price per kg of marketed species, volume and value of sales by nationality of the vessels in the fish markets, most sold species in volume and value), and data relating to European aid (files validated under measures 37, 43, 48, 51, 66, 68R, 69 of the FEAMP).

The monitoring framework also includes variables that indicate the sustainability of fisheries and products for sale: fisheries labelling (number of fisheries and aquaculture operations with a quality label, volume of products unloaded with a quality label), and communication actions implemented on the coastlines to promote seafood.

### **What are the data collection frameworks?**

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORK
French Agency for the Development and Promotion of Organic Agriculture (Agence BIO)	Surveys of economic operators in the organic sector
Algae Technology & Innovation Centre (CEVA)	WFD monitoring
National Institution of Agriculture and Sea Products (FranceAgriMer)	Visiomer
	Key figures for the fisheries and aquaculture sectors in France
National Institute of Origin and Quality (INAO)	Annual key figures

Ministry of Agriculture and Food (MAA)/Directorate of Maritime Fisheries and Aquaculture (DPMA)	List of operations of the national FEAMP programme 2014-2020
Ministry of Agriculture and Food (MAA)/Directorate General of Food (DGAL or DGAI)	Animal and plant product health surveillance
Ministry of Agriculture and Food (MAA)/Statistics and Forecasting Service (SSP)	Annual aquaculture survey
French Biodiversity Office (OFB)	Nitrate monitoring network: review of the implementation of the Nitrates Directive in France

## **Agriculture**

### **What does the sector cover?**

This sector includes all types of plant and animal production, located on the coast (such as salt marshes) or in the whole catchment area. Forests are included in this sector of activity, in particular to take into account the impact of land use on the artificialization of coastal environments and landscapes.

Agriculture is still mainly considered, on all the coasts, as a major factor in the anthropization of environments, through its impact on the quantity and quality of water in coastal waters and the catchment area. Nevertheless, agriculture can play a positive role in the occupation of the coastal area in the context of the fight against the artificialization of space and the maintenance of natural environments, particularly coastal marshes.

The agricultural sector is sometimes a significant stakeholder in the management of ports, whether in terms of environmental issues in the surrounding natural areas or in the maintenance of import (fertilisers, animal feed) or export (cereals, potatoes, dairy products, etc.) maritime traffic.

### **What are the identified elements and the elements to be reported?**

The monitoring framework integrates data concerning harvesting of agricultural land, by irrigation, throughout the catchment area, the quantity of nutrient inputs from agricultural activities, of contaminants (towns in zones vulnerable to nitrate pollution, sale of phytosanitary products) and of sediments linked to the erosion of cultivated land.

Other data focus on characterising the evolution of agricultural practices and areas (nature and volume of production, percentage of areas of organic farming, of permanent grassland, percentage of irrigated areas, evolution of wetland areas, etc.).

Finally, agriculture is also characterised by its need for marine inputs (aggregates, limestone and silica, algae, etc.). For example, the NAMO coast wishes to better understand and monitor the use of marine aggregates as agricultural soil improvers. This activity is also qualified by the development of agricultural products which are sold in local shops, directly, or by the maintenance and restoration of typical landscapes (hedgerows, dry stone walls) which contribute to the tourist appeal of the coast.

### **What are the data collection frameworks?**

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORK
French Agency for the Development and Promotion of Organic Agriculture (Agence BIO)	Surveys of economic operators in the organic sector
Ministry of Agriculture and Food (MAA)/Directorate-General for Education and Research (DGER)	Agricultural Census (RA)
French Biodiversity Office (OFB)	National Bank of Distributors' Sales of Phytopharmaceutical Products BNVD
	Nitrate monitoring network: review of the implementation of the Nitrates Directive in France

### 3.1.4 - Coastal tourism and leisure

#### *Coastal tourism*

##### What does the sector cover?

The coastal tourism sector covers all activities providing goods or services to people travelling for leisure or business in coastal towns. This includes, for example, accommodation, catering, shops, leisure and cultural services. This sector also covers seaside activities, which are restricted here to swimming activities and beach visits. All leisure and sports or sailing activities, taking place on beaches or in the water, are analysed in the "Recreational sailing and water sports" section.

For the coastal towns, and even more so the maritime coastlines, this sector represents a significant economic weight. Indeed, the influx of tourists in these towns allows shops and small businesses to be set up, the creation of jobs (especially seasonal) and these towns therefore have every interest in promoting what makes them attractive: promoting the natural and cultural heritage, services on offer, or maritime special events (events, festivals, etc.), among others. Beach visits is an important tourist asset for coastal towns. It is strongly influenced by weather conditions in the high season, but also by the opening of swimming areas: this type of activity is therefore dependent on sufficient quality of swimming water, but it is also exposed to the risks linked to the stranding of certain macro-algae or litter.

The dominance of tourism in some coastal areas is leading to an increase in land artificialization. This aspect is developed in the "land artificialization and coastal risk management" section. The seasonal increase in the population in coastal areas leads to an increased production of wastewater and litter, for which the treatment plants are not always designed (hence the recurrent problems of pollution of swimming waters by microbial pathogens), as well as an increase in greenhouse gas emissions. The problem of litter does not only concern the litter collected, but also the litter abandoned by users, both in urban and natural environments.

The challenge for the coastlines is therefore to maintain their attractiveness to tourists, without neglecting the balance of the coastal territories. The sustainability of seaside activities and the use of beaches requires increased vigilance regarding the quality of swimming water. Another challenge is to diversify what tourism has to offer and to move towards a deseasonalisation of the activity. The issues relating to the environmental impact of this sector have been developed in the "Protection and enhancement of natural environments, sites, landscapes and cultural heritage" section.

### **What are the identified elements and the elements to be reported?**

The variables of interest concern the demographic pressure generated by tourism, in particular an estimate of the population in coastal towns, the number of monthly overnight stays, the average length of stay and the number of tourists accommodated in commercial and non-commercial tourist accommodation. The ratio between the number of tourist beds and the year-round resident population provides information on the increase in population due to tourism, i.e. on the tourist pressure.

The economic weight of the coastal tourism sector is significant for all coasts, but also in relation to the tourism sector on a national level. The monitoring framework integrates the variables that describe the socio-economic structure of coastal tourism and the economic performance of the sector. On some coasts, a significant part of tourism is linked to the cruise sector. For this reason, we are interested in data relating to stops made by cruise passengers and variables relating to ports that can accommodate cruise ships.

The intensity of the activity can also be reported by data on beach use. They include data on the opening of beaches and sports facilities installed for swimming (areas built for swimming in the sea, sea swimming areas identified under Directive 2006/7/EC, operated beaches). The monitoring of swimming water quality, i.e. the classification of swimming waters using microbiological monitoring networks, is of particular importance as it determines the opening or closing of swimming areas and beaches.

Finally, concerning the environmental impacts of swimming activities and beach use, the "Blue Flag" certification process guarantees the commitment of a coastal town to 4 criteria: environmental education, litter management, water management, and the integration of environmental issues in the management of coastal areas.

### **What are the data collection frameworks?**

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORK
General Commission for Sustainable Development. (CGDD)/Data and Statistical Studies Department (SDES)	Transport handbook
	Report on the State of the Environment in France (REE)
National Institute for Statistics and Economic Studies (INSEE)	Tourist accommodation capacity in towns
	PR
Ministry of Agriculture and Food (MAA)/Directorate General of Food (DGAL or DGAI)	Animal and plant product health surveillance
	Atlas of shellfish production and relaying areas
Ministry of Solidarity and Health (MSS)/Directorate-General of Health (DGS)	SISE - Swimming Water
Ministry of Economy, Finance and Recovery (MEFR)/Directorate General for Enterprise (DGE)	Review of the Tourism Demand Monitoring Survey (SDT): French tourist travel
Ministry of Sports	Census of Sports Facilities (RES)
French Biodiversity Office (OFB)	Nitrate monitoring network: review of the implementation of the Nitrates Directive in France
TERAGIR	Blue Flag marinas and beaches

## *Recreational sailing and water sports*

### **What does the sector cover?**

The recreational sailing, water sports and activities sector covers:

- Beach sports activities, such as beach volleyball, land sailing, or beach clubs
- Water sports activities, such as windsurfing, surfing, kitesurfing, rowing or water-skiing
- Underwater sports activities, such as snorkelling or free-diving
- Sailing activities, including both boating and marina-related activities.

Sporting and sailing activities contribute to the vibrancy and attractiveness of the coastlines, since they represent both an employment and leisure opportunity for residents, and a definite tourist asset, both for taking part in the activities and for the associated events (sporting events, festivals, nautical events). Aimed at a wide audience, they are also an important medium for raising awareness of the marine environment for all ages. Sailing activities are a potential lever for the ecological, energy and solidarity transition for the coastlines, through changes in practices, with less impact on the marine environment, or through more sustainable port facilities and amenities.

Sailing activities and water sports potentially generate negative impacts on the marine environment, whether in terms of pollution (macro-litter, hazardous liquid waste, microbiological contaminants), disturbance of fauna and habitats, or even loss of habitats. These impacts are linked, for some users, both to bad practices at sea and to the number of people taking part in them. Moreover, these activities represent a source of land pressure due to the number and surface area of the dedicated facilities. The challenge for the coastlines is to reconcile access to the coast for these activities, which generate attractiveness and vibrancy, and their balance with other coastal and maritime activities, while encouraging their sustainability and their least environmental impact.

### **What are the identified elements and the elements to be reported?**

The monitoring framework includes variables on the geographical distribution and extent of sailing and water sports activities. This includes the location of sports facilities, authorisation or prohibition zones for activities, the boundaries of marinas and anchoring areas. The variables of interest also concern the number of sports facilities, the number of sports associations/clubs, the number of participants (members of a sport federation or not), the number of marinas and their capacity, the capacity of anchoring areas and minor facilities, the number of sailing boats and their type, and a number of variables relating to the amenities and services provided by the marinas. In addition, the monitoring framework incorporates variables that make it possible to qualify the activity of the public maritime domain (DPM) by recreational activities (SURICATE app).

The strategic targets of the coastlines mainly relate to the transition of sailing-related activities towards more sustainable practices and equipment with less environmental impact. So the socio-economic variables of interest mainly concern the management of litter and effluents at vessel and marina level, the environmental certification/labelling process of marinas, the presence of renewable energy charging and refuelling points and ecological anchorings.

The variables of interest characterising the impact of this sector on the environment relate to the physical disturbance of these activities on the seabed, the release of contaminants and liquid effluents into the environment or the spread of non-indigenous species (careening of vessels and submerged equipment). Changes in hydrographical conditions and the risk of acoustic masking are also integrated into the monitoring framework via activity spatialisation variables.

### **What are the data collection frameworks?**

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORK
Rhône-Méditerranée-Corse Water Agency (AERMC)	Aerial Observatory of the uses in the Mediterranean (MEDOBS)
Centre for studies and expertise on risks, environment, mobility and development (CEREMA)	Ports-Polmar
	Environmental Analysis Service by Automatic Identification System - AIS data (ENVISIA)
	Careening areas in marinas, anchorages and private boatyards
	Geographical data at sea and on the coast
	List of Clean Harbour certifications
	List of Clean Harbours Active in Biodiversity certifications
General Commission for Sustainable Development. (CGDD)/Data and Statistical Studies Department (SDS)	Report on the State of the Environment in France (REE)
Departmental Directorates for the Territories and the Sea (DDTM)	
French Research Institute for Exploitation of the Sea (Ifremer)	Optimised DCF fishing campaigns - AIS opportunity data for offshore collaborative vessels (AISOP)
National Institute for Youth and Popular Education (INJEP)	Census of permits and clubs with approved sports federations
Lloyd's List Intelligence	Lloyd's List Intelligence - maritime traffic data (LLI)
Ministry of Ecology Transition (MTE) / Directorate General for Infrastructure, Transport and the Sea (DGITM) / Direction of Maritime Affairs (DMA)	Monitoring centre of marinas
	Sailing in figures
Ministry of Sports/National Resource Centre for Nature Sports	SURICATE app: national public database of Spaces, Sites and Itineraries (ESI)
TERAGIR	Map of Blue Flag ports

## Recreational fishing

### What does the sector cover?

Recreational fishing includes three types of fishing: foot fishing (glasswort, shellfish, seaweed and crustaceans), fishing from the shore (rock fish, sea bass, etc.) and fishing on board (shad, herring, sardines, mackerel, sea bass, pollack, sea bream, etc.). It is a popular leisure activity for residents of the coastal towns, but also for residents of other towns in the coastal regions and for tourists. It therefore represents an asset in terms of living conditions for residents and in terms of attractiveness for more occasional users (especially for tourism).

However, this activity generates potential negative impacts on coastal and marine ecosystems, both on habitats (turning over of boulders, excessive numbers on sites, use of destructive or non-selective gear) and on the populations of fished species (failure to respect quotas or minimum sizes).

### **What are the identified elements and the elements to be reported?**

The socio-economic variables of interest of this activity relate to its conditions and its economic impact on the local economy. As a result, the monitoring framework includes data on the location of the activity (areas of recreational fishing on board, on foot and on the shore), the users (number of people practising each type of recreational fishing, number of members of the French Sport Fishing and Sea Fishing federations) and domestic consumption linked to recreational fishing (fishermen's expenditure by type of recreational fishing and by item of expenditure).

The impacts of recreational fishing on the environment are characterised by variables of interest which relate to physical disturbances linked to humans visiting habitats, catches of vulnerable species of incidental catches, monitoring of fish stocks and the presence of litter at sea resulting from recreational fishing activities.

### **What are the data collection frameworks?**

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORK
Departmental Directorates for the Territories and the Sea (DDTM)	
Directorate responsible for reporting under the EU Single-Use Plastics Directive	
Interregional Directorates for the Sea (DIRM)	
Regional Directorates of Environment, Land Settlement and Housing (DREAL)	
National Institution of Agriculture and Sea Products (FranceAgriMer)	Evaluation of recreational fishing activity in mainland France
National Federation of Sailing and Sea Fishing (FNPP)	
French Biodiversity Office (OFB)	Summary maps of all risks (of harming conservation objectives through fishing, for each Natura 2000 habitat, at Natura 2000 site level)
	ESTAMP database



### 3.1.5 - Industries and activities in the secondary sector

#### *Maritime and river public works*

##### What does the sector cover?

Maritime public works include all offshore and underwater works, marine dredging operations, construction and renovation activities (ports, dykes, quays, etc.), implementation of outfalls and flood protection works. The maritime public works sector also includes the cable-related activity, which includes the manufacture, laying and maintenance of submerged underwater cables designed to carry communications or electrical power. Marine energies are a new niche activity requiring maritime public works services.

The upstream and downstream activity of the industry involves the manufacturing and sale of equipment (e.g. barges and dredgers) and services (e.g. consultancy, port management, government regulation of the activity). The manufacturing activity and the cable laying and maintenance activities are very different activities: the first activity refers to an advanced technique manufacturing production, the second activities refer to specialised offshore work. Maritime public works generate significant added value, as this sector requires a particular technicality, which necessitates the use of qualified jobs.

These activities have a significant impact on the marine environment. The impacts are linked to the risk of accidental pollution during the construction phase, with the release of hydrocarbons and chemical products, and the emission of underwater noise induced by pile driving, excavations or mechanical trenching (cable activity) being sources of significant disturbance. Other impacts with a strong persistence over time can also be mentioned (turbidity, hydromorphological modification, loss of ecological features of the environments, etc.). Dredging and piling activities in particular are regulated at international, European and national levels, to allow controlled and environmentally friendly management. Finally, construction and renovation in ports (dykes, rip-rap, etc.) have significant effects on sediment dynamics. Some maritime works can nevertheless have positive impacts on the environment by creating habitats suitable for certain species. This is particularly the case for certain filled-in spaces on the foreshore or areas where rocky materials are piled or the reef effect observed on certain foundations. The field of ecological engineering, covering eco-design of offshore infrastructures, as well as restoration and compensation methods, is booming.

##### What are the identified elements and the elements to be reported?

Some socio-economic variables are related to spatialisation of the activity (evolution, extent and distribution of the areas subject to dredging and of the immersed volumes of dredged material, position of the cable ships, geographical position of the cables). They provide an account of the vibrancy of this sector, as well as its contribution to the local economy and

to employment. Other variables relate to the improvement of practices, particularly with regard to their impact on the marine environment.

The monitoring framework also includes variables that allow the evolution of the pressure of this sector on the environment to be characterised for maritime public works (number of developments subject to an operation to optimise their ecological role and share of the volume of reused dredged sediments) and dredging actions (spatial extent and distribution of the physical disturbance of the seabed: tonnage of dredged materials treated, surface area of the dredged areas, position of the vessels, areas and surface area of the dumping/piling operations and release by pressure pipe). Finally, a certain number of these variables relate to the optimisation of dredging actions (number of authorisations and dredging operations including mutualisation, onshore treatment and recovery of dredged sediments, tonnes of fine marine sediments treated onshore), the limitation of contaminant inputs of certain sediments into the sea, as well as the monitoring of the temporal and spatial distribution of acoustic emissions related to maritime and river public works activities.

### What are the data collection frameworks?

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORK
Office of Geological and Mining Research (BRGM)	
Centre for studies and expertise on risks, environment, mobility and development (CEREMA)	Environmental Analysis Service by Automatic Identification System - AIS data (ENVISIA)
Centre for studies and expertise on risks, environment, mobility and development (CEREMA)	National survey on dredging in maritime ports ("dredging survey")
	Permitted immersion areas
French Research Institute for the Exploitation of the Sea (Ifremer)	Optimised DCF fishing campaigns - AIS opportunity data for offshore collaborative vessels (AISOP)
Lloyd's List Intelligence	Lloyd's List Intelligence - maritime traffic data (LLI)
Ministry of Ecology Transition (MTE) / Directorate General for Infrastructure, Transport and the Sea (DGITM) / Direction of Maritime Affairs (DMA)	Review of the commercial fleet under the French flag
Naval Hydrographic and Oceanographic Service (SHOM)	Underwater cables and pipelines
	Register of impulsive emissions (SIRENE)
Professional Union of manufacturers of electrical and communication wires and cables (SYCABEL)	

## Industries

### **What are the identified elements and the elements to be reported?**

Industry refers to economic activities that combine production factors (facilities, supplies, labour, knowledge) to produce material goods for the market. These mainly land-based activities are not necessarily all related to the marine environment. However, they represent an important part of the coastal economy and reflect its vibrancy.

These activities can be sources of pressure and impact on the marine environment (pollution from hazardous substances, litter, thermal pollution, etc.) and are covered by the directive on industrial emissions (integrated pollution prevention and reduction), which particularly reinforces the measures for defining pollutant emission thresholds.

The shipbuilding and marine sector in particular is divided into sub-sectors that are distinct in terms of their products and markets. It includes civil shipbuilding (commercial, fishing and service vessels), military shipbuilding and repair, civil ship repair, sailing boat building and repair, and ship breaking (dismantling and recycling of ships). Upstream of the construction sector is the naval equipment sector, which includes the manufacture and supply of capital goods (propulsion, on-board handling, pumps, ventilation, painting, etc.) and the provision of services (installation of ventilation, cabin areas, etc.). French shipbuilding yards are dynamic and specialised in defence vessels, passenger ships, offshore service vessels, fishing vessels and port services. The French shipbuilding and ship repair industry employs around 42,000 people directly and ranks 2nd in Europe in the global civil and military market, 4th in the world in the production of motor ships, and world leader in the sailing and gliding markets.

### **What are the identified elements and the elements to be reported?**

The situational analysis of the industrial sector on the coastlines can be characterised by location variables (SEVESO sites, ICPE installations), or variables of resource extraction and/or litter production (data on freshwater extraction by department in m<sup>3</sup> of water withdrawn by industry, hazardous litter produced by industrial activities).

Certain variables (number of vessels placed on the market, number of boats dismantled annually on the coast, number of out-of-use sailing boats dismantled in dismantling centres, volume of dismantled litter reused) make it possible to qualify the intensity of activity in this sector. Finally, variables are sought to characterise the environmental impact of the industries and their products (number of APER-labelled dismantling centres on the coastline, number of certified clean harbours, average age of the registered sailing boat fleet, number of companies respecting the principles of eco-construction on the coastline, number of vessels placed on the market with an alternative propulsion method, number of vessels equipped with clean domestic discharge solutions). These variables of interest also relate to noise reduction, in particular by monitoring the temporal and spatial distribution of impulsive emissions.

### What are the data collection frameworks?

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORK
Association for Eco-Responsible Boating (APER)	Location of dismantling centres
General Commission for Sustainable Development. (CGDD)/Data and Statistical Studies Department (SDS)	Freshwater extractions in France by use and by resource
French Customs	Foreign trade figures
EVOLEN	
French Insurance Federation (FFA)/Statistics Department	
French Institute of Petroleum (IFPEN)	
National Institute of Intellectual Property (INPI)	Patent database
National Institute for Statistics and Economic Studies (INSEE)	Business and establishment register (REE)
	Data on the French economy
	Annual national accounts
Ministry of Ecology Transition (MTE) / Directorate-General for Risk Prevention (DGPR)	Geohazards: Pollution Emission Register
Ministry of Ecology Transition (MTE) / Directorate-General for Infrastructure, Transport and the Sea (DGITM) / Direction of Maritime Affairs (DMA)	List of removals
	Sailing in figures
	SNOSAN: summer season review
Ministry of Ecology Transition (MTE) - Ministry of Economy, Finance and Recovery (MEFR)	Minergies: the French portal for access to underground data collected from operators
Naval Hydrographic and Oceanographic Service (SHOM )	Register of impulsive emissions (SIRENE)

## *Electricity production*

### What does the sector cover?

Electricity production on coastlines covers two types of production:

- Electricity production by nuclear power plants (and incidentally by a power plant - 1 project in Corsica)
- Electricity production by marine renewable energy.

The production of electricity by nuclear power plants is largely in the majority, but the production of electricity by marine renewable energies (floating or fixed offshore wind turbines, tidal, current and wave power) is set to develop significantly, particularly with the installation of floating or fixed wind farms.

This sector gives rise to different types of environmental impacts. Coastal nuclear power plants generate very little artificialization on the coast (the plants are already established, and they are not likely to increase in number). However, they extract marine water for reactor cooling and the higher temperature of the discharged water can locally disturb coastal ecosystems. Renewable marine energies, which by definition are favourable to preserving the environment, nevertheless have an impact on the marine environment both in terms of seabed artificialization and coastal environments (degradation or even loss of habitats, increased turbidity), but also in terms of the nuisance generated (risk of collision for avifauna, particularly migratory birds, and for bats; noise and light pollution). However, their impacts are not well known and are subject to long-term monitoring. Furthermore, the development of this type of energy is associated with landscape issues and compatibility issues with other activities at sea, which are a source of tension.

The challenge for the coastlines is therefore to maintain the production of nuclear energy (for the affected coastlines), and to develop the share of renewable marine energy, while minimising the environmental and social impacts.

#### **What are the identified elements and the elements to be reported?**

The socio-economic variables of interest in this sector relate to the installations and their characteristics (types of power stations, types of MRE installations, MRE sizes, duration of installation and life of MRE), the structure of the sector (number of clusters, number of companies representing the entire value chain represented within clusters), as well as turnover indices for the MRE sector, by sector. Other variables focus on the development of MRE, and more particularly on the evolution of their productivity, the setting up of pilot projects and test sites, and on the measures to support the deployment of the sector. The data relate to: production capacity allocated through tenders, as well as connected production capacity, variables relating to the development of pilot projects or test sites (number and location of test sites) and their characteristics (shared connections via modular platforms, experimentation of co-activities, multi-use modular platforms supporting innovation, knowledge acquisition or the coexistence of uses at sea).

The environmental impacts of this sector of activities are mainly measured by variables relating to the physical disturbance of the seabed, changes in hydrographical conditions and the temporal and spatial distribution of impulsive emissions. Water discharged for the power plants (total monitoring in m<sup>3</sup> of heated discharged water, location of discharge points, biological monitoring of water discharged into the environment, water volumes in m<sup>3</sup> taken permanently or temporarily from the natural environment) and the variables relating to seabed artificialization (spatial extent of the anchorages on the seabed, modifications caused to the seabed, temporal evolution of the polygons of structures and electricity production facilities on the coast at the land-sea boundary) also make it possible to characterise the environmental impacts of this activity.

There is a strong need for the coastlines to strengthen the dialogue with all stakeholders on the subject of MRE development. In this respect, the monitoring framework includes variables relating to the existence of governance bodies promoting the exchange and pooling of knowledge between stakeholders, as well as variables relating to the representativeness of stakeholders within the sea basin council on the subject of MRE.

### **What are the data collection frameworks?**

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORK
International Atomic Energy Agency (IAEA)	
Office of Geological and Mining Research (BRGM) - Centre for studies and expertise on risks, environment, mobility and development (CEREMA)	WFD-MSFD artificialization database
General Commission for Sustainable Development. (CGDD)/Data and Statistical Studies Department (SDS)	Freshwater extractions in France by use and by resource
EDF - ENGIE	
Manager of the Electricity Transmission Network (RTE) - GRT gaz	Open Data Energy networks
Ministry of Ecology Transition (MTE) / Directorate-General for Energy and Climate (DGEC)	Multiannual energy plans (PPE)
Naval Hydrographic and Oceanographic Service (SHOM)	Register of impulsive emissions (SIRENE)
UMR Marine Coastal Ecosystems and Stress Responses (ECOSEAS)	French Mediterranean coast: inventory and impact of building work in the marine sector (MEDAM)

## ***Maritime transport and ports***

### **What does the sector cover?**

The maritime transport and port activities sector covers both freight and passenger transport activities. This sector of activity represents a major challenge at national level, as it is an important link in international logistics chains. For the coastlines, it also represents a sector that generates employment and is attractive.

In addition, the maritime transport and port activities sector is associated with several types of environmental impacts: the spread of non-indigenous species via the goods transported or via ballast water; the pollution of coastal waters through the discharge of grey and black water and through careening; and airborne emissions of pollutants and greenhouse gases from port infrastructures and from maritime transport and service vessels.

The commercial ports are bearers of economic development challenges, but they are also potential industrial platforms for the ecological and energy transition. The challenge for the coastlines is to reconcile the maintenance and development of port and maritime transport activities with their contribution to the ecological and energy transition objectives.

### **What are the identified elements and the elements to be reported?**

The monitoring framework integrates socio-economic variables relating to the characterisation of the commercial fleet, maritime services and maritime traffic on a national scale. The variables relating to the commercial fleet include the number of French-flagged or French-owned shipping and maritime services vessels, their total capacity, and the average

age of the shipping fleet (French-flagged or French-owned). The variables linked to national maritime traffic include the identification of the main passenger ports and the number of passengers transiting through the ports, as well as the size of the ships accessible in the ports and the tonnage of goods transported by sea (by type of goods).

Other variables of interest focus on characterising the competitiveness and international influence of the ports: tonnage of goods transiting through the coastline ports, traffic to or from Europe passing through the coastline ports, European rank of the main French ports in the transport of goods. The monitoring framework also includes data on port land management (surface area of port land identified as suitable for the establishment of new activities in the strategic projects of the Large Marine Ports, surface area of unconverted port wasteland on the coastline, surface area of natural areas of the Large Marine Ports covered by a management plan), the implementation of port strategies and management plans (number of management plans, development plans, master plans, strategies or strategic port projects underway in the coastline ports), and the integration of commercial ports in the territory (charters or contractual documents or participatory bodies between the commercial ports and the citizens, number of maritime freight and passenger shuttle projects in the relevant areas of the coastline). In order to strengthen their integration on the coastline, some ports are deploying inter-port cooperation or inter-regional coordination approaches (number of ports involved in these approaches).

In terms of logistics, other variables relate to the consolidation of flows and the digitalisation of procedures in ports (amount of port investments under the CPER/CPIER for the development of logistics activities and the consolidation of flows in maritime ports, the ecological and energy transition of ports, national indicator: creation of a single maritime and port window, number of ports that have adapted their information system to the single maritime and port window). The device also includes data on intermodality and/or modal shift (amount of port investments under the CPER/CPIER/FEDER/FNADT for the development of port areas, multimodal platforms, infrastructures favouring intermodality, share of river and rail transport in pre- and post-carriage at Large Marine Port level, modal shift rate (rail, river and sea), volume of goods passing from the sea to rivers or from the sea to trains, number of ships passing from the sea to rivers).

The energy transition is also a future issue for ports and ships, which can be characterised by several types of variables (number of recharging and refuelling points (electric, hydrogen, LNG) in ports, number of ships refuelling with alternative fuels, number of infrastructures allowing ships to be electrically connected at the quayside, number of ships using the electric connection at the quayside, number of ships moving to LNG, volume of annual bunkering with LNG).

More generally, the ecological transition of ports is also monitored (GHG emissions generated by the Nantes Saint-Nazaire Large Marine Port, number of ships inspected as non-compliant in the Channel and North Sea emission control areas, number of ports involved in environmental certification, number of commercial ports involved in environmental initiatives and innovative projects, number of ship owners involved in the ecological and energy transition, number of ships involved in the ecological and energy transition). With the same view of reducing the environmental impact of maritime transport and commercial ports, the monitoring framework includes variables relating to the treatment of wastewater and ballast water (number of ports equipped with careening areas with an effluent treatment system, number of careening areas meeting WFD standards on the coastline, number of ports with a wastewater and ballast water treatment system, number of ports offering the possibility of directly sucking up residual water from the bilges of ships and wastewater from the bunkering area).

To complete the picture, the monitoring framework integrates variables relating to the location and intensity of impacts linked to maritime transport (position of merchant ships on the coastline, types of merchant ships sailing), variables relating to the spread of non-indigenous species and the contamination of waters generated by maritime transport activities (for example via the use of anti-fouling paints: concentration of contaminants). Finally, the monitoring framework also includes variables of interest concerning the noise generated by this activity.

### **What are the data collection frameworks?**

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORK
Centre for studies and expertise on risks, environment, mobility and development (CEREMA)	List of Clean Harbour certifications
	List of Clean Harbours Active in Biodiversity certifications
	Ports-Polmar
	Environmental Analysis Service by Automatic Identification System - AIS data (ENVISIA)
	Geographical data at sea and on the coast
General Commission for Sustainable Development. (CGDD)/Data and Statistical Studies Department (SDS)	Transport handbook
	Activity of French maritime ports
	Datalab: key transport figures
Eurostat	Maritime transport database
Nantes Saint-Nazaire Large Marine Port (GPMNSN)	
French Research Institute for Exploitation of the Sea (Ifremer)	Optimised DCF fishing campaigns - AIS opportunity data for offshore collaborative vessels (AISOP)
Lloyd's List Intelligence	Lloyd's List Intelligence - maritime traffic data (LLI)
Ministry of Ecology Transition (MTE) / Directorate General for Infrastructure, Transport and the Sea (DGITM) / Direction of Maritime Affairs (DMA)	Review of the commercial fleet under the French flag
Ministry of Agriculture and Food/Veterinary and Phytosanitary Border Inspection Department (SIVEP)	TRACES system
SafeSeaNet	
Naval Hydrographic and Oceanographic Service (SHOM)	Register of impulsive emissions (SIRENE)
TERAGIR	Blue Flag marinas and beaches

## 3.2 - Public policies

### 3.2.1 - Occupation and management of coastal areas

#### *Artificialization of territories and coastal risk management*

##### **What do these public policies cover?**

Artificialization of coastal areas refers to the transformation of land use, the coastline, or part of the marine area by development actions. These actions are accompanied by a loss of the qualities of the 'natural' environment. The artificialization of coastal areas is the result of two main phenomena: the attractiveness of maritime and coastal areas for human activities and uses, and the implementation of flood, submersion and marine erosion risk management to protect



them. This sector therefore also covers public policies related to coastal risk management, involving the artificialization of the coastline and waterways. The management of these risks ensures the safety of property and people.

The development of activities and uses in certain coastal areas is leading to an increase in artificialization (in particular for the benefit of second homes for the tourism sector), which is also taking up land to the detriment of housing needs. This land artificialization is associated with an increase in the consumption of water resources, which represents a real challenge for coastal towns, whose resources may be limited and are already heavily used by the irrigation of agricultural land. This affects the flow of some small coastal rivers and has an impact on the ecology of their estuaries. Coastline artificialization also leads to increased inputs of litter and contaminants transferred to the marine environment, and loss of habitats (terrestrial and marine).

Soil sealing and coastline artificialization result in an increase in the risks of flooding (by multiplying obstacles and increasing the flow of surface water), and erosion and submersion (increase in the number of people and property exposed to hazards).

Given the various impacts of coastal artificialization on the environment and on the risk to human activities and uses, the main challenge of these public policies is to reduce artificialization and the level of risks (flooding, erosion, submersion) associated with these activities.

### **What are the identified elements and the elements to be reported?**

As the public policies affected in this section are mainly focused on the safety of goods and people, the monitoring framework includes many variables related to the management of the coastline by public authorities. An important part concerns the number of integrated coastal management strategies or projects (including spatial reshaping or laissez-faire projects) under consideration or in progress. The number of Natural Risk Prevention Plans on a coastline can also provide information on the challenges of limiting human issues on each coastline. Other variables are used to monitor the number of people and buildings exposed to coastal risks.

This sector can also be characterised by its impact on the coastal and maritime environment. The monitoring framework therefore includes variables of interest that make it possible to characterise the spatial extent of land artificialization. To do this, variables that allow their extent to be quantified and qualified are integrated into the monitoring framework (area reclaimed from the sea, number of structures, number of artificial obstacles, land use). The urban spread linked to welcoming new populations is also reported (housing stock, number of inhabitants and population, density of residential areas).

Lastly, the monitoring framework strives to identify the artificialization generated by coastal tourism, i.e. land consumption (number of tourist infrastructures created in the area just inland from the coast, monitoring of the ratio of renovation of buildings versus new construction in tourist accommodation, services, restaurants, etc.) and exposure to coastal risks increased by tourism (number of people exposed, number of tourist properties exposed, particularly in the 500m zone from an eroding coastline). Finally, the input of contaminants linked to artificialization of territories can be reported by the annual data from wastewater treatment plants.

### **What are the data collection frameworks?**

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORK
Agency for the Environment and Energy Management (ADEME)	SINOE litter
Office of Geological and Mining Research (BRGM) - Centre for studies and expertise on risks, environment, mobility and development (CEREMA)	WFD-MSFD artificialization database

General Commission for Sustainable Development. (CGDD)/Data and Statistical Studies Department (SDS)	Land use - CorineLandCover
	Report on the state of the environment in France (REE)
Conservatoire du littoral (CdL)	Adapto in figures
National Institute for Statistics and Economic Studies (INSEE)	PR
Ministry of Ecology Transition (MTE) / Directorate-General for Planning, Housing and Nature (DGALN)	Geoportail de l'urbanisme (GPU)
	Information portal on municipal sanitation
Ministry of Ecology Transition (MTE) / Directorate-General for Risk Prevention (DGPR)	GASPAR database (Geohazards)
French Biodiversity Office (OFB)	Frame of reference of flow obstacles (ROE)
UMR Marine Coastal Ecosystems and Stress Responses (ECOSEAS)	French Mediterranean coast: inventory and impact of building work in the marine sector (MEDAM)

## *Protection and enhancement of natural environments, sites, landscapes and cultural heritage*

### **What do these public policies cover?**

This sector includes public policies carried out with the aim of protecting the environment and landscapes, and enhancing coastal areas, as well as their tangible and intangible heritage. Public action in this sector can address several issues: preservation of certain habitats and associated biodiversity, preservation of sites and landscapes, maintenance of cultural heritage, maintenance of public access to the coast, transmission of local knowledge, etc.

It mobilises site and space classification tools, in particular protected areas, listed and classified sites, and major sites. It also includes land protection policies: sensitive natural areas, coastal conservation, coastal state forest. Other more programmatic tools such as architectural and landscape charters, departmental strategies for the management of the public maritime domain, plans of routes, major site operations, etc. are also included. Environmental preservation can also be achieved through environmental restoration operations. Finally, an important lever in favour of protecting natural environments and heritage is also raising awareness among the general public and users and environmental education, for example implementation, by the permanent centres for environmental education (CPIE), of participative science operations, the organisation of events and shows or as part of marine educational areas. Lastly, the inventory and conservation of maritime cultural heritage, museums and support for cultural events that contribute to a spirited maritime culture are considered here.

For the coastal towns, and even more so the maritime coastlines, this sector represents a major interest for the safeguarding of natural spaces, as well as the tangible and intangible heritage. In addition, it is strongly linked to coastal tourism, which is of significant economic importance. Indeed, the influx of tourists in these towns (which allows shops and small businesses to be set up and jobs created) depends to a large extent on public policies for the protection and/or enhancement of the local natural and cultural heritage. It is therefore in the interest of the areas to promote what makes them attractive. However, tourism can have significant environmental impacts. Increased use of walking routes increases disturbance to coastal flora and fauna, as well as trampling (particularly of short grass). For species of marine fauna and flora, coastal tourism also means increased visual, noise and light disturbance, and even degradation (extraction of species,

degradation of the seabed). Although it is associated with environmental risks, this sector of activity can nevertheless be considered as a favoured medium for raising user awareness of the preservation of the marine environment and coastal areas, since it concerns a large number of users, with varied profiles and of all ages.

### **What are the identified elements and the elements to be reported?**

The data sought relates to the number and spatial extent of protected areas and land protections, as well as all the data of the sites and landscapes policy. The number of restoration operations also makes it possible to qualify and quantify public environmental protection policies.

Promoting sites also involves maintaining or developing their public access (linear coastline open to the public by right of way, number of slipways under management or planned), while limiting their degradation. The data must therefore also cover the field of awareness-raising actions carried out by the various CPIE stakeholders, NGOs, scientific bodies, aquariums, museums, educational establishments, etc.

Maritime special events contribute to the tourist appeal of the coastlines, and data concerning them are therefore sought: census of events, attendance generated, census of organising or participating towns. More generally, the tangible and intangible maritime cultural heritage and its enhancement (lists, museums, events) are part of the information that is sought. Knowledge of the number and quality of beneficiaries is also important.

### **What are the data collection frameworks?**

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORK
Rhône-Méditerranée-Corse Water Agency (AERMC)	GDAI (Investment Aid Management) database
Water Agencies - French Research Institute for Exploitation of the Sea (Ifremer)	WFD Atlas (Envlit)
Centre for studies and expertise on risks, environment, mobility and development (CEREMA)	Coastal path survey
General Commission for Sustainable Development. (CGDD)/Data and Statistical Studies Department (SDS)	Report on the state of the environment in France (REE)
Regional Directorates of Environment, Land Settlement and Housing (DREAL)	
Ministry of Ecology Transition/Directorate of Housing, Urban Planning and Landscapes (DHUP)/Directorate of Housing, Urban Planning and Landscapes (DHUP)	National file of classified sites
Ministry of Ecology Transition (MTE)/Directorate-General for Planning, Housing and Nature (DGALN)	Landscapes objective: interactive map
National Museum of Natural History (MNHN)	National Inventory of Natural Heritage (INPN)
French Biodiversity Office (OFB)	List of "Marine Education Areas"
	Marine Protected Areas Portal France
Network of major sites in France	The member sites of the Network of Major Sites in France

UNESCO	World Heritage List
International Union for Conservation of Nature (IUCN)	IUCN Red List

## 3.2.2 - Research, innovation and training

### *Research and development*

#### **What do these public policies cover?**

This sector covers all scientific research, development and innovation activities.

Public sector research and development covers entities that perform or finance experimental research and development (R&D) for the state, for higher education institutions or for not-for-profit institutions (associations and foundations). This activity mainly involves Ifremer, university and CNRS/INSU oceanography laboratories, the French Navy's Hydrographic and Oceanographic Service (SHOM), the French Institute for Development Research (IRD) and the French Polar Institute Paul-Emile-Victor (IPEV) (resource agency). It also includes a spatial component with Earth observation satellites and spatial systems designed and implemented by the National Centre for Space Studies (CNES), generally as part of bilateral or multilateral cooperation. Often, the object studied requires a multidisciplinary and interdisciplinary approach, therefore involving several scientific disciplines. Other organisations may therefore be involved in ocean research: Météo-France, the French National Institute for Agricultural, Food and Environmental Research (INRAE), the Centre for International Cooperation in Agronomic Research for Development (CIRAD), and the Office of Geological and Mining Research (BRGM).

Private R&D is sensitive data which companies do not communicate much about. It is nevertheless largely associated with public research and is organised in a cooperative way in terms of innovation through innovation centres, three of which are dedicated to the maritime sector: the Brittany-Atlantic and Mediterranean sea centres, which operate as twins, and the Aquimer centre in Boulogne-sur-mer.

This sector represents a significant development issue for all coastlines. Increased knowledge of the sea allows for better adaptation and control of the impact of human activities on the ocean, but also for better exploitation of blue growth. This development is largely due to the need for technical and technological innovations, allowing for the collection of quantitatively and qualitatively superior data. This development of knowledge also requires an improvement in the quality of training in the maritime professions.

Another challenge in this sector is to facilitate the availability of data to the public and to the stakeholders of the maritime coastline. Data producers (scientific laboratories, associations, public research bodies, higher education establishments, etc.) are aiming to involve citizens (participatory science) and certain private stakeholders more and more. The interoperability of the data collected therefore makes it possible to improve their accessibility and reuse. The creation of national portals, for example, makes it possible to improve this flow of knowledge. Finally, the increasing pressures on the environment caused by various human activities require a fully interdisciplinary approach to research programmes.

#### **What are the identified elements and the elements to be reported?**

The monitoring framework includes variables that make it possible to quantify the public research effort carried out on the various coastlines based on data relating to organisations specialising in the production of knowledge on the marine

environment and the activities that take place there. The variables of interest therefore relate to the number of research units and their themes (number of public and private research laboratories on the maritime coastline specialising in the study of marine ecosystems and maritime activities, etc.). There is also interest in the incentive funding of research: public and private investments, future investment, European programmes and international programmes. The system also includes the number of scientific publications or research projects and patents (number of scientific publications concerning the Eastern Channel-Northern Sea sea basin, number of research and development projects relating to the ecological and energy transition of maritime activities, monitoring of scientific publications: number of articles published, number of research projects aimed at technological and environmental innovation, etc.). Through publications and patents, the aim is to measure scientific production in relation to the thematic priorities set out in the strategic targets for knowledge and innovation.

The coastlines also want to encourage innovation in various sectors of activity. Information on innovative research projects (number of companies on the coastline proposing eco-design and ecological restoration processes, number of companies on the coastline allowing biomass to be developed through biotechnologies) is therefore also sought.

Finally, some variables relating to the impact of this sector on the environment (temporal and spatial distribution of impulsive emissions), are directly related to the *in-situ* research activities.

### **What are the data collection frameworks?**

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORK
Agency for the Environment and Energy Management (ADEME)	Thematic review
General Commission for Sustainable Development. (CGDD)/Data and Statistical Studies Department (SDS)	Report on the state of the environment in France (REE)
National Institute of Intellectual Property (INPI)	Patent database
French Research Institute for Exploitation of the Sea (Ifremer)	"Marine Science and Technology" Survey: a national quantitative and qualitative inventory of public research resources
	French oceanographic fleet operated by Ifremer
Ministry of Agriculture and Food (MAA)/Directorate of Maritime Fisheries and Aquaculture (DPMA)	List of operations of the national FEAMP programme 2014-2020
Sea Centres	Logbooks of labelled projects
Naval Hydrographic and Oceanographic Service (SHOM)	Register of impulsive emissions (SIRENE)
AMURE Joint Research Unit	

## **Maritime training**

### **What do these public policies cover?**

Maritime training is considered here in the broadest sense, both for maritime training leading to jobs as sailors in the merchant navy, fishing, aquaculture, sailing and marine mechanics, which are regulated professions, and for training leading to jobs related to the sea and the coast, whether in industry, water sports and leisure, management of natural areas, regional planning, research, etc.

On the one hand, this includes specialised training courses such as professional maritime high schools and the Ecole Nationale Supérieure Maritime, the Ecole Navale, engineering courses specialising in the maritime industries (École Centrale de Nantes, ENSTA Bretagne, etc.), and postgraduate courses in maritime law or oceanography. On the other hand, this covers training, which is not specifically maritime, but which leads in part to jobs which are: leisure, biotechnologies, energy industry, digital, culture, etc. and which are linked to the objectives of ecological transition for example, or the development of maritime culture.

Maritime training is often a cross-cutting socio-economic issue, overlapping with many other issues. Firstly, employment, with the need to train a qualified workforce corresponding to the needs of the sectors, allowing both the creation of sustainable and attractive jobs and professional retraining. Maritime training (information, awareness-raising, communication) also helps to enhance the value of maritime occupations and the results of these activities, as well as their social acceptability. Raising the awareness of the general public and professionals also aims to better consider the impacts and pressures of activities on the environment. Finally, the last part of the challenges in this sector concerns the acquisition, circulation and sharing of data and knowledge on marine and coastal activities and environments.

#### **What are the identified elements and the elements to be reported?**

The data sought concerns the supply of training and the satisfaction of quantitative and qualitative hiring needs, particularly in order to cope with the evolution of jobs due to the ecological transition or the emergence of new activities.

It must be possible to measure the activity of maritime training: number of graduates of secondary maritime education on the coastline by sector of activity, number of approved training centres and their specialities, number of days of continuous training in maritime vocational colleges and vocational training centres. It must also be evaluated in terms of attractiveness by putting it into perspective with variables analysing the rates of professional integration (number of people hired after maritime training, Full Time Equivalent offers by maritime economic sector, share of maritime jobs in coastal areas).

Certain variables relating to maritime training make it possible to characterise the attractiveness of certain sectors, such as professional fishing (number of regional or joint State-regional strategies for the training of fishermen and managers of maritime companies, number of training courses available for fishermen, number of approved training centres on the coastline for fishermen, number of days of training in maritime vocational colleges), aquaculture (number of people trained in aquaculture, number of training courses available for fish farmers and managers of aquaculture companies, number of approved training centres, number of days of training in aquaculture in vocational colleges, and development of regional or State-regional strategies for the training of fish farmers), or the power generation and industry sector.

#### **What are the data collection frameworks?**

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORK
Association for the management of training for employees in SMEs (AGEFOS-PME) / Joint Professional Section for Fishing and Marine Crops (SPP-PCM)	
General Commission for Sustainable Development. (CGDD)/Data and Statistical Studies Department (SDS)	Report on the state of the environment in France (REE)
Interregional Directorates for the Sea (DIRM)	
École Nationale Supérieure Maritime (ENSM)	
Ministry of Ecology Transition (MTE) / Directorate General for Infrastructure, Transport and the Sea (DGITM) / Direction of Maritime Affairs (DMA)	

### 3.2.3 - Local economy

#### What do these public policies cover?

Some strategic targets deal with the local economy in a cross-functional manner, either because they aim to develop and promote different types of economy at coastline level (circular economy, blue economy, social and solidarity economy), or because they deal with the economy of a particular type of territory (island territories for example). The indicators linked to these targets, as well as the data collection frameworks they imply, are cross-functional to different sectors of activity, and cannot be linked to only one, or a few.

#### What are the identified elements and the elements to be reported?

The monitoring framework includes variables that allow the development of the circular economy to be characterised (number of innovative initiatives for the collection and reuse of litter by and from maritime activities, number of innovative initiatives for the collection and reuse of land-based litter arriving at sea, holders of NF Environnement and European ecolabelled products, number of ecological transition contracts put in place), the blue economy (areas identified in the Local Urbanisation Plan of coastal towns and the various planning and urban development documents of local authorities for the development of blue economy activities, quarterly/annual monitoring of the blue economy, number of access points to the sea for blue economy activities), and the social and solidarity economy (number of companies).

The objectives relating to the development of the NAMO coastline islands include variables relating to social and generational diversity (evolution of the unemployment rate in coastal towns since 1990, poverty rate of different age groups in coastal employment areas, share of over-occupied housing in coastal towns, share of unintegrated young people in coastal employment areas), as well as to the energy transition.

#### What are the data collection frameworks?

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORK
General Commission for Sustainable Development. (CGDD)/Data and Statistical Studies Department (SDES)	Report on the state of the environment in France (REE)
General Commission for Sustainable Development. (CGDD)/Data and Statistical Studies Department (SDES) - National Institute for Statistics and Economic Studies (INSEE)	Territorial indicators of sustainable development
Regional Directorates for Enterprise, Competition, Consumption, Labour and Employment (DIRECCTE)	List of SSE (Social and Solidarity Economy) enterprises
Ministry of Ecology Transition (MTE) / Directorate-General for Planning, Housing and Nature (DGALN)	Mapping: territories involved in ecological transition contracts

### 3.2.4 - Safety and security of maritime spaces

#### What do these public policies cover?

Maritime Territorial Defence (DMT) meets the objectives of national defence at sea and is the military counterpart of the State's action at sea (AEM), which aims to maintain order and safeguard property and persons. These two parts together form the "Permanent Maritime Safeguarding Position".

Beyond the 300m zone from the coastline, the responsibilities and policing powers of the State are exercised. The missions covered by the State Action at Sea are defined in the Decree of 22 March 2007, and six of them are qualified as priorities: saving human life and assisting ships in difficulty, combating illegal trafficking by sea, repressing illegal discharges at sea and combating major marine pollution, combating illegal fishing activities (via fisheries control), monitoring and preserving marine protected areas, and security at sea.

Defined in the Defence Code, Maritime Territorial Defence *"contributes to ensuring the security of the national territory, and in particular the protection of priority defence installations."* It complements civil defence, operational territorial defence and air defence. It is permanent and its purpose is:

- 1: To monitor the national territory approaches on its maritime coastlines, to detect and evaluate the threat that may be posed on or in the sea;
- 2: To inform the civil and military authorities of suspicious or hostile activities at sea and threats of maritime origin which concern their areas of responsibility;
- 3: To oppose actions by sea against national territory and adverse undertakings against national interests in the approaches to that territory, in particular, against national activities in all coastal and maritime areas where France has exploitation rights.

The units of the national navy, including those of the coastguard, permanently ensure surveillance of the maritime approaches within the framework of both the MEA and the LMD, in order to ensure the land-sea and defence-security continuum along the French maritime coastlines.



The implementation of the Permanent Maritime Safeguarding Position is therefore a matter for national coordination, under the authority of the Prime Minister.

This strategy concerns the coastline in two ways: on the one hand, on the deployment of means and actions to preserve safety and security at sea; on the other hand, on the economic side, through the number of affected infrastructures and jobs.

### **What are the identified elements and the elements to be reported?**

The socio-economic variables of maritime territorial defence activities and state action at sea are concerned with the location of these activities, and the means deployed to ensure maritime safety and security. The precise location variables of the activities cannot be disclosed for reasons of defence of national interests, but the monitoring framework nevertheless includes the perimeter of the maritime sectors used by Defence (for test firing, training sectors, or fly overs by aircraft), as well as the perimeter of intervention by CROSS.

The variables relating to the allocated resources mainly concern the budget allocated to the national navy, but also the employment directly or indirectly linked to this sector of activity (civilian and military personnel employed in the dockyards, personnel involved in the permanent maritime safeguarding position), or the companies supplying Defence (in particular the shipbuilding/dismantling companies) and their output (number of military ships built or deconstructed).

Other variables make it possible to characterise the means deployed (number of ships deployed, average age of the air-sea fleet, number of air and sea assets deployed for surveillance at sea and for surveillance of vital coastal points). They also relate to the characterisation of the operations carried out (monthly number of fly overs by a State aircraft, number of CleanSeaNet satellite passes in the month, number of hours at sea and their hourly cost for the State's action at sea, number of flight hours and their hourly cost for the State's action at sea, number and type of countermining operations). Finally, the monitoring framework includes variables relating to maritime surveillance systems (detection and identification range of surface vectors; integration time of detections of surveillance aircraft and surface vessels in surface status analysis systems), the implementation of POLMARs (implementation rate, number of reports of illegal oil discharges at sea, number of accidental spills of contaminants at sea), and non-hydrographic areas.

The activities related to the permanent maritime safeguarding position generate positive impacts on the environment (preservation of marine protected areas, including Natura 2000 sites, fight against pollution, fight against illegal fishing) but they also have negative impacts in terms of underwater noise pollution. The monitoring framework therefore also includes variables relating to impulsive emissions of high to very high acoustic levels generated by these activities.

### **What are the data collection frameworks?**

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORK
Ministry of Ecology Transition (MTE) / Directorate General for Infrastructure, Transport and the Sea (DGITM) / Direction of Maritime Affairs (DMA)	Security systems for goods, persons and installations in a sensitive maritime area (SECMAR)
Ministry of Armed Forces / Chief of Staff of the French Navy	
Naval Hydrographic and Oceanographic Service (SHOM)	Register of impulsive emissions (SIRENE)
	National Hydrography Programme

## **3.2.5 - Preservation of resources, biodiversity and marine environments**

### **What do these public policies cover?**

This section deals with the 'costs of degradation' of the marine environment. This analysis allows the socio-economic impacts of the deterioration of the marine environment to be estimated. It includes all existing public policies aimed at monitoring the state of the marine environment, its resources and biodiversity, preventing/avoiding their degradation and mitigating its effects. These public policies can be exclusively marine, as is the case for fisheries policy, or have a broader spectrum of application, as is the case for water quality protection or biodiversity conservation policies. In this second case ("broad-spectrum" public policies), the monitoring framework only includes data collection frameworks that are related to the marine environment, its resources and its biodiversity.

### **What are the identified elements and the elements to be reported?**

The concept of degradation costs refers to the actions required to degrade the marine environment and the costs that they impose on society as a whole. The aim is therefore to evaluate the costs associated with the various existing management systems, but also to combine this expenditure for the maintenance of the marine environment with an assessment of their effectiveness by listing the residual impacts, i.e. the differences observed between the current situation and the desired state of the marine environment.

Ten degradation themes are monitored, which have been defined with reference to the descriptors of the Good Environmental Status of marine waters, to the list of pressures and impacts mentioned in Annex III of the MSFD, and to the organisation of expenditure related to the protection of the marine environment:

- costs related to microbial pathogens (pressure)
- costs related to eutrophication (D5)
- costs related to micropollutants (D8, D9)
- costs related to the degradation of fishing resources (D3)
- costs related to the degradation of shellfish resources (D3)
- costs related to the loss of biodiversity and seabed integrity (D1, D4, D6)
- costs related to marine litter (D10)
- costs related to oil spills and illegal discharges (D8, D9)
- costs related to the impacts of non-indigenous species (D2)
- costs related to the introduction of energy into the environment and changes in the hydrological regime (D7, D11)

Measures to combat biodiversity erosion are largely cross-functional to all degradation themes: the approach adopted for the assessment of the costs related to this theme is therefore to assess the costs not taken into account by the other issues, most of which are built around specific anthropogenic pressures.

For each degradation theme, costs are estimated for four types of measures:

- information and monitoring measures, which include actions related to information gathering, applied research and monitoring and surveillance frameworks associated with a degraded marine environment;
- preventive measures, which consist of economic investments or incentives aimed at the prevention of behaviour harmful to the marine environment; they include awareness-raising measures, management measures and monitoring and control measures;

- preservation measures, which consist, when harmful behaviour could not be prevented, in preventing impacts on the marine environment, in particular through clean-up measures (for example, wastewater treatment to avoid chemical or bacteriological contamination);
- remediation measures, which consist, when impacts on the marine environment could not be prevented, of putting in place curative measures aimed at restoring the quality of the marine environment or protecting human populations against the impacts of degradation.

### **What are the data collection frameworks?**

DATA PRODUCER/HUB	DATA COLLECTION FRAMEWORKS
Water Agencies	
National Committee of maritime fisheries and marine fish farming (CNP MEM)	
Conservatoire du Littoral (CdL)	
National Institute for Statistics and Economic Studies (INSEE)	Survey on industry investments to protect the environment (ANTIPOL)
Ministry of Ecology Transition/Water and Biodiversity Directorate (DEB)	
Ministry of Agriculture and Food (MAA)/Directorate of Maritime Fisheries and Aquaculture (DPMA)	
Ministry of Ecology Transition (MTE)/Directorate-General for Planning, Housing and Nature (DGALN)	Information portal on municipal sanitation
French Biodiversity Office (OFB)	

## **4 - ANNEXES**

**4.1 - Annex 1. Monitoring programmes under the second cycle of the MSFD - Part 1**

**4.2 - Annex 2. Reminder of strategic targets and criteria - Part 2**

**4.3 - Annex 3. Indicators and data collection frameworks by coastline - Part 2**

**4.4 - 3a. Focus on Socio-Economic Objectives (SEOs)**

**4.5 - 3b. Focus on Environmental Targets (ETs), Good Environmental Status (GES) criteria and Economic and Social Analysis (ESA)**

**4.6 - Annex 4. Data collection frameworks - Part 2**

**4.7 - Annex 5. Glossary**





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