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SIMNORAT

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1 Introduction

The purpose of this document is to identify the specific ecological characteristics of the marine management area. It aims at identifying where the particularly sensitive or ecologically important areas are. Identifying where ecologically or biologically significant areas are located is a key step for marine spatial planning. This assessment is centered on the Marine Strategy Framework Directive (European Parliament et Council of European Union s. d.) 'Good Environmental Status' Descriptor 1 (Biodiversity) and Descriptor 4 (Ecosystems, including food webs).

2 Benthic habitats (Descriptor 1, Descriptor 6)

2.1 Substrate types, bathymetry and 'Broad Habitat Types'

On the Cantabrian and the Galician shelf, and most probably in the whole region, depth and sediment characteristics (grain size and organic contents) are the main factors controlling the distribution of both epibenthic and endobenthic communities (ICES 2008).

2.1.1 Bathymetry and biological zones

Figure 1 shows the main biological zones drawn from the bathymetry of the seabed. The wide continental shelf in the Bay of Biscay appears on the Figure 1 below (with large 'shallow circalittoral' and 'deep circalittoral' areas). The continental slope (uper, mid and lower bathyal zones) lies very near to the Iberian and Portuguese coasts. Beyond the continental slope lies the abyssal plain, about 5000m deep.

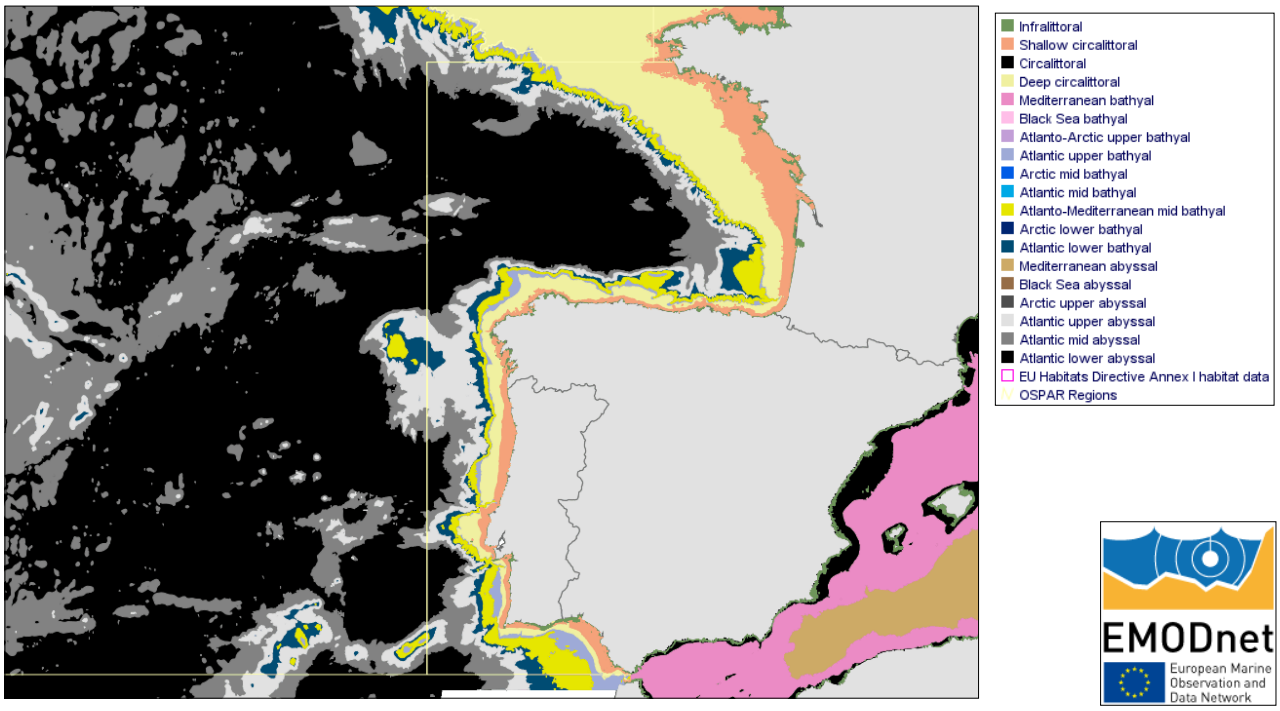

Figure 1: Biological zones in the OSPAR IV region, according to depth.

2.1.2 Type of substrate

The substrate of the shelf of the Bay of Biscay and the Iberian Coast ecoregion is dominated by sand and muddy-sand areas, with a large mud area in the northern part of the Bay of Biscay (Grande Vasière) and in its southern part (Vasière des Landes) as well as in the Gulf of Cadiz (Figure 2).

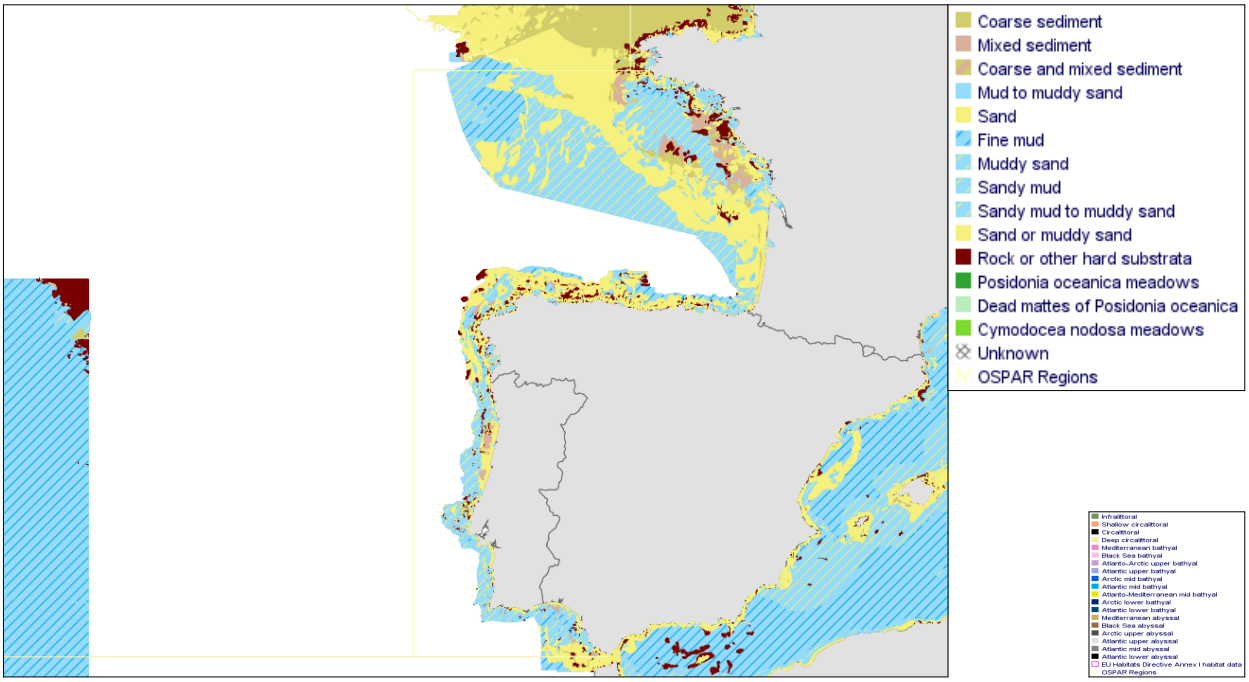

Figure 2 : Substrate types in the OSPAR Region IV

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2.1.3 Substrate and depth define 'Broad Habitat Types'

The list of Broad Habitat Types as defined by the Marine Strategy Framework Directive, and their correspondence with EUNIS (European Nature Information System) typology, is found in Table 1Table 5 below. The MSFD defines broad habitat types widely as corresponding to EUNIS "level 2" habitat typology. A map of MSFD Predominant Habitat Types is provided hereafter.

Broad Habitat type	Relevant EUNIS habitat codes (version 2016)
Littoral rock and biogenic reef	MA1, MA2
Littoral sediment	MA3, MA4, MA5, MA6
Infralittoral rock and biogenic reef	MB1, MB2
Infralittoral coarse sediment	MB3
Infralittoral mixed sediment	MB4
Infralittoral sand	MB5
Infralittoral mud	MB6
Circalittoral rock and biogenic reef	MC1, MC2
Circalittoral coarse sediment	MC3
Circalittoral mixed sediment	MC4
Circalittoral sand	MC5
Circalittoral mud	MC6
Offshore circalittoral rock and biogenic reef	MD1, MD2
Offshore circalittoral coarse sediment	MD3
Offshore circalittoral mixed sediment	MD4
Offshore circalittoral sand	MD5
Offshore circalittoral mud	MD6
Upper bathyal rock and biogenic reef	ME1, ME2
Upper bathyal sediment	ME3, ME4, ME5, ME6
Lower bathyal rock and biogenic reef	MF1, MF2
Lower bathyal sediment	MF3, MF4, MF5, MF6
Abyssal	MG1, MG2, MG3, MG4, MG5, MG6

Table 1 : MSFD Benthic broad habitat types as defined in Commission Decision (EU) 2017/848

Broad habitat types and biological communities.The mean fish species richness shows a progressive decrease with depth whereas the inverse phenomena appears in invertebrates, which prefer deeper water and muddy substrates owing to their predominantly detritivorous feeding habits. Mediterranean species occur in the southern part of the OSPAR IV region, with decreasing abundance eastwards in the Cantabrian Sea at least for shallow species. The dominant mobile invertebrates on the soft grounds of the shelf are detritivorous crustaceans and molluscs, while the same type of

grounds in deeper areas are dominated by filter-feeders such assponges and cnidarians. The latter are abundant on rocky bottoms together with echinoderms. In some areas bioherm, such as maerl beds occur in shallow waters. *Lophelia* formations are known to be present in the Cantabrian Sea on the slopes at depth ranges that coincide with the Mediterranean Outflow Water (ICES 2008).

Figure 3 provides a map of MSFD Broad Habitats Types. Data was extracted from EMODnet to perform a quantitative analysis of each habitat type area. The most representative broad habitat types in OSPAR IV region are:

- → 'Shelf sulittoral sediment' (coarse, sand, mud, mixed) represents 30% of the total mapped area (16,595.1 Km^2). This habitat can be found all over the continental shelf of OSPAR IV Region, but is more represented on French continental shelf. The largest area of this broad habitat type is the shelf sublittoral mud area in the north of the Bay of Biscay ('Grande Vasière'). These areas have a high ecological importance as many fish species use them as nurseries.
- → 'Abyssal sediment' represents 28% of the broad habitats (155,885.3 km^3). In the OSPAR IV Region, it is mostly represented in the Bay of Biscay. Biological diversity of bathyal and abyssal sediments is not well known, but likely to be very high.
- → 'Shallow sublittoral sediment' (coarse, sand, mud, mixed) is present in 13% of the area (73,423.45 Km^2).
- → 'Upper bathyal sediment' is present in 12% of the seabed surveyed (68,100.01 Km^2). The presence of this habitat can be highlighted in the Bay of Biscay (French waters, offshore of Asturias region, and in the southern border of Portuguese and Spanish waters).
- → 'Lower bathyal sediment' represents 9% of the area (47,141.15 Km^2) and is mainly distributed in the lower bathyal seabed of French waters.

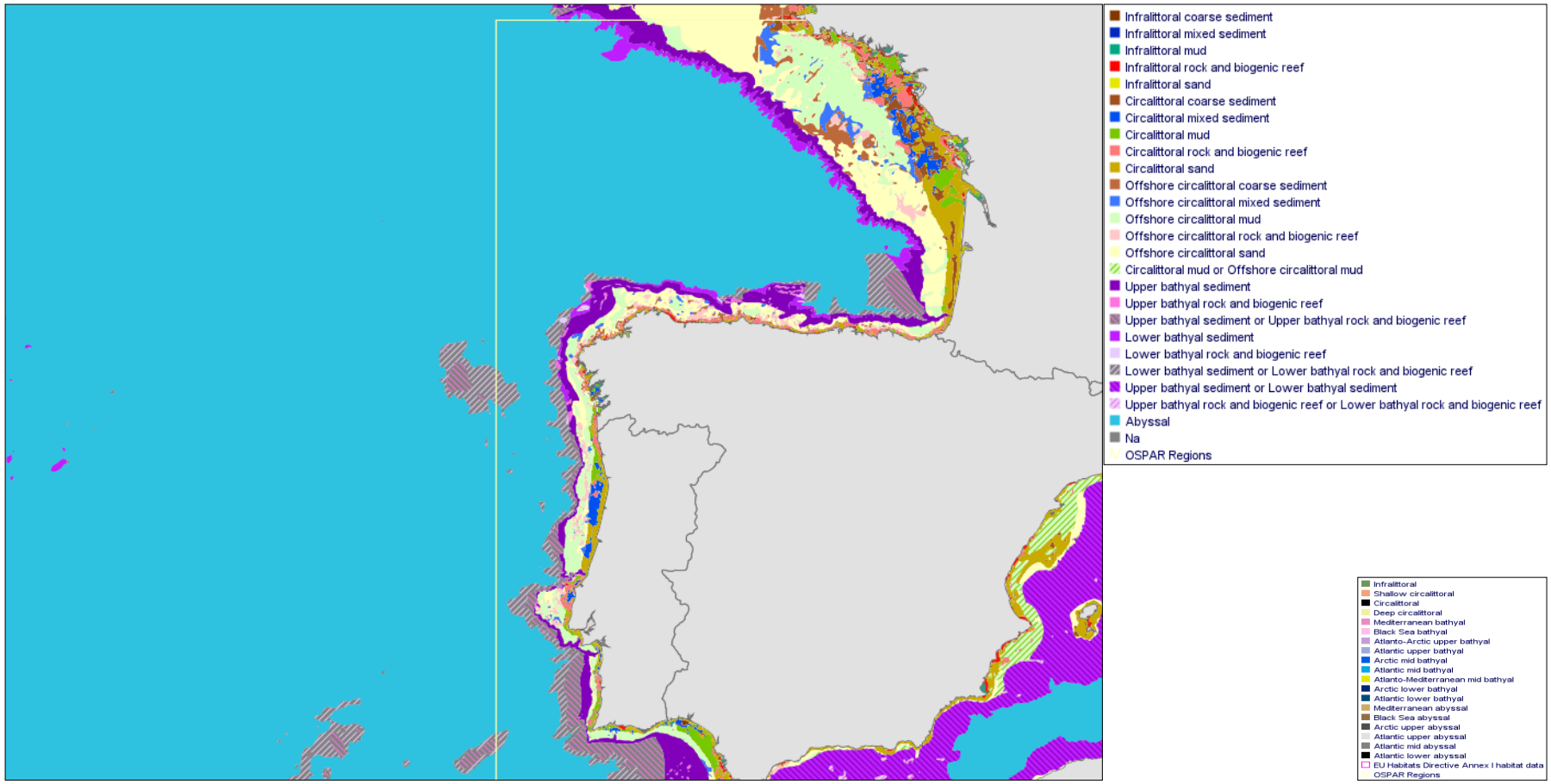

Figure 3 : MSFD Broad Habitat Types

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2.2 Distribution and status of special habitats

2.2.1 Definition of particular/special habitats

The assessment of MSFD habitats includes both "predominant seabed and water column types" often referred to as "Broad Habitat Types", and "Special Habitat Types" which refer especially to those recognized or identified under Community legislation (the Habitats Directive) or international conventions (e.g. OSPAR) as being of special scientific or biodiversity interest. This may include areas subject to intense or specific pressures or areas which merit a specific protection.

2.2.2 Listed habitats under Community legislation or international conventions

Marine habitats of Commnity interest are listed in **Annex I to 'Habitats Directive' 92/43/EEC**[1]**.** Moreover, OSPAR established a **List of Threatened and/or Declining Habitats**[2]**.** Further information on Habitats Directive can be found in Annex III. Description of habitats listed in Annex I to Habitat Directive. The full OSPAR List of habitats can be found in Annex II. Description of OSPAR Listed Habitats occurring in Region IV

There are correspondances between Annex I. MSFD Benthic broad habitat types as defined in Commission Decision (EU) 2017/848 and OSPAR Listed habitats. Habitats Directive or OSPAR Convention use different habitat typologies, and often the links between typologies are from "many to many" rather than "one to one" (European Environmental Agency 2014). For example, most OSPAR habitats are part of a wider Annex I. MSFD Benthic broad habitat types as defined in Commission Decision (EU) 2017/848 (e.g. the very widely defined Annex I habitat "1170 Reefs" includes several OSPAR habitats). There can also be overlaps in some cases.

Correspondances between Annex I. MSFD Benthic broad habitat types as defined in Commission Decision (EU) 2017/848 and OSPAR Listed habitats is detailed in Table 4.

2.2.2.1 *Annex I to Habitats Directive (description and distribution)*

The Habitats Directive 92/43/EEC defines habitat of Community Interest (listed in its Annex I. MSFD Benthic broad habitat types as defined in Commission Decision (EU) 2017/848) as those that (i) are in danger of disappearance in their natural range; or (ii) have a small natural range following their regression or by reason of their intrinsically restricted area; or (iii) present outstanding examples of typical characteristics of one or more of the seven following biogeographical regions: Alpine, Atlantic, Boreal, Continental, Macaronesian, Mediterranean and Pannonian (Article 1c, as modified in 1995 and 2004).

2.2.2.2 *Annex I habitats occuring in OSPAR IV Region*

Marine habitat types in the Annex I to Habitats Directive (habitats of Community interest) are presented in the following Table 2.

All of these marine habitats are occurring in the OSPAR IV region, except Posidonia beds. Coastal lagoons (1150) are qualified as 'priority habitats' by the Habitats Directive.

[1] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

[2] https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats

Natura code	Typology of marine habitat types
1	Coastal and halophytic habitats
11	Open sea and tidal areas
1110	Sandbanks which are slightly covered by sea water all the time
1120	Posidonia beds (*)
1130	Estuaries
1140	Mudflats and sandflats not covered by seawater at low tide
1150	Coastal lagoons (**)
1160	Large shallow inlets and bays
1170	Reefs
1180	Submarine structures made by leaking gasses
8	ROCKY HABITATS
83	Other rocky habitats
8330	Submerged or partially submerged sea caves

Table 2 : Annex I to Habitats Directive marine habitat types. (*): not present in OSPAR IV region. (**): Priority habitat.

Remark: 'Reefs' (1170) can be either biogenic concretions or of geogenic origin. A description of each habitat type is provided in Annex II. Description of OSPAR Listed Habitats occurring in Region IV.

Further description of each habitat type is provided in the Interpretation Manual of the European Commission (GD Environnment 2013).

In France, Annex I habitats present in French waters are listed and described in the 'Cahiers d'habitats Natura 2000' (Bensetti et al. 2004). Their spatial distribution is also provided in the mentioned document.

2.2.2.3 *Distribution of Annex I habitats in OSPAR IV Region*

Figure 4 shows the distribution of Annex I marine habitat types in the OSPAR IV Region.

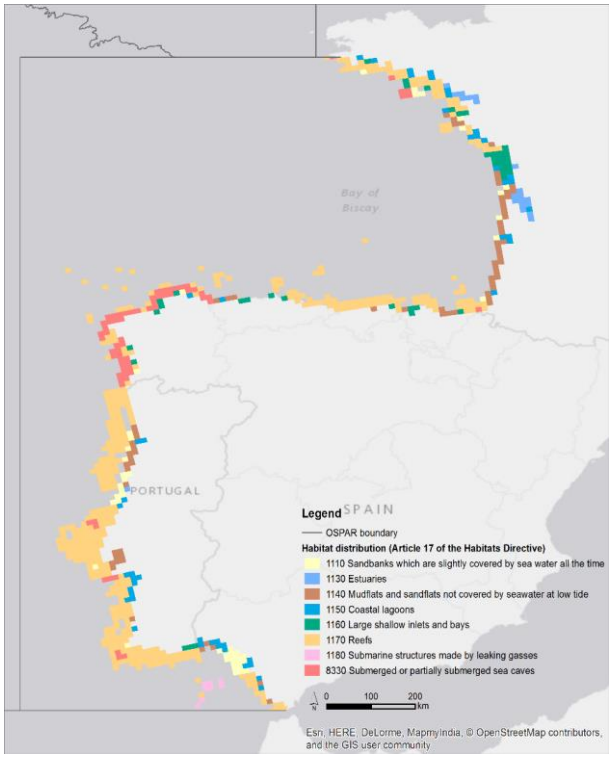


Figure 4 : Habitats distribution (Article 17 of the Habitats Directive). Data from EEA spatialized through ArcGIS by University of Aveiro, 2017

Remark: spatial distribution of Annex I habitats is given with low resolution. Therefore, each square containing one of the Annex I habitats surely also contains some surface occupied with Broad Habitats.

- → 1110 'Sandbanks which are slightly covered by seawater all the time' are locally found near French coasts, north of Portugal and south of Spain coasts.
- → 1130 'Estuaries' show large estuaries of France (Vilaine, Loire, Gironde, Adour), and smaller estuaries of Portugal and Spain.
- → 1140 'Mudflats and sandflats not covered by seawater at low tide' are manily found along French coasts in the south of the Bay of Biscay and in northern Portugal coasts.
- → 1150 'Coastal lagoons' are mainly found in the Bay of Biscay as well as in Portugal and Gulf of Cadiz.
- → 1160 'Large shallow inlets and bays' is most common in northern part of the Bay of Biscay (Concarneau Bay, Gulf of Morbihan, Vilaine bay and Pertuis).
- → 1170 'Reefs' occur mainly near Portugal coasts, cantabrian coasts, and northern part of the Bay of Biscay. Remark: reefs can be biogenic concretions or of geogenic origin(GD Environnment 2013). This habitat type includes or overlaps with many OSPAR habitats (Table 4Table 15). It is worth mentioning that *Lophelia pertusa* reefs which is an OSPAR habitat included in 1170 'Reefs' is reported to be found along the continental slope of the Bay of Biscay (Figure 4).
- → 1180 'Submarine structures made by leaking gas only appears south of Region IV, in the Gulf of Cadiz. However, gas seep depressions (commonly referres to as 'pockmarks') have been reported in south of Britanny, France (Baltzer et al. 2013).
- → 8330 'Submerged or partially submerged sea caves' are mainly found in Galicia.

2.2.3 OSPAR List of Threatened and/or declining habitats

2.2.3.1 *OSPAR Listed habitats occurring in Region IV*

The OSPAR List of Threatened and/or Declining Habitat types occurring in region IV are the following:

Habitat type name	OSPAR Regions where the habitat occurs	OSPAR Regions where such habitats are under threat and/or in decline
Coral Gardens	**I, II, III, IV, V**	**All where they occur**
Cymodocea Meadows	**IV**	**All where they occur**
Deep-sea sponge aggregations	**I, III, IV, V**	**All where they occur**
Intertidal mudflats	**I, II, III, IV**	**All where they occur**
Lophelia pertusa reefs	**All**	**All where they occur**
Maerl beds	**All**	**III**
Modiolus modiolus beds	**All**	**All where they occur**
Ostrea edulis beds	**II, III, IV**	**All where they occur**
Sabellaria spinulosa reefs	**All**	**II, III**
Seamounts	**I, IV, V**	**All where they occur**
Sea-pen and burrowing megafauna communities	**I, II, III, IV**	**II, III**
Zostera beds	**I, II, III, IV**	**All where they occur**

Table 3 : OSPAR Threatened and/or declining habitat types occurring in OSPAR IV region. The full OSPAR List is provided in Annex II. Description of OSPAR Listed Habitats occurring in Region IV

Remark: 'Carbonate mounds' listed in OSPAR Convention are not said to be present in Region IV on OSPAR website, however it was reported to be present in areas like Avilès canyon (south of the Bay of Biscay (Sanchez et Punzon 2014). Similarly, 'Intertidal *Mytulis edulis* Beds on Mixed & Sandy Sediments' is listed in OSPAR Convention. OSPAR does not report it in Region IV. However, MSFD Initial Assessment mentions a *M. edulis* community, even though further investigation is needed to find if it really falls under OSPAR criteria for this habitat. (Agence des Aires Marines Protégées et Ifremer 2012)

A description of each OSPAR habitat types is provided in each OSPAR Background Document that can be found on the OSPAR website.[3] These Background documents provide description of habitats, information on their location, reasons for their nomination for inclusion on the OSPAR list, (according to the Criteria for the Identification of Species and Habitats in need of Protection and their Method of Application, i.e. Texel-Faial Criteria), as well as main threats.

Annex II. Description of OSPAR Listed Habitats occurring in Region IV provides a summary of information available in these Background Documents for each OSPAR Listed habitat that occurs in Region IV.

[3] https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats

Correspondances between OSPAR Listed habitats and Annex I to Habitats Directive habitats occurring in OSPAR IV Region appear in the Table 4Table 15 below:

Name of the Annex I habitat (occurring in Region IV)	Type of correspondance	OSPARConvention habitat (occurring in Region IV)
Sandbanks which are slightly covered by sea water all the time (1110)	Overlap	Maerl beds
	Overlap	*Ostrea edulis* beds
	Includes	*Zostera* beds
Estuaries (1130)	Overlap	Intertidal mudflats
	Overlap	*Ostrea edulis* beds
	Includes	*Zostera* beds
Mudflats and sandflats not covered by seawater at low tide (1140)	Overlap	Intertidal mudflats
Coastal lagoons* (1150)	Overlap	Intertidal mudflats
Large shallow inlets and bays (1160)	Overlap	Maerl beds
	Overlap	*Ostrea edulis* beds
	Overlap	Sea-pen and burrowing megafauna communities
Reefs (1170)	Overlap	Coral gardens
	Overlap	Deep-sea sponge aggregations
	Includes	*Lophelia pertusa* Reefs
	Includes	*Modiolus modiolius* beds
	Overlap	*Ostrea edulis* beds
	Includes	*Sabellaria spinulosa* beds
Submarine structures made by leaking gasses (1180)	No correspondance	
Submerged or partially submerged sea caves (8330)	No correspondance	

Table 4 : Correspondance between habitats listed in OSPAR List and Annex I to Habitats Directive occuring in OSPAR Region IV. (*): priority habitats. Source of information: INPN data search tool

2.2.3.2 Distribution of OSPAR habitats in OSPAR IV Region

Figure 5 hereafter shows the location of habitats listed under the OSPAR Convention, listed in the List of Threatened and/or Declining Habitats.

However, it is important to say that this map does not mention all existing location of all OSPAR habitats, as other documents might mention.

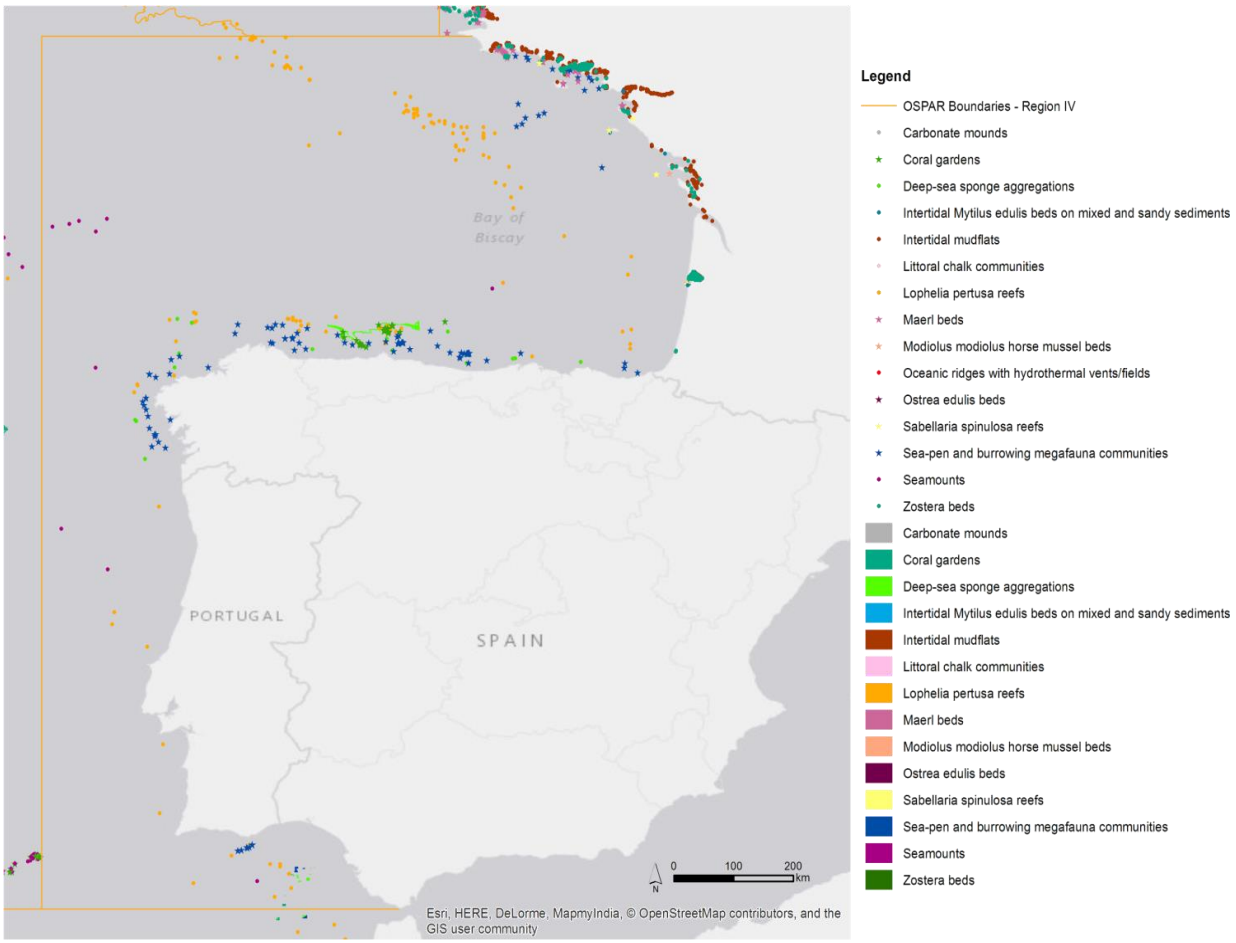


Figure 5 : OSPAR Threatened and/or declining habitats (https://odims.ospar.org/maps/298)

The most representative threatened and/or declining habitat identified (more than 600 identified locations) by OSPAR is the **'Intertidal mudflats'** mainly distributed in the Bay of Biscay coastal areas of France (especially in the coastal region between Concarneau and La Rochelle with higher incidence on bays and estuarine areas).

***'Zoostera* beds'** occurs a lot in this region (over 300 locations) sharing the same locations as the 'Intertidal mudflats' except for the important area of Arcachon. ***'Lophelia pertusa* reefs'** are identified in circa 150 locations mainly distributed on the continental slope of the Bay of Biscay and Galicia.

'Sea pens and burrowing megafauna communities' is also an important threatened and/or declining habitat (over 100 locations) in the northern part of the Bay of Biscay, in the north of Spain, and a small aggregation of this habitat occurs in the south of Portugal. They are often found along with **'Coral gardens'** and '**Deep-sea sponge aggregations'** near submarine canyons (e.g. canyons of North Altantic Spanish waters)

'Maerl beds' are also an important threatened and/or declining habitat especially in the north of the Bay of Biscay (French continental platform) (over 40 locations). They are also found in areas not mentioned on this map:

10 **'Seamounts'** are present in the OSPAR IV Region, such as '*El Cachucho'* in Cantabrian sea, *'Banco de Galicia (Spain)*' offshore Galicia, Vigo Seamount and Vasco da Gama seamount, or '*Gorringe Bank (Ormonde ond Gattysburg seamount)*' in the margin of the zone (Portugal). Despite the small number these habitats must be subject to especial attention as they are "hotspots" of

marine life. For this reason they are the main grounds for high seas fishing activities and highly vulnerable to the pressure of this activity.**'Carbonate mounds'** are not reported to occur on this OSPAR Region IV map, however they are mentioned to occur at least in Avilès canyon area (Sánchez, et al., 2014)

Remark: Figure 4 (showing Annex I habitats) does not report 'Reefs 1170' on the continental slope of the Bay of Biscay, even though this habitat type includes '*Lophelia pertusia* reefs' that appear on Figure 5. The Figure 5, more recent, is to be used.

2.3 Status and trends for benthic habitats (assessment frameworks)

2.3.1 Assessment of benthic habitats under MSFD and OSPAR

Benthic communities and benthic habitats status are assessed by France, Portugal and Spain under Marine Strategy Framework Directive (European Parliament et Council of European Union s. d.) (for all marine habitats), OSPAR Regional Sea Convention (for OSPAR Threatened and/or declining habitats and species)

Reporting under MSFD and OSPAR is based on many indicators, some being common to both MSFD and OSPAR. MSFD indicators are assessed every 6 years in MSFD Initial Assessment (latest in 2012), and OSPAR indicators are assessed every 10 years in Quality Status Reports (OSPAR Commission 2010). OSPAR also published Intermediate Assessment in 2017 (OSPAR Commission 2017). However, criteria and indicators used change over time as methodology improves. Therefore, MSFD criteria and indicators have changed between 2012 and 2018 Assessments[4], and the OSPAR Intermediate Assessment provides the first assessment of a new set of OSPAR indicators. Some of these new indicators were developed by the EcApRHA project (development of biodiversity indicators for the OSPAR regions). MSFD indicators are not likely to be the same from country to country, whereas OSPAR indicators are common to OSPAR members.There is an increasing effort for harmonization of indicators, to contribute to both OSPAR and MSFD reporting.

MSFD	Criteria elements	Criteria
Descriptor 6: 'Sea-floor integrity'	Physical loss of the seabed (including intertidal areas)	D6C1: Spatial extend and distribution of physical loss (permanent change) of the natural seabed
	Physical disturbance to the seabed (including intertidal areas)	D6C2: Spatial extend and distribution of physical disturbance on the natural seabed
	Benthic broad habitat types or other habitat types	D6C3: Spatial extent of each habitat type which is adversely affected (…) by physical disturbance
Descriptor 1: 'Biodiversity'	Benthic broad habitat types	D6C4: Extent of loss of the habitat resulting from anthropogenic pressures
	Benthic broad habitat types	D6C5: Extent of adverse effects from anthropogenic pressures on the condition of the habitat type

Table 5 : Criteria used to assess benthic habitats under MSFD Descriptor 1 and Descriptor 6 (Decision 2017/848)

[4] Commission Decision (EU) 2017/848 of 17 May 2017 laying down criteria and methodological standards on good environmental status of marine waters and specifications and standardized methods for monitoring and assessment, and repealing Decision 2010/477/EU

2.3.1.1 *French MSFD elements on benthic habitat*

The French MFSD evaluation on benthic habitat is based on the "Benthoval" indicator (describing the effect of all human pressures by comparing an actual status and a reference status): himself based on the data from WFD. The 2018 MFSD reports are still in progress.

2.3.1.2 *Spanish MSFD elements on benthic habitat*

In terms of biogeography, the north-atlantic area of Spain is located at the subtropical/boreal transition zone of the Eastern Atlantic. Typical temperate water species from the south cohabit together with others of northern origin and, consequently, high biodiversity indices exist in relation to adjacent areas. In addition, the topographical complexity and the wide range of substrates on its narrow continental shelf give rise to many different types of habitats. This diversity is reflected in the biological richness of the region, which includes a wide range of species, many of which are of commercial interest.

2.3.1.2.1 Environmental conditions driving benthic habitats distribution

Benthic habitats are controlled by water column production that in the area is greatly influenced by a seasonal coastal upwelling (spring and summer) and hydrographical mesoscale activity along the northwestern shelf-break. Upwelling events are more common and intense to the west of Cape Peñas, and that this is a mechanism of spatial variability between the western and eastern parts of the subregion. This is a consequence of the geographical location of the western area, which is closer than the eastern one to the anticyclone edge of the Azores High, and hence more influenced by eastern winds. Because of this, coastal summer upwelling strength—and hence chlorophyll values—decrease eastwards, and following the trophic webs these differences are also reflected in the abundance of zooplankton. In spring (as a consequence of mountain snow melting), the southeasternmost corner of the Bay of Biscay is the area of greatest discharge of continental fresh water, mainly through French rivers.

Other key factors in habitat distribution are topography, the different geomorphology of Galician and cantabrian shelves. East of Cape Peñas, the Cantabrian sea shelf is very narrow (10-35 km), with an abrupt shelf break where the environmental gradients are very short, whereas west of Cape Peñas the shelf is wider (25-75 km), with a gradual transition between shelf and slope.

On the Galician shelf, the outwelling of large estuaries called *rias* is a very important process, whereas rivers are not important on the Cantabrian shelf, where the role of great submarine canyons is more determinant. The sediment distribution in the two areas also differs: the Galician upper slope is composed mainly of sand, while the Cantabrian upper slope consists mainly of mud. The organic inputs of the French rivers thus lead to the presence of organic-enriched mud in the easternmost part of the Cantabrian Sea.

All this environmental heterogeneity determines a patchy distribution of benthic habitats in the area, specially where the gradients are stronger, in the narrow shelf of the Cantabrian Sea.

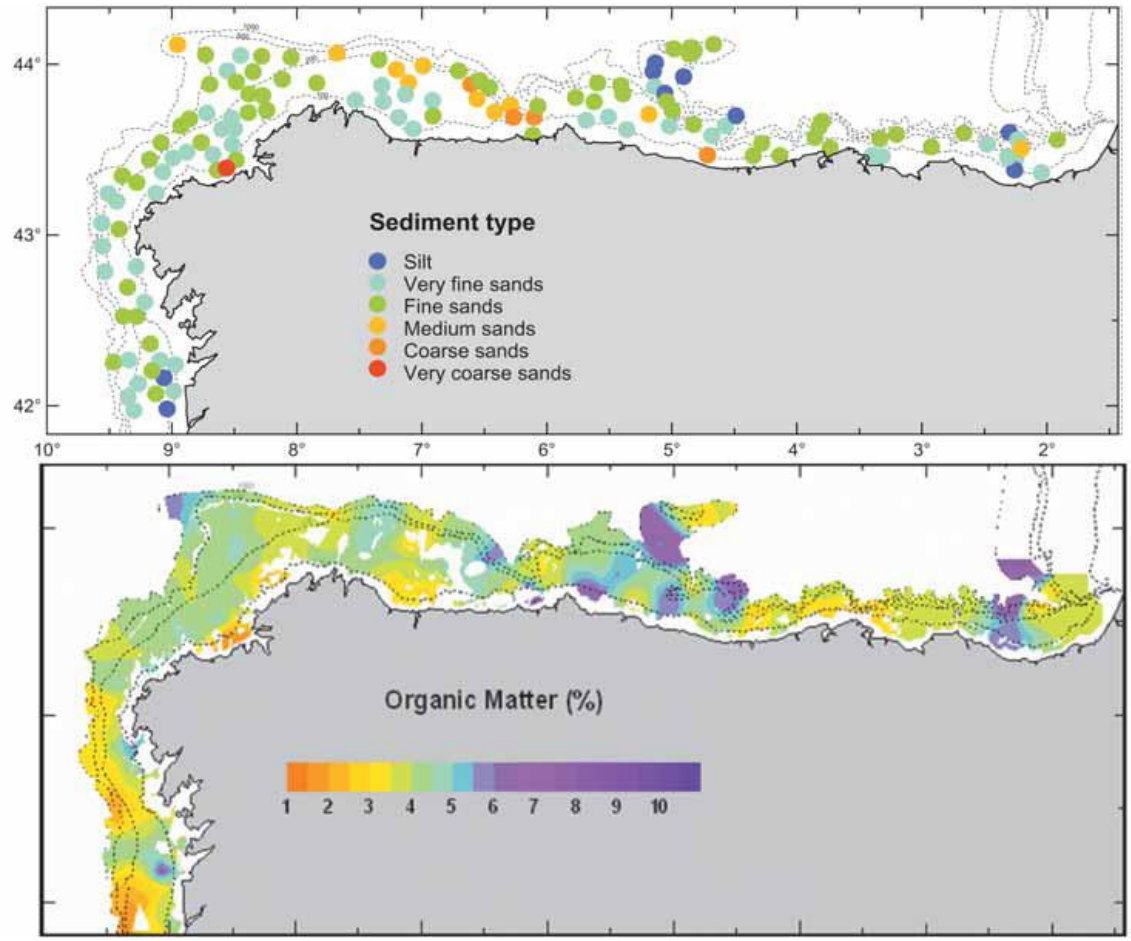


Figure 6 : Sediment and organic matter in the Cantabrain Sea

2.3.1.2.2 Benthic habitats distribution

There are a high number of habitats described in the area (an exhaustive list can be found in the inventory published by (Templado et al. 2012)). Several of these habitats have interest from a conservation point of view (Habitats Directive, OSPAR list of threatened areas).

Dominant ecosystems in the infralittoral zone are rocky and are dominated by macroalgaes, mainly Laminariales, *Gelidium* sp. and/or *Cystoseira baccata*. Incrustant algae, maerl habitats and habitat characterised by animals (e.g. sciaphilic habitats, caves, walls, overhangs…) are also important. All these habitats can be included in the habitat type 1170, Reefs, in the Habitats Directive or as different habitats in the OSPAR lis (coral gardens, sponge aggregations…).

Deeper areas, circalittoral are mainly covered by sediment with hard bottoms associated with geomorphological features as canyons, banks and mounts. Circalittoral sediment areas are the scenario where trawl fisheries act, and are highly impacted. There are not well structured three-dimensional habitats and only resistant species are present. Sea pens, crinoids and sea urchin can form habitats in low fishing effort areas.

In circalittoral rocky areas are very important habitats formed by cold-water corals, as white corals (*Lophelia* and *Madrepora*) and yellow corals (*Dendrophyllia*), and also communities of black corals (antipatharians) and bamboo corals. Large sponges are also habitat-forming species: hexactinellids (*Asconema, Pheronema*), *Phakellia* spp and *Geodia* spp and stone sponges (litisthids).

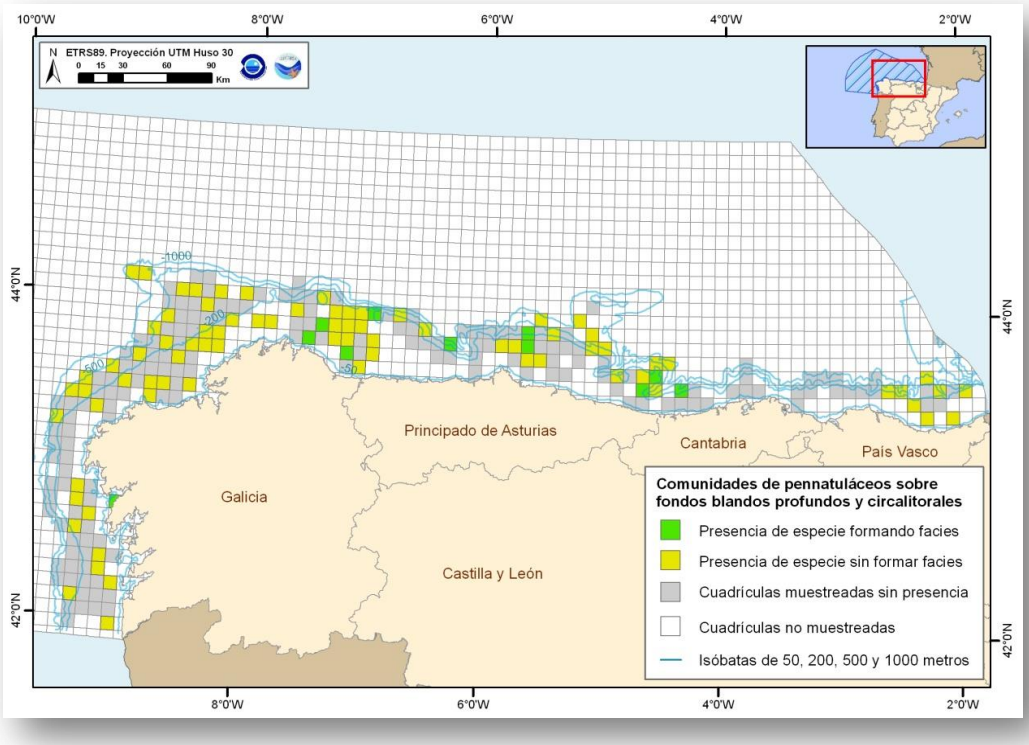


Figure 7 : Distribution of sea-pens communities in sedimentary circalittoral and bathyal areas.

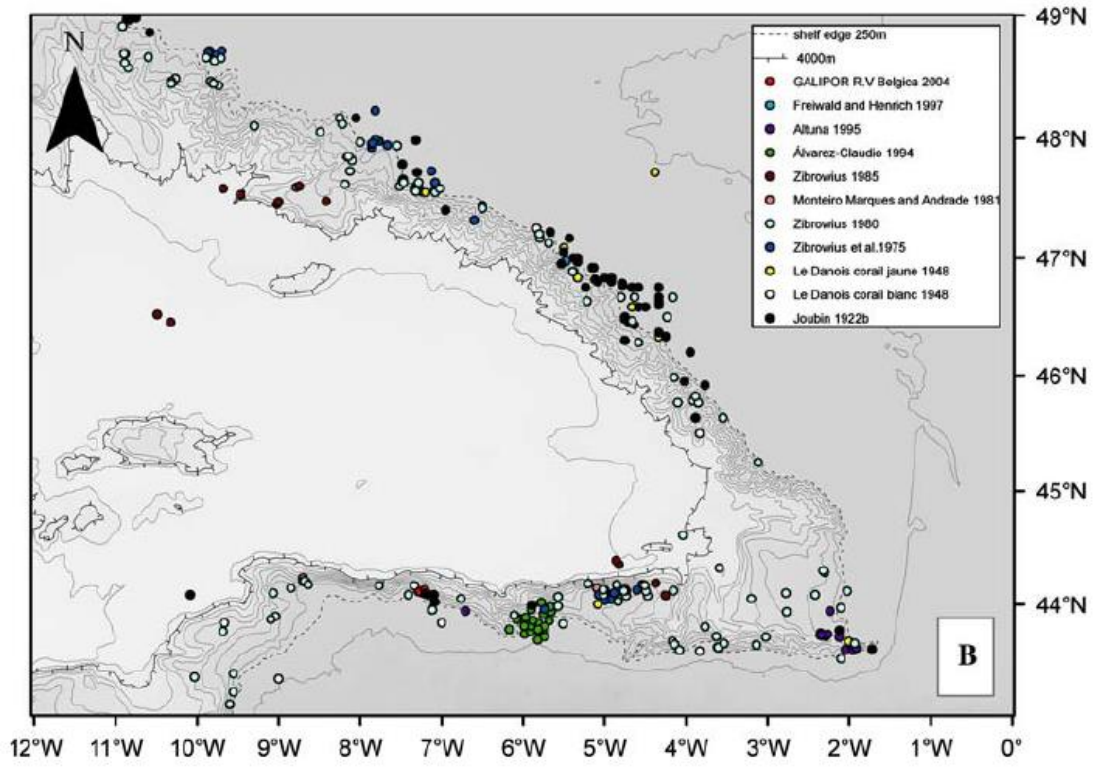


Figure 8 : Findings of cold-water scleractinians along the continental margin in the Bay of Biscay (Reveillaud et al. 2008).

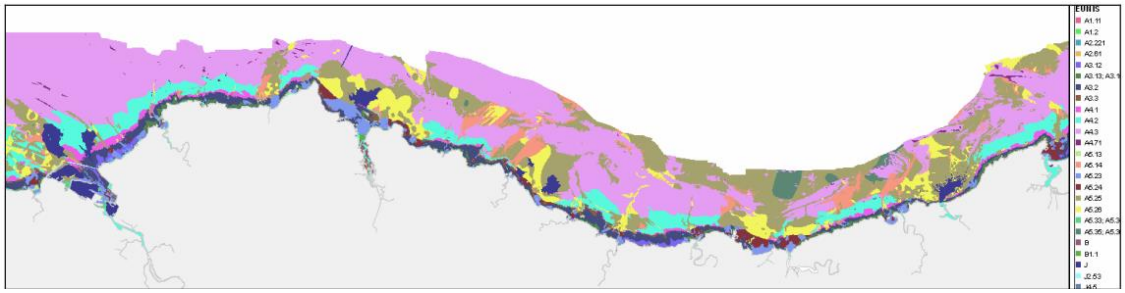


Figure 9 : EUNIS habitats in the Basque country (MESH Atlantic Project) showing their patchy distribution.

2.3.1.3 *Portugues MSFD elements on benthic habitat*

In the first Portuguese MSFD assessment, benthic communities were found to have a good ecological quality (see section 'impacts of *physical pressure in the T1.4 Pressures Impacts').*

2.3.2 Conservation Status under Habitats Directive

Reporting under **Habitats Directive** consists in an assessment of the **Conservation Status** and trend for Conservation Status for each Annex I habitat, and for each Member State (or biogeographical region).

Annex III. Description of habitats listed in Annex I to Habitat Directive provides Conservation Status of Annex I habitats in the period 2007-2012 in Atlantic waters of France, Spain and Portugal.

Conservation Status under Habitats Directive in OSPAR Region IV

KEY FACTS

→ No habitat was reported with 'Favourable' status.
→ 5 habitats have at least an 'Unfavourable-Inadequate' status in at least one of the three countries (cf. below)
→ 2 habitats have an 'Unknown' status all were they occur (1180 'Submarine structures made by leaking gases' only occurring in Spain, and 8330 'Submerged or partially submerged caves' in France, Spain, Portugal)

Marine habitat listed in Annex I to Habitats Directive	Conservation Status (overall assessment, 2007-2012) Bioregion: Marine Atlantic		
	France	Spain	Portugal
1110 Sandbanks which are slightly covered by sea water all the time	Unfavourable-Bad	Unfavourable-Inadequate	Unfavourable-Inadequate
1130 Estuaries	Unfavourable-Bad	Unfavourable-Inadequate	Unfavourable-Inadequate
1140 Mudflats and sandflats not covered by seawater at low tide	Unfavourable-Inadequate	Unfavourable-Inadequate	Unfavourable-Bad
1160 Large shallow inlets and bays	Unfavourable-Bad	Unknown	Unfavourable-Inadequate
1170 Reefs	Unfavourable-Inadequate	Unknown	Unfavourable-Inadequate

Table 6 : 2007-2012 Overall Assessment of marine habitats listed in Annex I to the Habitats Directive, in Marine Atlantic bioregion of French, Spanish and Portuguese waters.

Remark: The reporting under Habitats Directive is structured by bioregions. The 'Marine Atlantic bioregion' contains OSPAR Region IV, but also includes northern waters of France and Azores and Madeira for Portugal, which are all outside OSPAR IV. Therefore, this assessment of Marine Atlantic bioregion does not exactly depict the situation for habitats in OSPAR IV Region.

2.4 Pressures known to have impacts on benthic habitats

Major pressures on benthic habitats, mentioned in MSFD Initial Assessments or in OSPAR Quality Status Report, are:

- → Extraction of species (target and non target)
- → Pressure on sea floor integrity: Physical loss (due to permanent change of seabed substrate or morphology and to extraction of seabed substrate) and physical disturbance to the seabed (temporary of reversible)
- → Changes to hydrological conditions
- → Input of nutrients, inputs of organic matter, leading to human-induced eutrophication
- → Contaminants
- → Input of litter
- → Introduction of non-indigenous species

Impacts of physical pressures on benthic habitats depend on their sensitivity, and on the intensity and frequency of the pressure. Further description of these pressures could be find in the Annex 2 to Initial Assessment: Pressures Impact.

2.5 Significant areas for benthic habitats

2.5.1 Ecological challenges and/or challenge areas relative to benthic habitats in the Bay of Biscay (French MSFD process)

For the second round of MSFD implementation, France identified and prioritized 'ecological challenges'. Ecological challenges are considered as elements or marine ecosystems for which GES should be reached or maintained (Ministère de l'Environnement, de l'Energie et de la Mer et Agence Française Biodiversité 2017). Among these ecological challenges, some are considered to be prioritized following three criteria: representativity, sensitivity, functional importance.

Ecological challenge and/or challenge area of 'major' and 'high' importance, within OSPAR Region IV, are listed in Table 7. Ecological challenges are mentioned for each assessment area, as shown in Figure 10.

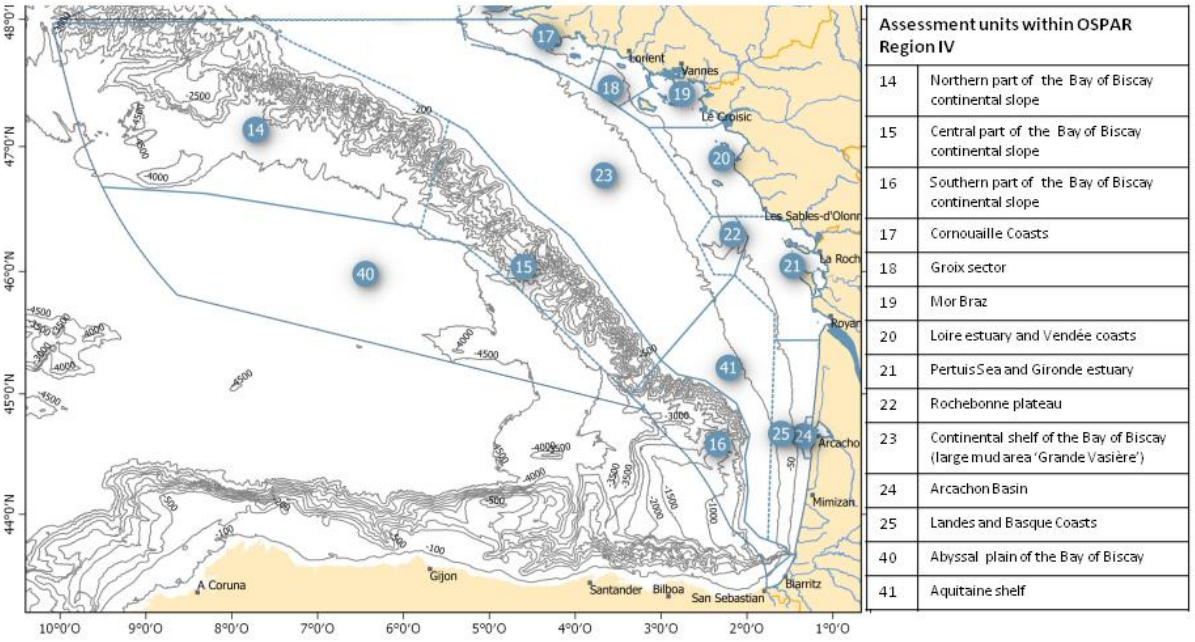


Figure 10: Assessment areas for the identification of ecological challenges in French MSFD process that are within OSPAR Region IV.

Degree of importance	Assessment area		Ecological challenge and/or challenge area relative to benthic habitats
Major importance (and below)	**17**	**Cornouaille coasts**	Major: Sea-pen and burrowing megafauna communities (OSPAR) High: Maerl beds (OSPAR), Laminaria, haploops communities, 1170 'Reefs' (rocks, infralittoral and circalittoral), circalittoral mud sediments Medium: Zostera beds (OSPAR), circalittoral coarse sediments
	18	**Groix sector**	Major: circalittoral sea-pen mud High: Maerl beds (OSPAR), *Sabellaria spinulosa* beds (OSPAR), subtidal mud areas Medium: *Zostera beds* (OSPAR), Laminaria
	23	**Continental shelf of the Bay of Biscay (large mud area 'Grande Vasière')**	Major: Sea-pen and burrowing megafauna communities (OSPAR) High: 1170 'Reefs' (rocks); Sand, mud or mixed sediments (circalittoral) Medium: Coarse sediments (circalittoral)
	21	**Pertuis sea and Gironde estuary**	Major: *Sabellaria alveolata* (reef-forming polychaete), Intertidal mudflats (OSPAR), infralittoral mudflats High: Zostera beds (OSPAR), *Ostrea edulis beds* (OSPAR), salt meadows, Sandbanks which are slightly covered by sea water all the time (Habitats Directive 1110), mixed subtidal sediments, mediolittoral and infralittoral and reefs (Habitats Directive 1170) Medium: maerl beds (OSPAR), sedimental forshore, subtidal sand
	24	**Arcachon basin**	Major : Zostera noltii beds, Medium : Zostera beds (OSPAR), Sabellaria alveolata, intertidal sediments Low: salt meadows

High importance (and below)	14	**Northern part of the Bay of Biscay continental slope**	High: OSPAR habitats: Coral gardens, *Lophelia pertusa* reefs, Deep-sea sponge aggregation , Sea-pen and burrowing megafauna communities, Coral species: Gorgonacea, Antipathidae
	15	**Central part of the Bay of Biscay continental slope**	High : corals (Antipatharia, Gorgonacae, *Madrepora oculata*), sponges, *Lophelia pertusa* reefs (OSPAR)
	16	**Southern part of the Bay of Biscay continental slope**	High : corals (Antipatharia, Gorgonacae, *Madrepora oculata*), sponges Medium: *Lophelia pertusa* reefs (OSPAR), Sea-pen and burrowing megafauna communities (OSPAR)
	19	**South east of Britanny and Mor Braz**	High : maerl beds (OSPAR), Zostera beds (OSPAR), Ostrea edulis beds (OSPAR), Laminaria, circalitorral sea-pen mud, ciralittoral and infralittoral reefs (Habitats Directive 1170), subtidal and intertidal mudflats (OSPAR) Medium : saltings, mediolittoral reefs
	20	**Loire estuary and Vendée coasts**	High : *Zostera noltii,* S. alveola and S. spinulosa (OSPAR), Laminaria, haploops communities, circalittoral and infralittoral reefs (Habitats Directive 1170), which are slightly covered by sea water all the time (Habitats Directive 1110) Medium: maerl beds (OSPAR), salt meadows, mediolittoral reefs (Habitats Directive 1170), intertidal sediments
	41	**Aquitaine shelf**	High: subtidal sands

Table 7 : Ecological challenges and/or challenge areas relative to benthic habitats identified in the French MSFD process. Only areas within OSPAR Region IV are mentionned in this table. Identified areas of 'medium' and 'lower' importance were

2.5.2 Significant areas for benthic habitats in Spanish waters

Submarine canyons can be highlighted as significant areas for benthic habitats in Cantabrian Sea. Submarine canyons are found on the continental slope. They host habitats and species that are listed in Habitats Directive orf OSPAR Convention. Major canyons of Spanish North Altantic subdivision include: Capbreton canyon, Avilés canyon, Santander and Torrelavega, Lastres and Llanes, and La Coruña.

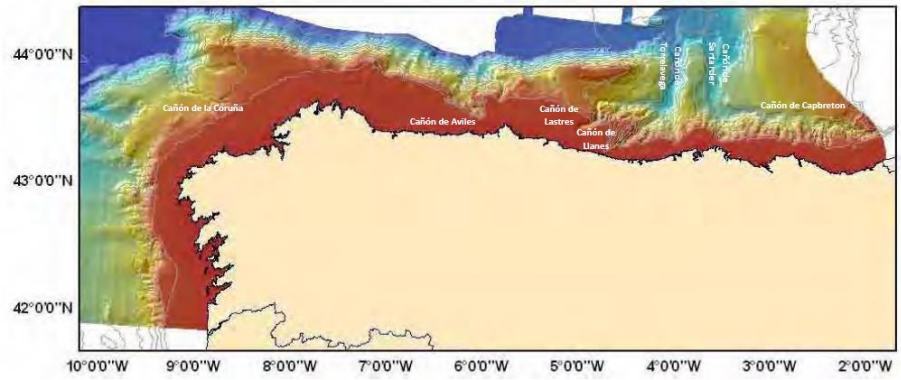


Figure 11 : Map of major canyons in North Altantic subdivision of Spanish waters (Demarcacion Noratlantica) (Instituto Espanol de Oceanografia, 2012)

Avilès canyon is a Proposed Site for Community Imporance (pSCI) [5]. Biodiversity in the Avilès canyons system is very high. It hosts vulnerable species such as corals, sponges and sharks, including

[5] http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=ESZZ12003#3

many species listed in Habitats Directive. It hosts the Habitats Directive 'Reefs' (1170) that includes several OSPAR habitats (Lophelia pertusa reefs, Coral gardens, Sponge aggregations). Carbonate mounds are also present in this area (Sanchez et Punzon 2014).

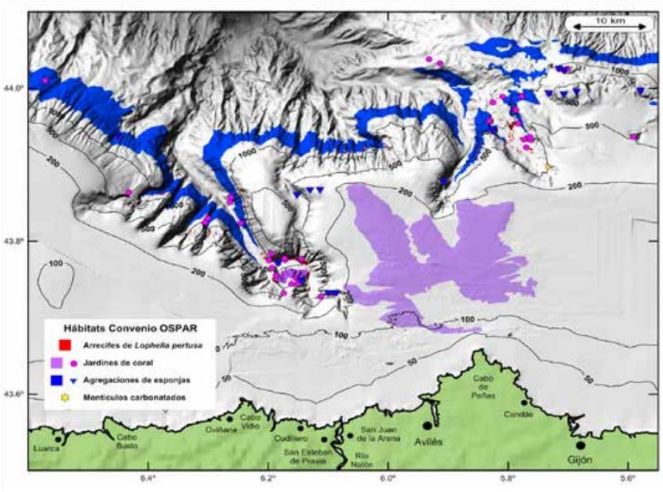


Figure 12 : Spatial distribution of habitat 'Reefs' (1170) in the area of El Corbiro, La Gaviera and El Agudo de Fuera (Sanchez et Punzon 2014).

Another remarkable site for benthic habitats is the El Cachucho Bank in the Cantabrian sea[6].

2.5.3 Significant areas for benthic habitats in Portuguese waters

Seamounts are prominent features of the seafloor throughout the oceans (Clark et al. 2014). Seamounts may support a large number and wide diversity of fish and invertebrates, and can be an important habitat for commercially valuable species, targeted by large-scale fisheries in the deep-sea. However, seamount communities are also vulnerable to impacts from fishing, effects associated with climate change, and future seabed mining.

The Gorringe Bank located 160 nautical miles SW off the Portuguese coast lies at 5,000 m depth and the peaks of the two main seamounts are placed at less than 50 m beneath the surface. Due to the high productivity that seamounts present, they are regularly frequented by widely distributed or migratory species that spent important periods of their lifecycle, such as mating and reproduction. High variety of habitats and communities take place in this seamount due to its special characteristics (Oceana 2014).

[6] http://www.mapama.gob.es/es/costas/participacion-publica/Ficha_OSPAR_El_Cachucho_cast_12-9-08_tcm7-14757.pdf

3 Pelagic habitats (Descriptor 1)

3.1 Typologies and distribution of pelagic habitats

OSPAR Region IV waters can be qualified of warm-temperate waters (Figure 13).

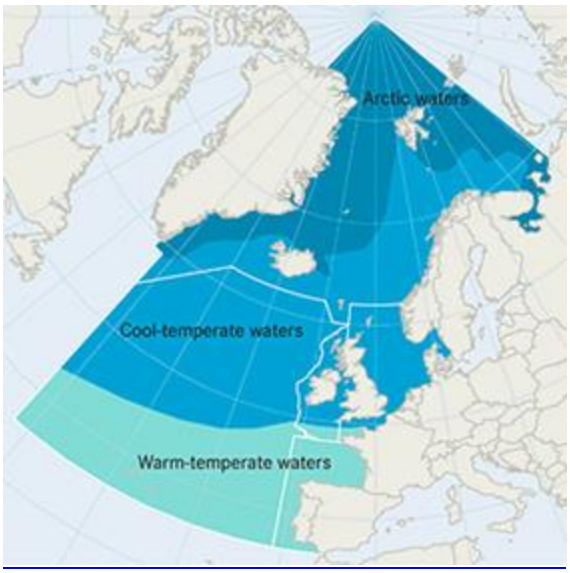


Figure 13 : Dinter Biogeographic Classification for the pelagic environment. (OSPAR Commission 2010) https://qsr2010.ospar.org/en/ch02_03.html

3.1.1 MSFD typology of pelagic habitat

Three broad types of pelagic habitats (i.e. water column) are defined in the MSFD framework[7]:

- → Variable salinity (situations where estuarine plumes extend beyond transitional waters);
- → Coastal;
- → Shelf and oceanic/beyond shelf.

3.1.2 EUNIS typology of pelagic habitats

Pelagic habitats are also classified according to the EUNIS typology. It has only 3 levels, based on physical and hydrodynamical criteria (salinity, stratification of the water column, etc.) Despite being comprehensive and the European standard, and being comprehensive, EUNIS typology is not perfectly suited to describe plankton population and other approaches have been undertaken to depict pelagic habitats.

[7] Commission Decision (EU) 2017/848

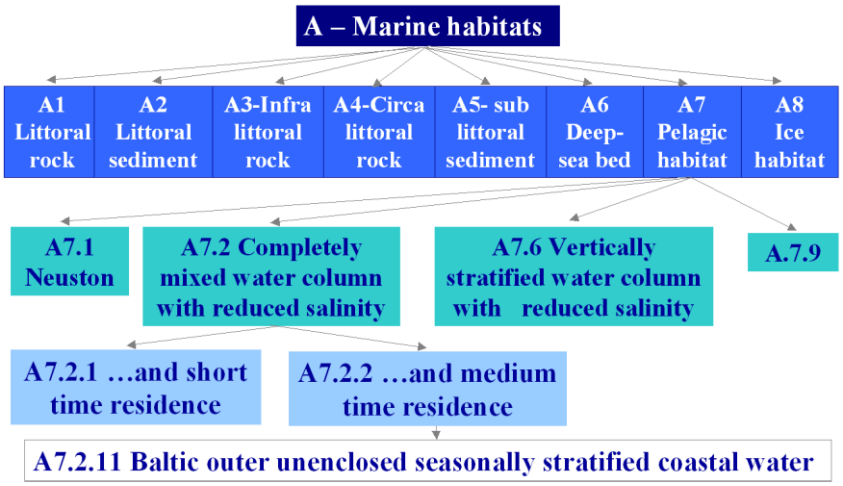


Figure 14 : EUNIS Classification of pelagic habitats (Gailhard-Rocher et al. 2012)

In the Bay of Biscay, four hydrological types based on two levels of EUNIS typology are shown Figure 15. These types are based on the type of water column stratification and salinity.

In the Bay of Biscay, a large 'light blue unit' (A7.9) corresponds to continental shelf and open sea waters. A rather restricted 'Blue unit' (A7.6) corresponds to continental shelf near French coasts. Small 'dark blue units' (A7.2) are found in coastal areas. Very restricted 'green units' (A7.3) lie in French coastal areas of the north of the Bay of Biscay and in a very small area in the south of France.

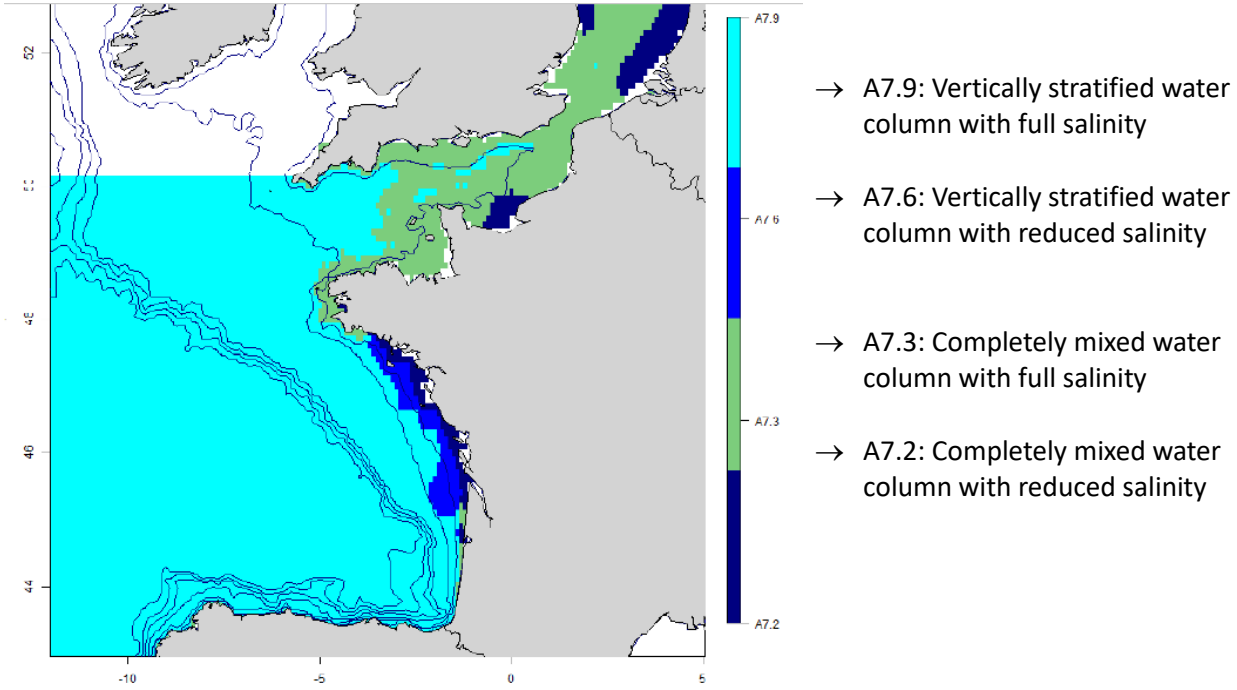


Figure 15 : Typology obtained using EUNIS classification in the Bay of Biscay (Gailhard-Rocher et al. 2012)

No map of Eunis Pelagic habitats including Portuguese waters was found.

3.1.3 Another approach: Hydrological landscapes

As previously mentioned, EUNIS typology is not perfectly suited to describe plankton communities. The "hydrological landscape" approach suggests more units for pelagic habitats than the EUNIS typology. Works conducted by Ifremer on hydrological landscapes in marine waters under

French jurisdiction (Gailhard-Rocher et al. 2012) identified 10 hydrological types, whereas the EUNIS typology distinguishes only 4. To do so, critical indicators determining pelagic population structure were selected (indicators of water column stratification, indicator of river plums (surface salinity), Bottom Temperature, etc.). Their spatial and time evolution was taken into account to determine hydrological landscapes.

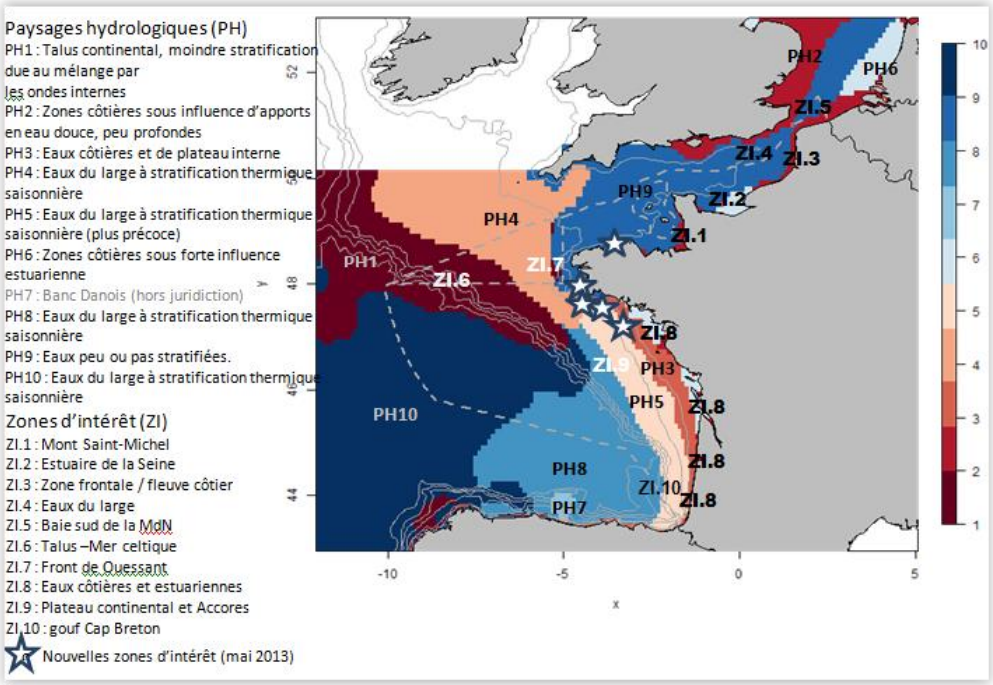


Figure 16 : Spatial distribution of hydrological landscapes and areas of interest submitted for initial assessment of Channel-Atlantic façade (Guerin et al. 2013)

- → PH1: Continental slope, less stratification due to mix by internal waves
- → PH2: Shallow coastal areas under the influence of riverine input
- → PH3: Coastal and continental shelf waters
- → PH4: Open sea waters with seasonal stratification
- → PH5: Open sea waters with earlier seasonal stratification
- → PH6: Coastal areas under strong esturary influence
- → PH7: Le Danois Bank (El Cachucho)
- → PH8 : Open sea waters with seasonal stratification
- → PH9: Less or not stratified waters
- → PH10: Open sea waters with seasonal stratification

3.1.4 Conclusion: distribution of pelagic habitats

The most important feature enhancing primary production and phytoplankton biomass are coastal upwelling, coastal run-off and river plumes, seasonal currents, and internal waves and tidal fronts. Pelagic habitats in the OSPAR IV region are dominated by the mixture of Mediterranean waters in the south and the influence of Atlantic waters in Portuguese, northern Spanish, and French waters. River run-off, particularly along the French coast, also influences the pelagic habitat.

The "hydrological landscape" approach applied in the Bay of Biscay has identified the following units (see Figure 16) :

- → Coastal areas under strong estuary influence (PH6) near Gironde and Loire estuaries; Coastal and continental shelf areas (PH3) near French and Cantabrian coasts.
- → Continental slope, less stratification due to mix by internal waves (PH1) in the northern Bay of Biscay slope and in Galicia slope

→ Open sea waters with earlier seasonal stratification (PH5) on continental shelf in the central part of the Bay of Biscay; Open sea waters with seasonal stratification (PH8, PH10) beyond the continental shelf

→ A specific area, Le Danois Bank (El Cachucho)

3.2 Overview of distribution and dynamics of plankton communities in OSPAR Region IV

Pelagic habitats are dominated by the mixture of Mediterranean waters in the south and the influence of Atlantic waters in Portuguese, northern Spanish, and French waters. River run-off, particularly along the French coast, also influences the pelagic habitat (ICES 2016b).

The dynamics of plankton are highly variable both in space and time in addition to being strongly dependent on the physico-chemical properties in the environment (Budria et al. 2017).

Productivity and phytoplankton

The most important features enhancing primary production and phytoplankton biomass are coastal upwelling (for example in canyons), coastal run-off and river plumes (for example large French estuaries), seasonal currents, and internal waves and tidal fronts (ICES 2016b).

Phytoplankton

The spring bloom sometimes starts as early as February in western Iberia and in the southern part of the OSPAR IV region, and in March in the Bay of Biscay. By March–early April the spring bloom covers the entire offshore region. From May onwards, chlorophyll drops sharply offshore, although strong blooms may still occur in the river plumes over the French shelf. Low chlorophyll values are observed in summer. The autumn bloom is variable, and restricted to coastal areas. During winter and in the coastal areas, inwards the 100 m isobath, chlorophyll estimates remain relatively high. Hydrological features related to river plumes and light availability seems the two main factors regulating the winter to spring phytoplankton production in the Bay of Biscay. Late winter phytoplankton blooms limit the availability of nutrients from March, phosphorous being the first limiting nutrient during these blooms. Due to slope processes, blooms are regularly observed from satellite images over the shelf break from April to October. The average total primary production over the whole Bay of Biscay shelf, estimated from a primary production model coupled to a hydrodynamic model and using satellite data is 83 g C m−2.y−1(6-year mean 1998–2003). Along the southern Bay of Biscay and western Galician coasts, diatoms dominate the phytoplankton community during most of the year, especially during upwelling events, whereas microflagellates and small naked dinoflagellates dominate during winter, and small dinoflagellates dominate in warmer, stratified waters, offshore (ICES 2008).

Zooplankton

The most abundant zooplankton species are *Acartia spp*. and *Calanus helgolandicus*. Crab larvae are also important during winter months along the Portuguese coast. In recent years, copepod species such as *Temora stylifera*, characteristic of warmer waters, have appeared or increased in abundance (e.g.) related to increases in sea surface temperature. The seasonal cycle of zooplankton biomass is characterized by a bimodal pattern along the western Iberian coast, with peak biomass in April and August, caused by seasonal upwelling. Copepod abundance remains high throughout the year, with the highest abundances from August through November along the Iberian coast. The interannual variation of zooplankton abundance and biomass does not show clear trends in the ecoregion except for Galicia, where it couples with the upwelling cycles. There are also differences in the structure of the zooplankton community along the north Iberian coast (ICES 2016b).

Regarding the whole Bay of Biscay, the temporal and spatial biomass distribution of mesozooplankton (200–2000 µm) has shown since 1992 the same patterns as those described for phytoplankton with biomass values of ~70 mg DW m−3shortly after the phytoplankton spring bloom. Zooplankton decreases after the spring bloom, showing a patchy distribution with some hot spots in connection with upwelling regions and fresh-water plumes. During the summer, the regional zooplankton biomass production is highest off Galicia often reaching over 30 mg DW m^3 (peaks of 60 mg DW m−3are frequent) due to upwelling. Along the Cantabrian Sea the biomass decreases toward the east. In coastal zones, mesozooplankton abundance presents a seasonal variation with absolute values rarely over 3000ind. m^3 in spring. In winter values are 250 ind. m^3. The oceanic area off Iberia is oligotrophic and zooplankton biomass varies little throughout the year, with a peak in April. Three hundred species of zooplankton have been identified in the Bay of Biscay, among which 10% are copepods. In the whole ecoregion, plankton consists of 70–90% copepods in number, with only about ten species taking a significant part in biomass and secondary planktonic productivity (ICES 2008).

3.3 Status and trends for pelagic habitats and plankton communities

There is not enough knowledge on pelagic habitats to qualify status as 'good' or not, There is first a general lack of knowledge regarding the anthropogenic pressures affecting plankton distribution because of the nature of pelagic habitats (large and open waters so diffuse sources of pollution can be involved, especially for the Bay of Biscay…). This is enhanced by a general lack of knowledge regarding plankton diversity, especially small plankton (pico- and nano-) and for plankton in the open seas (i.e. beyond WFD monitoring programmes). All of this limits our ability to define reference values for the PH indicators, meaning we can only use them so far to follow trends in plankton composition."

Pelagic habitats status is assessed by France, Portugal and Spain under Marine Strategy Framework Directive (MSFD) and OSPAR Regional Sea Convention. Eutrophication status is assessed under MSFD, Water Framework Directive 2000/60/EC (WFD), OSPAR Common Procedure for the Identification of the Eutrophication status. Detailed assessment approaches for Eutrophication status: cf. Part on Interactions between uses and environment. Criteria, indicators, references and threshold values used to describe pelagic habitats (2017) under MSFD and OSPAR Convention are found in Table 8. Metrics on "Sensitivity / tolerance" are missing because the current scientific ability to identify precise anthropogenic pressures for pelagic habitats is limited.(Budria et al. 2017).

MSFD Descriptor	MSFD criteria	MSFD/ OSPAR Indicators
Descriptor 1: Biodiversity (State)	D1C6 (1.6) Pelagic habitat condition	PH1 (ratios of plankton types) PH2 (biomass and abundance) PH3 (taxonomic diversity)

Table 8 : MSFD/OSPAR criteria and indicators (criteria as in the Decision (EU) 2017/848 of the Commission of May, 17 2017)

Trends in pelagic habitats are not yet available

3.4 Biological pressures known to have an impact on pelagic habitats

The MSFD Decision 2017/848 specifies to analyse the following pressures, which can impact pelagic habitats:

→ D2C3: Species groups and broad habitat types that are at risk from NIS.
→ D5C2: chlorophyll a in the water column

→ D5C3: Harmful algal blooms (e.g. cyanobacteria) in the water column
→ D5C4: Photic limit (transparency) of te water column
→ D7C1: hydrological changes to the seabed and water column
→ D8C2: Species and habitats which are at risk from contaminants
→ D8C4: Significant acute pollution events

3.5 Significant areas for pelagic habitats

3.5.1 Areas of interest identified in French waters of the Bay of Biscay

Identifying areas of interest ('Zones d'intérêt, ZI' in French) is part of the prioritization approach used in France to define "Environmental Targets" in the MSFD framework. Areas of interest were identified in France in terms of:

→ Diversity of plankton communities (especially zooplankton, on the basis of studies by (Raybaud et al. 2012)).
→ And/or anthropogenic pressures.

Areas of interest are shown in

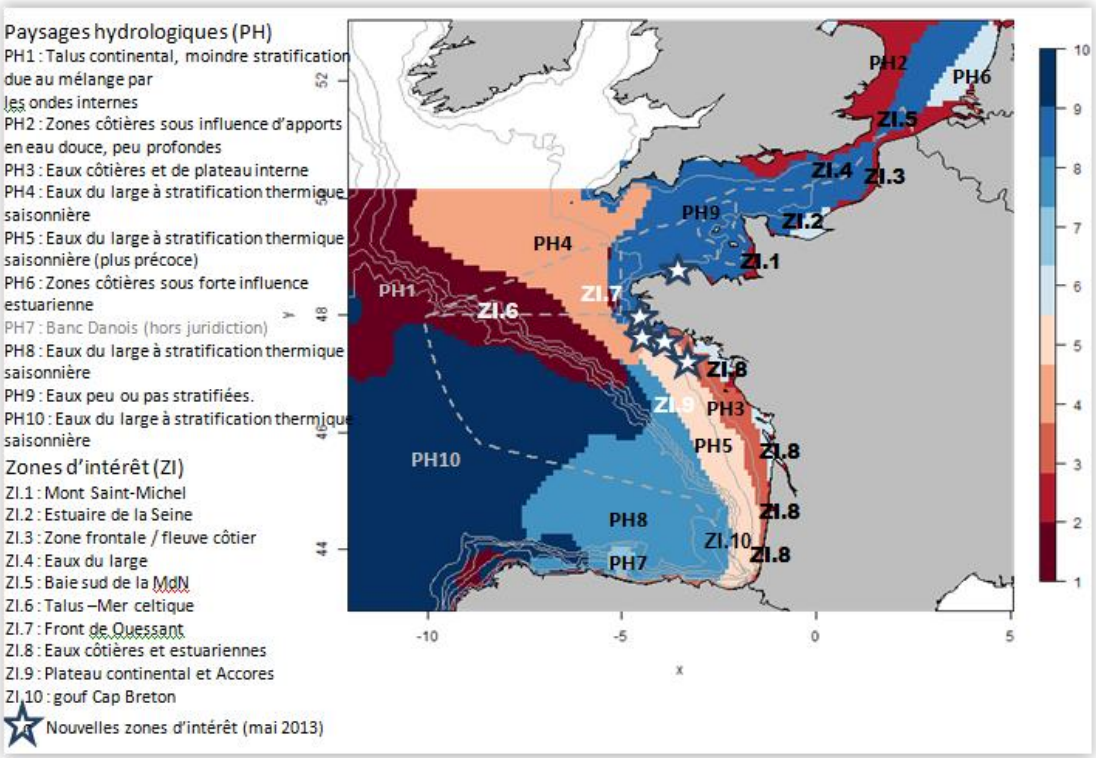


Figure 17 below, and listed in Table 9. Areas of interest ZI.1 to ZI.7 are not part of OSPAR Region IV, only ZI.8, ZI.9 and ZI.10 are. River plums areas were all identified as interest areas (ZI.8).

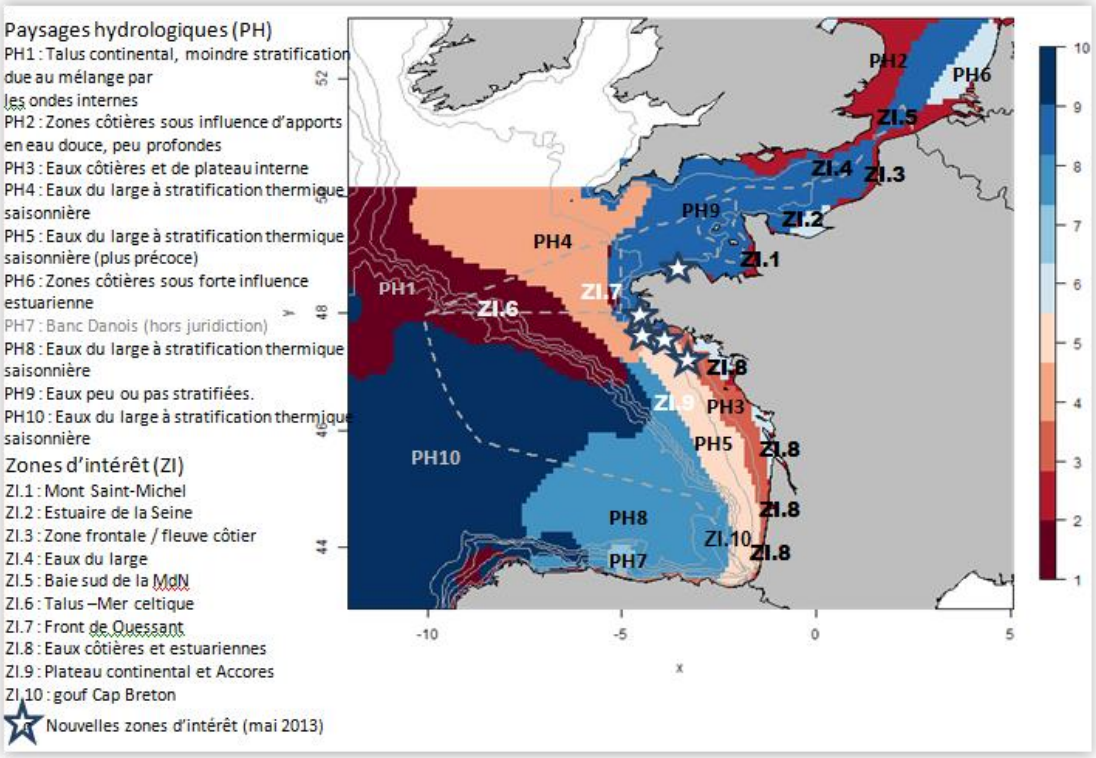


Figure 17 : Hydrological landscapes and Areas of Interest (ZI) as identified in French MSFD process (Guerin et al. 2013). Stars represent new areas of interest identified for the second round of MSFD process.

In the Bay of Biscay, the following areas of interest were identified:

Area	Hydrological landscape	Areas of interest for phytoplankton and zooplankton
Coastal waters and inner continental shelf	PH9: Less or not stratified waters	Coastal waters in the north of Vilaine bay
		Vilaine bay
		Coastal waters in the south of Vilaine bay
	PH6: Coastal areas under strong esturary influence	Loire river plum (ZI.8)
		Gironde river plum (ZI.8)
		Adour river plum (ZI.8)
	PH3: Coastal and continental shelf waters	All coastal and inner shelf waters under influence of river plums or not have high plankton biomass and diversity (ZI.9)
Continental shelf	PH4: Open sea waters with seasonal stratification	Central and outer parts of the continental shelf are characterized by diatomae and dinoflagellates mixs. It is also a high biomass and diversity area for zooplankton.
	PH5: Open sea waters with earlier seasonal stratification	Continental shelf waters with high plankton diversity and biomass
		Capbreton spit: tourbillion area, rich in plankton (ZI.10)
Northern part of continental slope	PH1: Continental slope, less stratification due to mix by internal waves	Ouessant (outside OSPAR Region IV)
		Area in continuity with Celtic seas slope ZI.6 (outside OSPAR Region IV)
Southern part of continental slope and offshore	PH8 : Open sea waters with seasonal stratification	Dominance of pico and nano phytoplankton in spring and summer (production and biomass)
	PH10: Open sea waters with seasonal stratification	Similar characteristics than PH8

Table 9 : Hydrological landscapes and Areas of interest for implementation of MSFD Measures Programme in France (Bay of Biscay) (Guerin et al. 2013).

3.5.2 Significant areas for pelagic habitats in Cantabrian Sea and Galicia

3.5.3 Significant areas for pelagic habitats in Portuguese waters

The seamounts represent an obstacle to the water mass oceanic circulation. From this process result several phenomena, such as speed increase of oceanic currents, upwelling, turbulence, and/or eddies formation. These kinds of variations were also detected in Gorringe bank. In its surroundings an extensive anticiclonic eddy is formed, associated to the rise of nutrients from depp water masses. The water mass from the Mediterranean (MOW), from the Golf of Cadiz, is subdivided in two branches flowing north and west, formating meddies of high salinity reachin the Gorringe Bank (Ministério da Agricultura, do Mar, do Ambiente e do Ordenamento do Território 2012)

The topography of the seamount, disturbing the oceanic circulation, acts as a source of internal waves, propagating through the water column (Global Ocean Associates 2004). Around Gorringe Bank seamounts there is an extensive anticyclonic eddy associated with lifting of nutrients from the rich deep water giving rise to high concentrations of nitrates and chlorophyll in the shallow waters (Coelho et Santos 2003) which encourages the development of a wealth of flora and fauna on the

peaks of these seamounts. Life on these seamounts depends on the constant supply of nutrients from the superficial layers. In the North Atlantic, the primary annual productivity in oceanic waters is between 45 and 125g C/m^2, being much richer in the northern part than in the southern (Berger 1989).

Theese effects, generated by the topography of the seamounts, mean that they have become oasis of life compared to their surroundings, which tend to feature a much lower biomass and diversity. Meanwhile, this supply of nutrients contrasts with the generalised oligotrophy of deep waters, where only the supply of food from the superficial layers, or the chemossynthetic production of Habitats, such as hydrothermal vents and gas seepage, allow the existence of relatively abundant biomasses (Lee Van Dover 2000).

4 Marine mammals (Descriptor 1)

Marine mammals, as other large marine vertebrates represent a conservation challenge. Most of them are under anthropogenic threats (by-catch, collision, pollution, disturbance from constructions, exploration and exploitation of mineral resources, habitat loss etc.) and many of their populations have a low recovering capacity after being depleted. The Black right whale (*Eubalaena glacialis glacialis*) is a historical example of the disappearence of a population in the Bay of Biscay.

The OSPAR Region IV has a high diversity of marine habitats, leading to high species diversity (See part on habitats).

Habitats diversity and species diversity

In the northern part of the Bay of Biscay, the continental shelf is wide and becomes narrower in the south (between 200km in the north and 50km in the south). The continental shelf along north of Spain and Portugal is also quite narrow. Its depth is up to 200m. Meriadzek terasse and Landes plateau are the two main plateaus of Bay of Biscay's continental shelf. Some marine mammal species are mostly distributed on the continental shelf such as Harbour porpoise *Phocoena phocoena* or Common bottlenose dolphin *Tursiops truncatus.*

In the south of the Bay of Biscay, submarine canyons cutting the continental shelf can be found (gouf de Capbreton, Cap Ferret canyon). The cantabrian shelf slope also has important canyons (Submarine canyons of Aviles, etc.) These areas have upwellings causing local increase in marine productivity that may enhance feeding opportunities, resulting in local abundance of marine mammal species like Risso's dolphin *Grampus griseus.*

The abyssal plain above continental slope hosts species only observed in depth above 2000m such as Sperm whale *Physeter macrocephalus*, Pigmy sperm whale *Kogia berviceps*, or Cuvier's beaked whale *Ziphius cavirostris*.

4.1 Regulatory and IUCN conservation status of marine mammal species

4.1.1 List of marine mammals species in the OSPAR Region IV

Annex VIII. Marine mammal species in OSPAR Region IV provides a comprehensive list of marine mammals that occur in the OSPAR region IV. It specifies different 'occurrence status' (presence with undetermined regularity (P), presence with regularity (R), occasional or erratic presence (O). Indeed, marine mammals species have different behaviors (migratory or non migratory, movements out of the known distribution area etc.) and even though some species are only 'visitors' of the region, it is important to monitor all species as their spatial distribution may change due to global warming for example.

4.1.2 IUCN conservation status

Annex VIII. Marine mammal species in OSPAR Region IV also provides the latest available IUCN conservation status at European scope (or world scope if the information was not found). The most critical species regarding IUCN European conservation status are:

- → **1 is Critically Endangered**: Northern Right Whale *Eubalaena glacialis* (disappeared from Northeast Atlantic)
- → **2 are Endangered**: Sei whale *Balaenoptera borealis* and Blue whale *Balaenoptera musculus*
- → **2 are Vulnerable**: Sperm whale *Physeter macrocephalus* and Harbour porpoise *Phocoena phocoena*
- → **1 is Near Threatened**: Fin whale *Balaenoptera physalus*

→ **15 are Data Deficient**

A description of IUCN categories is provided in Annex VII. IUCN Conservation Status criteria to this document.

Among the 3 species occurring in Region IV that are in the OSPAR List of Threatened and/or Declining Species, 2 are reported as 'under threat and/or decline' in OSPAR IV Region.

4.1.3 Regulatory status of marine mammals

The high mobility and transboundary movements of cetaceans require cooperation across national boundaries (e.g. Economic Exclusive Zones) to conduct coherent monitoring and conservation strategies.

The main international, community and national regulatory instruments concerning marine mammals are listed in Annex IX. Main regulatory instruments concerning marine mammals.

Table 10 provides information on regulatory status of mammal species in OSPAR Region IV regarding 4 main regulatory frameworks: Bonn Convention, Bern Convention, Habitats Directive and OSPAR Convention.

Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals)
Appendix I (Endangered species) 6 species *: Eubaleana glacialis, Balaenoptera borealis, Balaeloptera physalus, Balaenoptera musculus, Megaptera novaeangliae, Physeter macrocephalus*
Appendix II (Migratory species conserved through Agreements) 6 species: *Halichoerus grypus, Balaenoptera borealis, Balaenoptera physalus, Physeter macrocephalus, Hyperoodon ampullatus, Orcinus orca*
Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats)
Appendix II (Strictly protected fauna species) 22 species : *Odobenus rosmarus, Eubalaena glacialis, Balaenoptera musculus, Balaenoptera physalus, Megaptera novaeangliae, Kogia breviceps, Ziphius cavirostris, Hyperoodon ampullatus syn. H. rostratus, Mesoplodon mirus, Mesoplodon bidens, Lagenorhynchus albirostris, Lagenorhynchus acutus, Orcinus orca, Delphinus delphis, Stenella coeruleoalba, Steno bredanensis, Tursiops truncates, Globicephala melas, Globicephala macrorhynchus, Grampus griseus, Pseudorca crassidens, Phocoena phocoena*
Appendix III (Protected fauna species) All cetacean species that are not in Appendix II are in Appendix III
Habitat Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora).
Annex II (species of community interest whose conservation requires the designation of special areas of conservation) 2 species : Bottlenose dolphin (*Tursiops truncatus)* and Harbour Porpoise (*Phocoena phocoena)*
Annex IV (species of community interest in need of strict protection) All Cetacea species
Annex V to the Habitat Directive (species of community interest whose taking in the wild and

exploitation may be subject to management measures) Phocidae that are not mentioned in Annex IV
OSPAR Convention
Three species are in OSPAR List of Threatened and/or Declining Species: Blue whale (*Balenoptera musculus)*, Northern Right Whale (*Eubalena glacialis)* and Harbour Porpoise (*Phocoena phocoena)*

Table 10 : Marine mammal species in OSPAR Region IV listed in different regulatory frameworks.

Remark: some species are listed in one of these regulatory frameworks, but only regarding one or some of their sub-populations; their regulatory status is not mentioned in Table 10 (and in Annex IX. Main regulatory instruments concerning marine mammals) if the concerned sub-population is not within OSPAR Region IV

4.1.4 Distribution, ecology, status and trends of marine mammals in the OSPAR Region IV

Marine mammals present in the OSPAR IV region have different use of space and food resources. They move at different spatial (oceanic, regional and local) and time scales. For many species, the movement patterns are still unknown. Detailed information on distribution and migratory patterns is restricted to the most common species.

- → Some species are migratory and present movements and exchanges at the **oceanic scale**. That's the case for the Humpback whale *Megaptera novaeangliae,* the Fin whale *Balaenoptera physalus,* the Blue whale *Balaenoptera musculu, or* the Sperm whale *Physeter macrocephalus.* Their migration paths are barely known.
- → Some species present movements and exchanges at the **regional scale**. For example, the Common dolphin *Delphinus delphis*, the Harbour porpoise *Phocoena phocoena*, Risso's dolphin *Grampus griseus* or the Grey seal *Halichoerus grypus*. These movements can be steady and seasonal to reach functional areas, or rather more opportunistic. The movement patterns are unknown for many species.
- → Other marine mammals have a rather restricted distribution area, and show movements at the **local scale**. That can be the case for specialized species that depend on certain areas, but also some unspecialized species are sedentary. These isolated species with a fragmented habitat are vulnerable and often threatened. For example, the Bottlenose dolphin *Tursiops truncatus* Northeast Atlantic population is composed of two ecotypes: one coastal, one offshore (Louis et al. 2014). The Cuvier's beaked-whale *Ziphius cavirostris* show a residence behavior in the Bay of Biscay, near Basque canyons(Savouré-Soubelet et al. 2016).

All cetacean species except for Globicephalinidae have a seasonal variation of their abundance, their distribution or their preferential habitats(Pettex et al. 2014).

4.1.4.1 *Bay of Biscay*

Figure 18 below presents the number of species observed in French waters by different types of observation campains, between 2000 and 2015.

Figure 18 is not a map of population abundance, it shows where mammal species where observed in this period. No seasonal or inter-annual variation of distribution can appear in this map.

The continental shelf has a higher number of observations, and higher number of observed species as compared to abyssal plan. The continental slope, as well as coastal waters, shows the highest number of observed species.

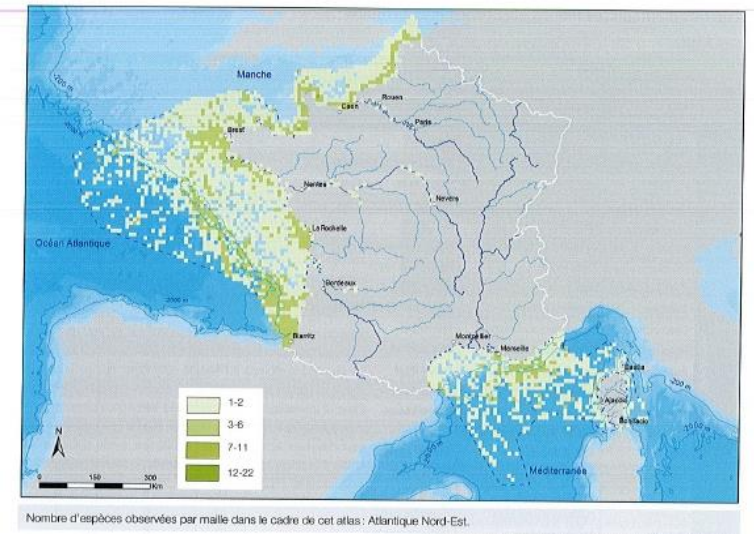


Figure 18 : Number of species observed in French waters, compiling observation data from 2000-2015. (Savouré-Soubelet et al. 2016)

4.1.4.1.1 Species in the southern limit of their natural distribution

No seals are common to the OSPAR IV region, except for the **Grey seal** (*Halichoerus grypus*) and the **Harbor seal** (*Phoca vitulina*), present in the north of the Bay of Biscay, being the very southern limit of their natural distribution area (however, they have colonies close to OSPAR region IV, on Channel French coasts). Grey seals are present in French Natura 2000 sites 'Roches de Penmarc'h' and 'Glénans' (very north of OSPAR Region IV). These species can appear elsewhere in the region but their presence is considered erratic, they don't establish permanent colonies.

Atlantic white-sided dolphin (*Lagenorhynchus acutus*) is sometimes found in the Bay of Biscay even though its distribution area is up north to OSPAR IV region. It is more common in the northern part of the Bay of Biscay. Major groups seem to be located near the continental slope during summer.

Short-finned Pilot Whale (*Globicephala macrorhynchus*) is rarely observed in the Bay of Biscay, being the southern limit of its distribution area.

4.1.4.1.2 Species occurring more often in the Bay of Biscay - Relatively coastal species (coasts and continental shelf)

Some species are **relatively coastal**, or at least limited to continental shelf, such as the **Harbour Porpoise** (*Phocoena phocoena*), the **Common bottlenose dolphin** (*Tursiops truncatus*) and the **Minke whale** *(Balaenoptera acutorostrata)*.

The Harbour Porpoise and the Bottlenose dolphins are the only two cetacean species listed in Annex II to Habitats Directive (species of Community interest whose conservation requires the designation of Special Areas of Conservation).

Harbour porpoise (Phocoena phocoena)

Scope	Habitats Directive conservation status (2007-2012, atlantic bioregion)	IUCN conservation status
France	Unfavourable-bad	Near Threatened
Spain	Unfavourable-inadequate	Least Concern
Portugal	Unfavourable-inadequate	Vulnerable
Europe	Not assessed	Vulnerable

The Harbour Porpoise is distributed in coastal and continental shelf waters (generally <100m)(Savouré-Soubelet et al. 2016). It frequents relatively shallow bays, estuaries and tidal channels.

Its distribution changes a lot between winter and summer, as shown in

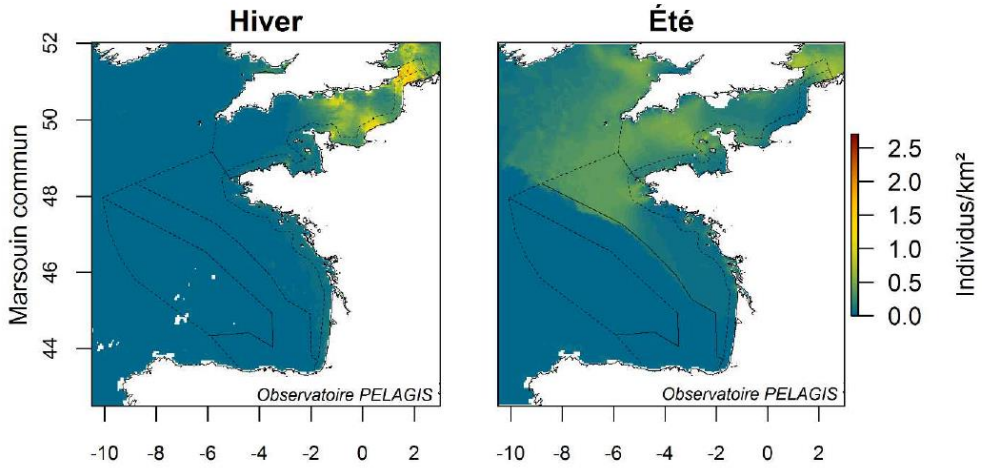


Figure 19 (Pettex, et al., 2014). In the Bay of Biscay, Harbour Porpoise appears to be about five times more abundant in summer period (Ruys et Soulier 2013).

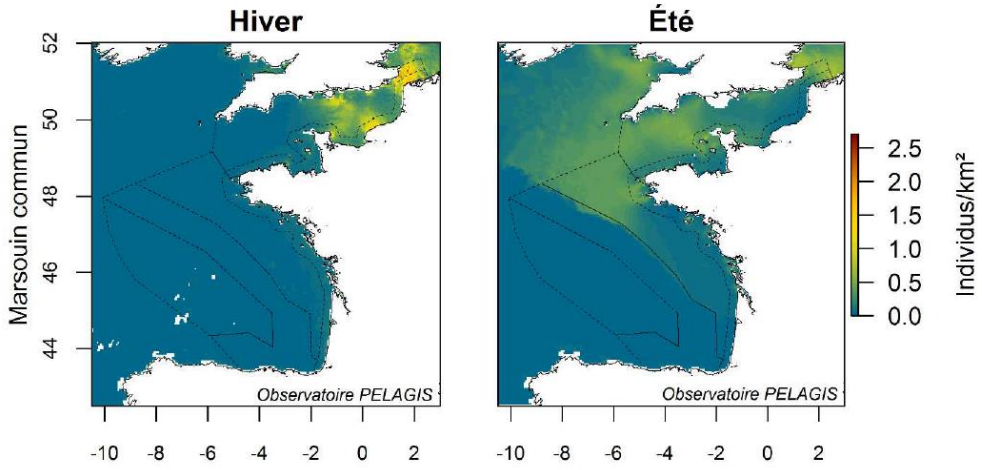


Figure 19 : Predicted preferential habitats for Harbour porpoise in winter (left) and summer (right). Key: number of individuals per km2.(Pettex et al. 2014)

Common bottlenose dolphin (*Tursiops truncatus)*

Scope	Habitats Directive conservation status (2007-2012, Atlantic bioregion)	IUCN conservation status
France	Unfavourable-inadequate	Least concern
Spain	Unknown	Least concern
Portugal	Favourable	Least concern
Europe	Not assessed	Data deficient

Bottlenose dolphins are observed both near coasts and near the continental shelf, reflecting different groups that are genetically distinct (Louis et al. 2014). In fact, the Bottlenose dolphin Northeast Atlantic population is composed of two ecotypes: one coastal and one offshore(Louis et al. 2014).

The **coastal ecotype** was specifically assessed in OSPAR Intermediate Assessment. It is quite sedentary and frequents estuaries, bays, lagoons and other shallow areas. Studies on coastal groups show that some of them are almost resident. The coastal ecotype population is divided in Assessment Units in OSPAR Intermediate Assessment (OSPAR Commission 2017). In many coastal areas of the North-East Atlantic Ocean, coastal Bottlenose dolphin populations declined or disappeared completely during the 19th and 20th centuries (OSPAR Commission 2017). Where trends could be assessed, the remaining populations show little long-term change with the exception of the declining population in the Sado Estuary in Portugal. The reasons for the decline in the Sado Estuary are unknown but could be related to estuarine pollution (OSPAR Commission 2017).

In the Bay of Biscay, Bottlenose dolphin is twice more abundant in winter as compared to summer (Savouré-Soubelet et al. 2016) (Figure 20). Large concentrations of Common dolphins are often observed near Gironde estuary and north of Capbreton gouf (Ruys et Soulier 2013).

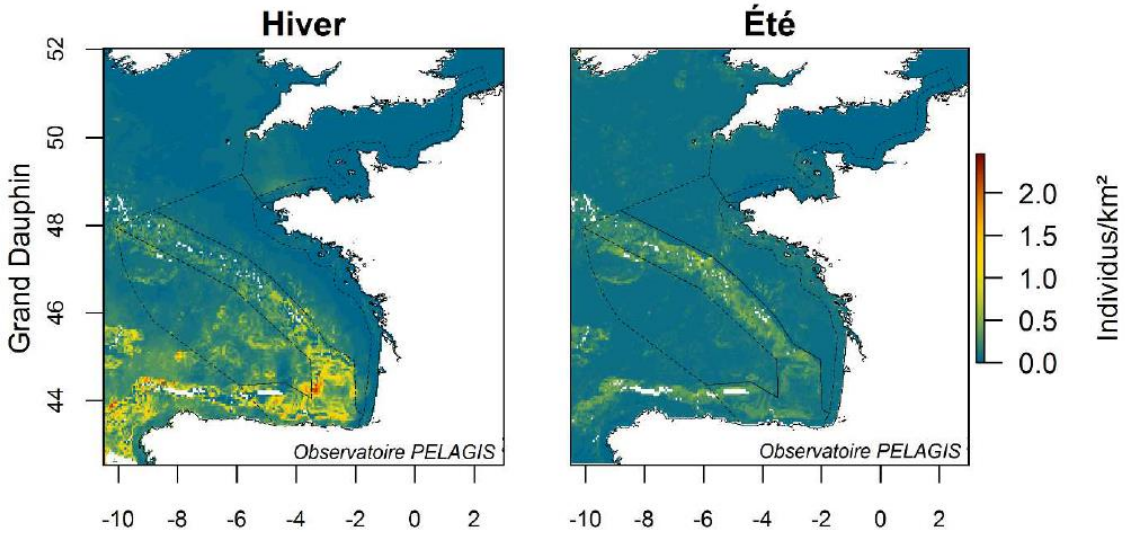


Figure 20 : Predicted preferential habitats for Common bottlenose dolphin in winter (left) and summer (right). Key: number of individuals per km2. (Pettex et al. 2014)

The **Common dolphin** and the **Minke Whale** frequent the continental shelf of this region.

4.1.4.1.3 Species occurring more often in the Bay of Biscay - Oceanic waters species (continental shelf and beyond)

Some species live essentially in **oceanic waters**, such as **Striped dolphin** (*Stenella coeruleoalba*), **Common Dolphin** (*Delphinus delphis*), **Long-finned pilot whale** (*Globicephala melas*) and **Risso's dolphin** *(Grampus griseus),* or exclusively beyond the continental slope such as **Fin whales** (*Balaenoptera physalus*).

Risso's dolphin *Grampus griseus* and Long-finned pilot whale *Globicephala melas* (*Globicephalinae* group)

Long-finned pilot whales *Globicephala melas* prefer deep waters (continental slope and deep canyons). Risso's dolphins *Grampus griseus* inhabit primarily deep waters of the continental slope and outer shelf (especially with steep bottom topography). Risso's dolphin and Long-finned pilot whale (Globicephalinae group) have similar ecological preferences (Pettex et al. 2014). They have a very low variability of abundance from one seaon to the other (Pettex et al. 2014). In winter, they are distributed near continental slope as well as in dynamic areas of Channel. In summer, they have a higher density near continental slope, especially in the Bay of Biscay and in Galicia (Figure 21).

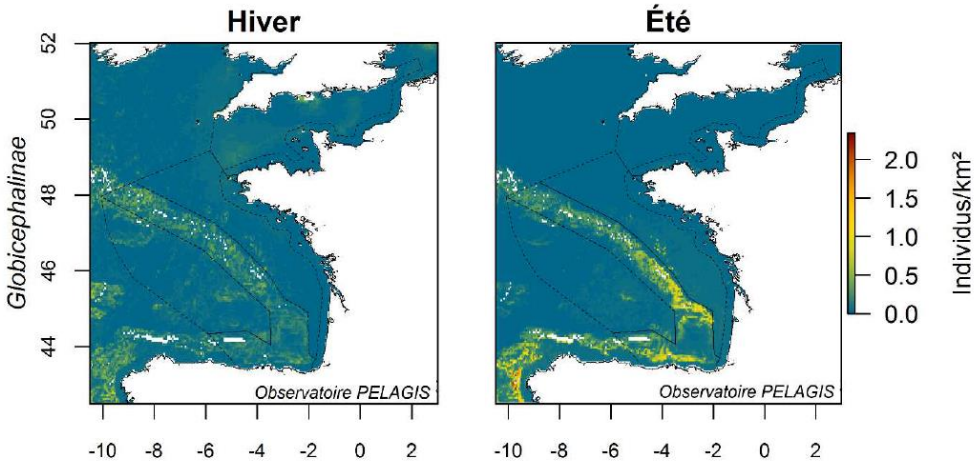


Figure 21 : Predicted preferential habitats for Globicephalinae (Grampus griseus and Globicephala melas) in winter (left) and summer (right). Key: number of individuals per km (Pettex et al. 2014)

Common dolphin (*Delphinus delphis*) and Striped dolphin (*Stenella coeruleoalbla*) (Small *Delphininae* group)

Common dolphin and Striped dolphin (Small *Delphininae* group) are the most abundant species the Bay of Biscay and Channel region(Pettex et al. 2014). Their seasonal distribution is highly contrasted. In winter, they are rather found on continental shelf. In summer, they go off the self (with a preference for continental slope) (Pettex et al. 2014). Striped dolphins are frequently observed on continental slopes, and are seen close to shore only where deep water approaches the coast (for example, south of the Bay of Biscay) (Source: IUCN Red List). Striped dolphins are often observed in upwelling areas (for example, the Capbreton gouf).

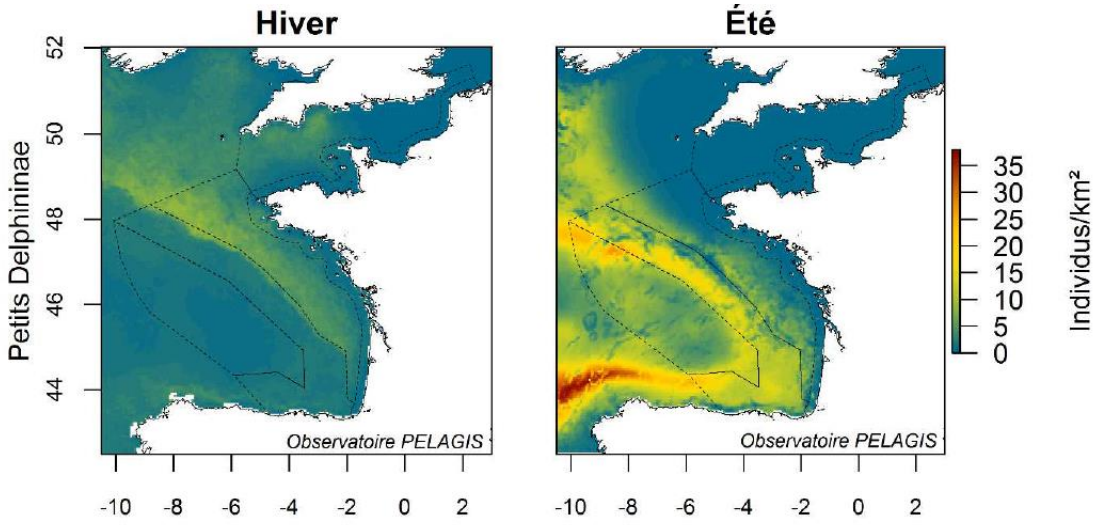


Figure 22 : Predicted preferential habitats for small delphininae (Delphinus delphis and (Stenella coeruleoalbla) in winter (left) and summer (right). Key: number of individuals per km (Pettex et al. 2014)

4.1.4.1.4 Species occurring more often in the Bay of Biscay - Deep waters above 2,000m

Some species are only observed in deep waters above 2,000m, such as **Sperm whale** (*Physeter macrocephalus*), **Pigmy sperm whale** *(Kogia breviceps),* **and Cuvier's beaked whale** *(Ziphius cavirostris).* Sperm whales can be found in almost all marine waters deeper than 1,000 m that are not covered by ice, except in the Black Sea and possibly the Red Sea[8]. Pigmy Sperm whale is rarely seen at sea; it tends to live a long distance from shore and has inconspicuous habits[9]. Although Cuvier's beaked whales can be found nearly anywhere in deep (>200 m) waters, they seem to prefer waters near the continental slope, especially those with a steep sea bottom[10]. It is rarely found close to mainland shores, except in submarine canyons or in areas where the continental shelf is narrow and coastal waters are deep.

Sperm whale has a '**Vulnerable**' world, European and France IUCN status. Pigmy Sperm whale has a 'Data Deficient' status at global scope. Cuvier's beaked whale has a 'Data Deficient' IUCN Europe status

4.1.4.2 *Iberian waters*

In the northern and northwestern Iberian waters (Northatlantic region of Spain) 24 species of cetaceans have been cited, of which 8 can be considered common and 5 for which presence in the area is occasional (Table 11).

Species	Common name	Presence

[8] Taylor, B.L., Baird, R., Barlow, J., Dawson, S.M., Ford, J., Mead, J.G., Notarbartolo di Sciara, G., Wade, P. & Pitman, R.L. 2008. *Physeter macrocephalus*. The IUCN Red List of Threatened Species 2008: e.T41755A10554884. http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T41755A10554884.en. Downloaded on **23 May 2017**.

[9] Taylor, B.L., Baird, R., Barlow, J., Dawson, S.M., Ford, J.K.B., Mead, J.G., Notarbartolo di Sciara, G., Wade, P. & Pitman, R.L. 2012. *Kogia breviceps*. The IUCN Red List of Threatened Species 2012: e.T11047A17692192. http://dx.doi.org/10.2305/IUCN.UK.2012.RLTS.T11047A17692192.en. Downloaded on **23 May 2017**.

[10] Taylor, B.L., Baird, R., Barlow, J., Dawson, S.M., Ford, J., Mead, J.G., Notarbartolo di Sciara, G., Wade, P. & Pitman, R.L. 2008. Ziphius cavirostris. The IUCN Red List of Threatened Species 2008: e.T23211A9429826. http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T23211A9429826.en. Downloaded on **23 May 2017.**

Balaenoptera acutorostrata	Minke whale	Occasional
Balaenoptera borealis	Sei whale	Ocasional
Balaenoptera musculus	Blue whale	Rara
Balaenoptera physalus	Fin whale	Común
Megaptera novaeangliae	Yubarta	Ocasional
Kogia breviceps	Pygmy sperm whale	Ocasional
Eubalaena glacialis	North Atlantic right whale	Rara
Physeter macrocephalus	Sperm whale	Común
Delphinus delphis	Common dolphin	Común
Globicephala melas	Long-finned pilot whale	Común
Globicephala macrorhynchus	Short-finned pilot whale	Rara
Grampus griseus	Risso´s dolphin	Común
Orcinus orca	Orca	Rara
Pseudorca crassidens	False orca	Rara
Stenella coeruleoalba	Striped dolphin	Común
Tursiops truncatus	Bottlenose dolphin	Común
Phocoena phocoena	Harbour porpoise	Común
Hyperoodon ampullatus	Northern bottlenose whale	Rara
Mesoplodon densirostris	Blainville´s beaked whale	Rara
Mesoplodon mirus	True´s beaked whale	Rara
Mesoplodon bidens	Sowerby´s beaked whale	Rara
Ziphius cavirostris	Zifio de Cuvier	Ocasional
Lagenorhynchus albirostris	White-beaked dolphin	Rara
Lagenorhynchus acutus	White-sided dolphin	Rara

Table 11 : Cetacean species recorded in the waters of the North Atlantic region of Spain and their level of

presence based on sightings and records in the stranding series in the area.

In Portugal mainland waters 17 species of marine mammals have been identified, from which six are considered residents: Common bottlenose dolphin *Tursiops truncatus*, *Striped dolphin Stenella coeruleoalba*, Common dolphin *Delphinus delphis*, Risso's dolphin *Grampus griseus*, Harbour porpoise *Phocoena phocoena* and Minke whale *Balaenoptera acurostrata*. One species is visitant: Fin whale *Balaenoptera physalus*. The remaining 10 species are considered as occasional occurrence or unknown (Ministério da Agricultura, do Mar, do Ambiente e do Ordenamento do Território 2012).

On the Odontocetes group, *Delphinus delphis* is the species most frequently sighted, representing about 65% of the total cetaceans observations. It is a pelagic species occurring in depths above 100m. The *Phocoena phocoena* specie is observed along the entire coast of Portugal, with higher densities in the north. (Ministério da Agricultura, do Mar, do Ambiente e do Ordenamento do Território 2012).

From the Mysticetes group *Balaenoptera acurostrata* and *Balaenoptera physalus* are the moast regular. The records of *Balaenoptera acurostrata* indicate the presence along all year while *Balaenoptera physalus* records does not allow to know any occurrence patterns, although it is likely that some individuals might be resident all year on the West of Iberian Peninsula (Ministério da Agricultura, do Mar, do Ambiente e do Ordenamento do Território 2012).

4.2 Pressures known to have impacts on marine mammals

Most cetacean species are highly mobile, following their prey over long distances or migrating regularly between breeding or feeding ranges. In the OSPAR IV area they encounter a variety of man-made threats, of which bycatch, the accidental entanglement in fishing gear, is considered the most serious. Every year, several thousand cetaceans drown because they become ensnared in fishing nets, preventing them from coming up to the surface to breathe (ASCOBANS[11]).

Marine pollution is another serious threat that calls for an international, coordinated approach. Toxic substances like heavy metals and persistent organic compounds, most notably the PCBs, enter the food chain and accumulate in the body tissues of marine mammals, adversely affecting their health (ASCOBANS). For instance, due to their near shore distribution, Harbour Porpoises or some groups of Bottlenose dolphins are exposed to coastal sources of pollution.

Commercial shipping, industrial activity (e.g. pile-driving and seismic explorations), explosions and navy sonar cause underwater noise. Such acoustic disturbance can lead to behavioural changes, physical injury and even death. Moreover, the expanding shipping fleets result in increasing numbers of ship strikes, collisions between the vessels and the cetaceans, which is of growing concern (ASCOBANS).

The extent and the effects of the threats faced by small cetaceans vary among areas and species. The combined effects of all human activities are unknown, but it is clear that cetaceans are under additional pressure from prey depletion, habitat degradation and climate change, which have a detrimental effect on whales, dolphins and porpoises (ASCOBANS).

MAJOR PRESSURES TO MARINE MAMMALS

→ **Bycatch**– Extraction of, or mortality/injury to, wild species, including target and non-target species

[11] http://www.ascobans.org/fr/node/1385

- → **Marine pollution** – Inputs of substances (synthetic substances, non-synthetic substances, radionuclides)
- → **Marine pollution** – Input of litter
- → **Prey depletion**– Extraction of, or mortality/injury to, wild species, including target and non-target species
- → **Underwater noise** – Introduction of anthropogenic sound, input of other forms of energy (noise)
- → **Disurbance (Ship strikes)** – Disturbance of species (e.g. where they breed, rest and feed) due to human presence

For the waters of the Bay of Biscay and the Iberian Peninsula, ICES Working Group of Marine Mammal Ecology, WGMME (ICES 2016a) summarised the main threats faced by the different species of marine mammals present in the area. These include: bycatch, disturbance as a result of marine construction (including renewable energy developments), geophysical surveys and shipping, pollution and loss of habitat and/or prey resources.

Table 12, taken from the report of WGMME (ICES 2016a) classifies threat levels as high, medium or low (i.e. following a traffic light system), for each species as follows:

- → *High (red) = evidence or strong likelihood of negative population effects, mediated through effects on individual mortality, health and/or reproduction*
- → *Medium (yellow) = evidence or strong likelihood of impact at individual level on survival, health or reproduction but effect at population level is not clear*
- → *Low (green) = possible negative impact on individuals but evidence is weak and/or occurrences are infrequent.*
- → WGMME also used the category “other” (no colour) *"for cases where there was little or no information on the impact of these pressures on marine mammals or the threat is absent or irrelevant (in this latter case it was indicated in the corresponding cell in the table) for a particular species*".

			Harbour porpoise	Common dolphin	Striped dolphin	Cuvier´s beaked whale	Risso's dolphin	Long-finned pilot whale	Killer whale	Fin whale	Sperm whale	Northern bottlenose whale	Sowerby's beaked whale	Offshore bottlenose dolphin	Coastal bottlenose dolphin
POLLUTION & OTHER CHEMICAL CHANGES	**Contaminants**		**H**	**M**	**M**	**L**	**L**	**M**	**H**	**L**	**L**	**L**	**L**	**L**	**H**
	Nutrientenrichment		**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**
PHYSICAL LOSS	**Habitatloss**		**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**
PHYSICAL DAMAGE	**Habitatdegradation**		**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**
OTHER PHYSICAL PRESSURES	**Litter (inc.microplastics and discardedfishinggear)**		**L**	**L**	**L**	**M**	**L**	**L**	**L**	**L**	**L**	**M**	**M**	**L**	**L**
	Underwaternoisechanges	**Sonar**	**L**	**L**	**L**	**H**	**L**	**L**	**L**	**L**	**L**	**M**	**M**	**L**	**L**
		Seismicsurveys	**M**	**M**	**M**	**M**	**M**	**M**	**L**	**M**	**M**	**M**	**M**	**M**	**M**
		Pile-driving	**No current activity but potentially harmful**												
		Shipping	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**M**	**L**	**L**	**L**	**L**	**L**
	Barrier to speciesmovement (offshore windfarm, wave ortidaldevicearrays)		**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**
	Deathorinjurybycollision	**Withships**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**H**	**H**	**L**	**L**	**L**	**L**
		Withtidaldevices	**No current activity but potentially harmful**												
BIOLOGICAL PRESSURES	**Introduction of microbialpathogens**		**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**
	Removal of target and non-target species (preydepletion)		**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**
	Removal of non-target species (bycatch)		**H**	**H**	**M**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**M**	**H**
	Disturbance (e.g. wildlife watching)		**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**L**	**M**
	Deliberatekilling + hunting		**Does not occur**	**L**	**Does not occur**										

Table 12: Main threats to marine mammals in the waters of the Bay of Biscay and the Iberian Peninsula (reproduced from ICES WGMME (ICES; 2015).

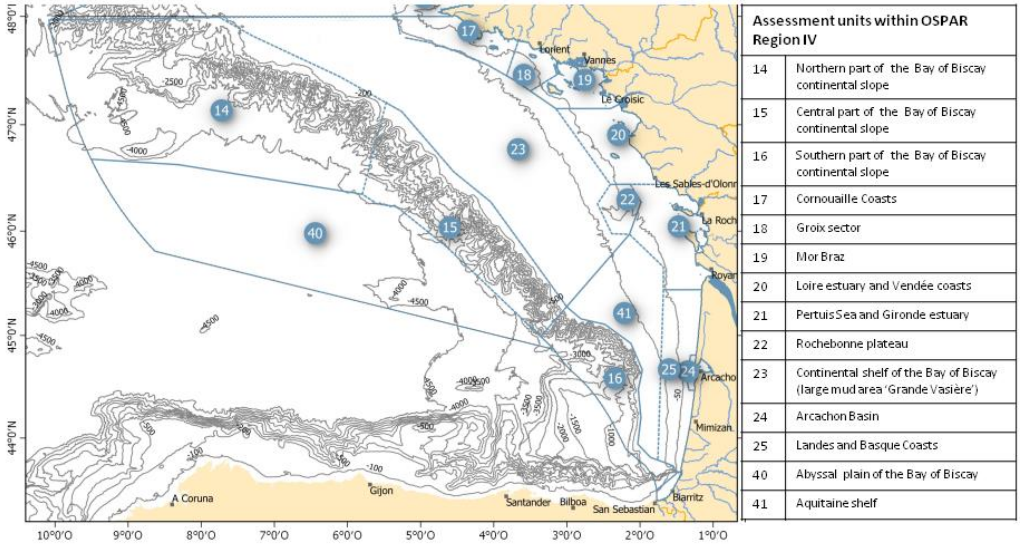
4.3 Significant areas for mammals species

There is a lack of robust and consistent data on marine mammal distribution and densities, let alone ecological requirements. Therefore MSP initiatives should maybe focus on identifying areas of potentially high threat to marine mammals.[12]

4.3.1 Ecological challenges and/or challenge areas relative to marine mammals as identified in the MSFD second implementation in France

For the second round of MSFD implementation (definition of 'Environmental Targets' to eventually reach 'Good Environmental Status', GES), France identified and prioritized 'ecological challenges'. Ecological challenges are considered as elements or marine ecosystems for which GES should be reached or maintained (Ministère de l'Environnement, de l'Energie et de la Mer et Agence Française Biodiversité 2017). Among these ecological challenges, some are considered to be prioritized following three criteria: representativity, sensitivity, functional importance.

Ecological challenge and/or challenge area of 'major' and 'high' importance, within OSPAR Region IV, are listed in Table 13. Ecological challenges are mentioned for each assessment area, as shown in



Assessment units within OSPAR Region IV	
14	Northern part of the Bay of Biscay continental slope
15	Central part of the Bay of Biscay continental slope
16	Southern part of the Bay of Biscay continental slope
17	Cornouaille Coasts
18	Groix sector
19	Mor Braz
20	Loire estuary and Vendée coasts
21	Pertuis Sea and Gironde estuary
22	Rochebonne plateau
23	Continental shelf of the Bay of Biscay (large mud area 'Grande Vasière')
24	Arcachon Basin
25	Landes and Basque Coasts
40	Abyssal plain of the Bay of Biscay
41	Aquitaine shelf

Figure 23.

[12] Summary Report of the Third International Conference on Marine Mammal Protected Areas (ICMMPA 3), Adelaide, Australia, 9-11 November 2014

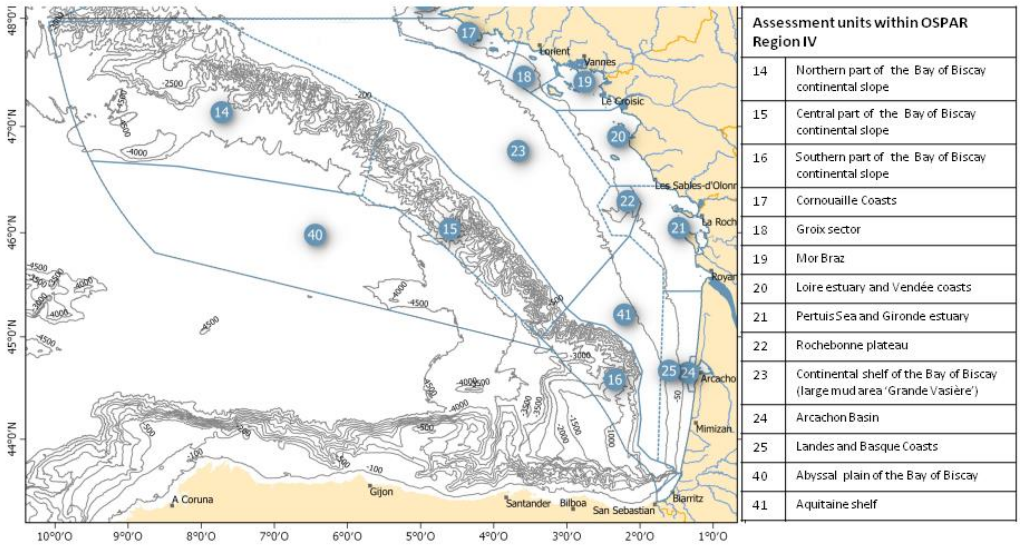


Figure 23: Assessment areas for the identification of ecological challenges in French MSFD process that are within OSPAR Region IV.

Degree of importance		Assessment area	Ecological challenge and/or challenge area relative to marine mammals
Major importance (and below)	40	Abyssal plain of the Bay of Biscay	Major : highest density of fin whale in Europe; delphinidae in summer; almost all cetacean species
High importance (and below)	**14**	Northern part of the Bay of Biscay continental slope	High : Harbour porpoise in summer, and almost all cetacean species (maximum diversity), delphinidae Medium: Globicephales
	15	Central part of the Bay of Biscay continental slope	High: hosts the highest observed diversity of marine mammals of the Bay of Biscay. Almost all cetacean species, delphinidae and globicephales
	16	Southern part of the Bay of Biscay continental slope	High: hosts the highest observed diversity of marine mammals of the Bay of Biscay. Almost all cetacean species, delphinidae and globicephales. High importance for deep-divers and bottlenose dolphin. Medium: common dolphin
Medium importance	19	Mor Braz	Medium : habour porpoise in summer
	24	Arcachon basin	Medium : habour porpoise

Table 13: Ecological challenges and/or challenge areas relative to marine mammals identified in the French MSFD process (Ministère de l'Environnement, de l'Energie et de la Mer et Agence Française Biodiversité 2017). Only areas within OSPAR Region IV are mentionned in this table.Only Major, High and Medium importance

challenges are listed here.

4.3.2 Significant areas for marine mammals in Spain

The Habitats Directive specifies that for some marine mammal species, those listed in Annex II, the harbour porpoise and the bottlenose dolphin, Special Areas of Conservation (SACs) should be designated for their protection. In the case of highly mobile species such as marine mammals, there have been doubts expressed as to whether SACs (or other types of MPAs) could offer effective protection. An exception would be the resident populations of bottlenose dolphins which could benefit from such spatially explicit protection measures since, as in the case of the population in the Rias Bajas (southern Galicia), individuals in such populations inhabit specific coastal areas and have a limited distribution range (see MAGRAMA, 2012). Spain has declared several Marine Protected Areas, although none is specific for marine mammals.

4.3.3 Significant areas for marine mammals in Portugal

The seamounts of the Gorringe Bank host many mammal species. This site was proposed as a Site of Community Importance as part of Natura 2000 network.

Due to the lack of information the Portuguese mainland, MSFD does not evaluate the the status of this functional group. However, the National Institute of Nature Conservation and Forests (ICNF) have

data regarding the distribution of some of the most common species of marine mammals (

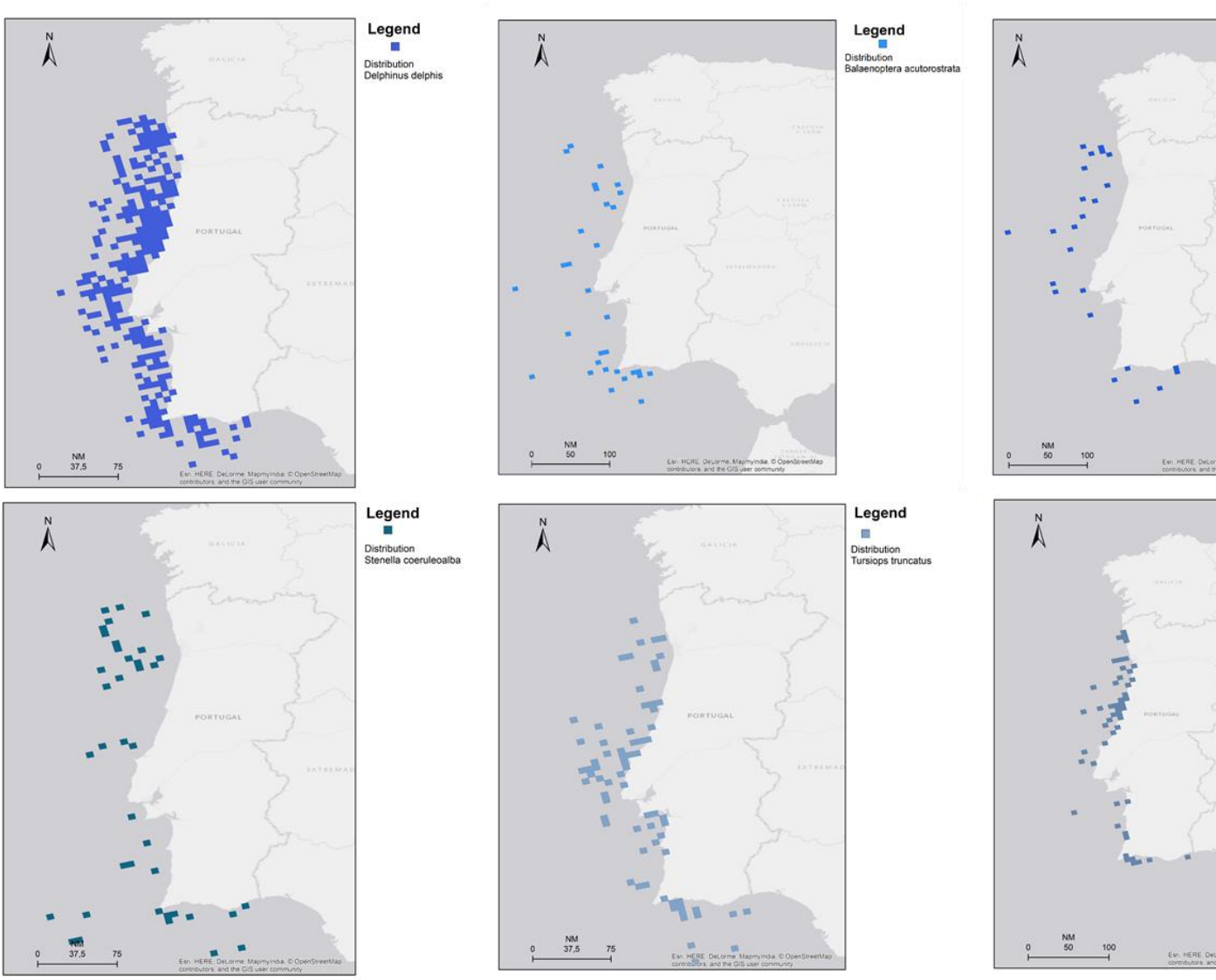


Figure 24).

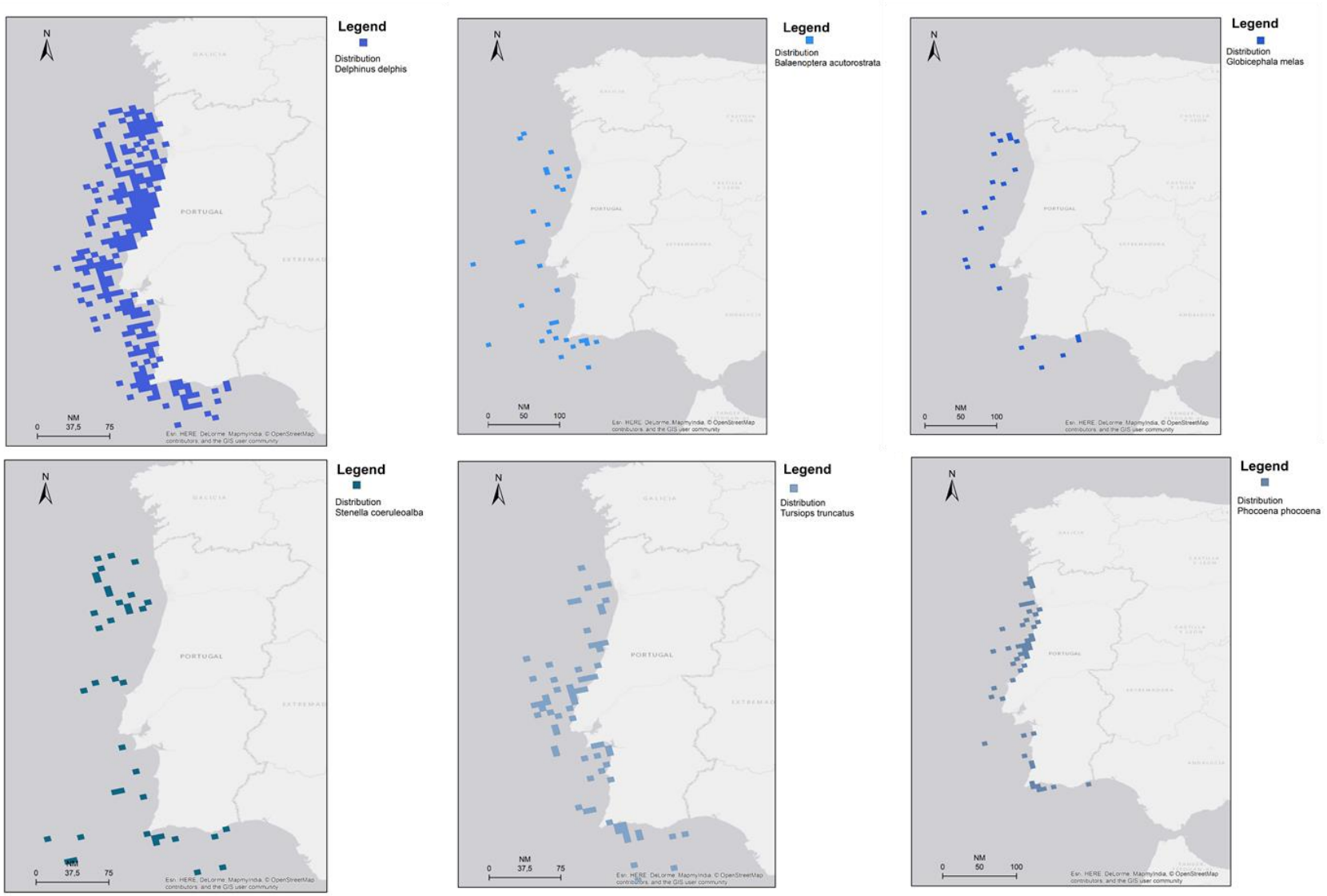


Figure 24 : Distribution of some species of marine mammals on Portugal mainland. (ICNF/SNIMAR- data spatialised through ArcGis)

5 Marine birds (Descriptor 1)

5.1 Distribution of marine birds species

5.1.1 List of marine birds in the OSPAR IV region

Annex X. Marine bird species in OSPAR Region IV provides a list of marine birds that occur in the OSPAR region IV. It was made from OSPAR documents and national MSFD initial assessments.

Among the 4 species present in OSPAR List of Threatened and/or Declining Species, 3 are reported as 'under threat and/or decline' in OSPAR Region IV (Balearic shearwater *Puffinus mauretanicus*, Roseate tern *Sterna dougallii*, and Iberian guillemot *Uria aalge*)

5.1.2 Regulatory status of marine birds

The European Union meets its obligations for bird species under the Bern Convention and Bonn Convention and more generally by means of Directive 2009/147/EC (Birds Directive) on the conservation of wild birds (the codified version of Council Directive 79/409/EEC as amended). One main provision of the Directive is the identification and classification of Special Protection Areas (SPAs) for rare and vulnerable species listed in Annex I, as well as for all regularly occurring migratory species. Since 1994, all SPAs are included in the Natura 2000 ecological network, set up under the Habitats Directive 92/43/EEC.

Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals)
Appendix I (Endangered species)
Appendix II (Migratory species conserved through Agreements)
Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats)
Appendix II (Strictly protected fauna species)
Appendix III (Protected fauna species)
Birds Directive (Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds)
Annex I (species in Annex I shall be the subject of special conservation measures concerning their habitat –Special Protection Areas)
Annex II
OSPAR Convention
3 species are in OSPAR List of Threatened and/or Declining Species: Balearic shearwater *Puffinus mauretanicus*, Roseate tern *Sterna dougallii*, Iberian guillemot *Uria aalge*

Table 14: Main international and Community regulatoy frameworks for marine birds in OSPAR Region IV

The list of Species and their affiliation to each framework is detailed in Annex X. Marine bird species in OSPAR Region IV

5.1.3 Distribution, abundance and ecology of marine birds

Most marine bird species are highly mobile and have large ranges that are mostly constrained by climatic, geographic and physiographic factors, rather than by human pressures except at a very local level (OSPAR Intersessional Correspondence Group on the Coordination of Biodiversity Assessment and Monitoring 2012).

5.1.3.1 *Functional groups*

According to MSFD Decision 2017/848, species groups to be assessed:

→ Grazing birds
→ Wading birds
→ Pelagic-feeding birds
→ Benthic-feeding birds

OSPAR uses the following typology for functional groups : Offshore surface feeders, Offshore pelagic feeders,Intertidal benthic feeders, Inshore benthic feeders, Coastal top predator (OSPAR Intersessional Correspondence Group on the Coordination of Biodiversity Assessment and Monitoring 2012)

5.1.3.2 *Seasonal occurrence of marine birds*

The coasts of the Bay of Biscay and the western Iberian Peninsula are used by several seabird species for breeding. Several species are even resident in some areas, meaning that they are known or thought to use the habitat throughout the year, including for breeding (Table 15).

Habitat seasonal occurence	BirdLife definition
Resident	Known or thought to use the habitat throughout the year, including for breeding
Breeding	Known or thought to use the habitat for breeding during the appropriate season
Non-breeding	Known or thought to use the habitat, but not normally for breeding

Table 15: Habitat seasonal occurrence as used by BirdLife International

For examples :

→ The following species are resident in all three countries Spain, France and Portugal (within OSPAR Region IV): European shag (*Phalacrocorax aristotelis),* yellow-legged gull (*Larus michahellis)*, lesser black-backed gull (*Larus fuscus)*, black-legged kittiwake (*Rissa tridactyla)* and common guillemot (*Uria aalge)*.
→ The European storm petrel (*Hydrobates pelagicus)*, is resident in France, breeding in Spain and non-breeding in Portugal.
→ Many more species use these waters for feeding in the non-breeding period (ICES 2016b)

5.1.3.3 *Abundance and distribution of marine birds species in OSPAR Region IV*

In the Bay of Biscay and Iberian Coasts ecoregion, the most important species in terms of abundance, without consideration of seasons, are (ICES 2016b):

→ Northern gannet (*Morus bassanus)*
→ Gulls (*Larus spp)*. (seven species)
→ Balearic shearwater (*Puffinus mauretanicus)*
→ Manx shearwater (*Puffinus puffinus*)
→ Sooty shearwater (*Puffinus griseus)*

→ Cory's shearwater (*Calonectris diomedea)*
→ Razorbill (*Alca torda)*
→ Atlantic puffin (*Fratercula arctica)*

*Trends in the numbers of seabirds breeding around these seas are not known, with the exception of Iberian common guillemot (*Uria aalge)* and black-legged kittiwake (*Rissa tridactyla*) that are either now extirpated or close to that state. Shags have also declined. (ICES 2016b)

Many marine bird species have seasonal variations in distribution and density. This is mainly because most of marine birds breed during summer in remote areas far from wintering zones(Schreiber et Burger 2001).

The following section shows abundance and distribution of some species in the Bay of Biscay.

5.1.3.3.1 Species more abundant in winter (Bay of Biscay)

The majority of marine bird species breed in summer in northern Europe. After breeding, most species migrate to southern areas like the Bay of Biscay. These areas show higher abundance of marine birds in winter for the following species (Pettex et al. 2014)

→ Northern fulmar (*Fulmarus glacialis*)
→ Northern gannet (*Morus bassanus)*
→ Great skua *(Stercorarius skua)*,
→ Little gull (*Hydrocoloeus minutus* or *Larus minutus)*
→ Black-legged kittiwake (*Rissa tridactyla)*
→ Black-headed gull (*Larus ridibundus),* Mediterranean gull *(Ichthyaetus melanocephalus)*
→ Common gull *(Larus canus)*
→ Auks *(Alcidae* e.g. Common murre *Uria aalge,* Razorbill *Alca torda,* Atlantic puffin *Fratercula arctica)*
→ Scoters (Anatidae)

As an example, Figure 25 shows seasonal variation of predicted habitats of Alcidae (higher abundance in winter).

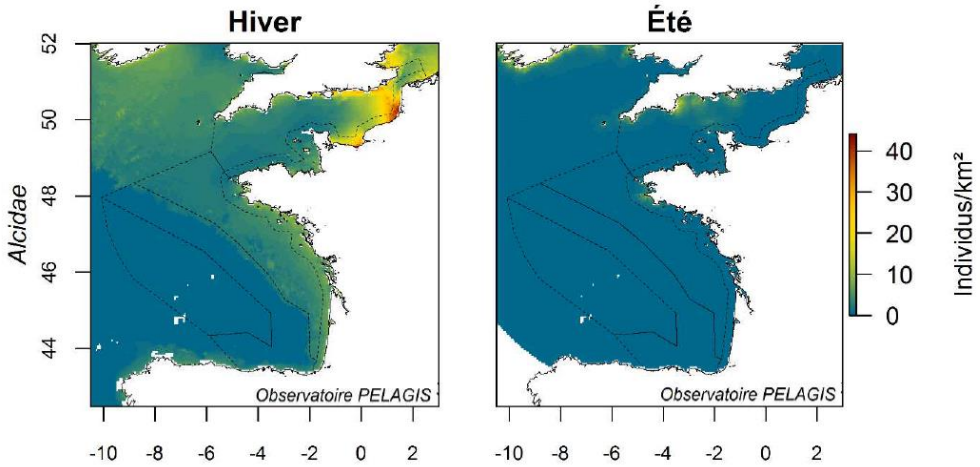
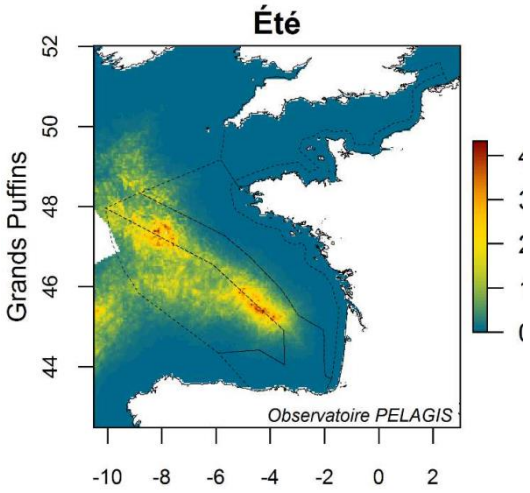


Figure 25 : Predicted habitats for Alcidae (auks, like Uria aalge, Alca torda or Fratercula arctica) in winter (left) and summer (right) in Atlantic.(Pettex et al. 2014)

5.1.3.3.2 Species more abundant in summer (Bay of Biscay)

On the contrary, some marine bird species breed in the Bay of Biscay and are therefore more abundant in summer. It is the case for the following species (Pettex, et al., 2014):

→ 'Small shearwaters': Manx shearwater (*Puffinus puffinus)*
→ 'Large shearwaters': Cory's shearwater (*Calonectris borealis*) (or Scopoli's shearwater *Calonectris diomedea ??) and* Great shearwater (*Puffinus gravis)*
→ 'Storm petrels': European storm-petrel (*Hydrobates pelagicus)*
→ 'Terns' : *Sterna sp.*



As an example,

Figure 26 shows predicted habitats for large sheawaters in summer (in the Bay of Biscay). They are almost absent of French waters during winter. They are quite abundant in summer in the Bay of Biscay, with higher densities above continental slope.

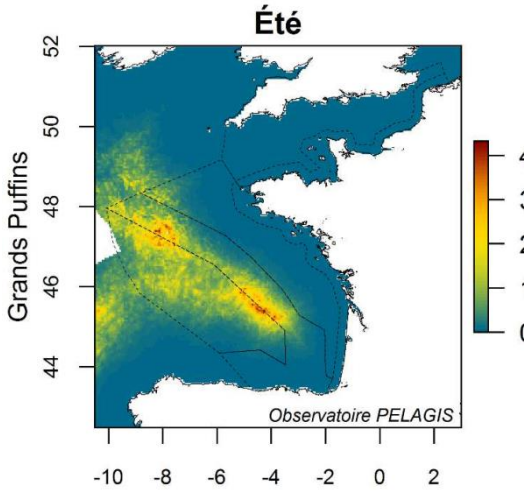


Figure 26 : Predicted habitats for large shearwaters in summer in Atlantic.(Pettex et al. 2014)

5.1.3.3.3 Species with low variable abundance and distribution (Bay of Biscay)

→ 'Cormorants': European shag *Phalacrocorax aristotelis*, Great cormorant *Phalacrocorax carbo*

→ 'Herring gull complex': (*Larus argentatus and Larus michahellis*)
→ 'Black-backed gulls': (*Larus marinus and Larus fuscus*)
→ 'Large sized gull sp': non identified gulls

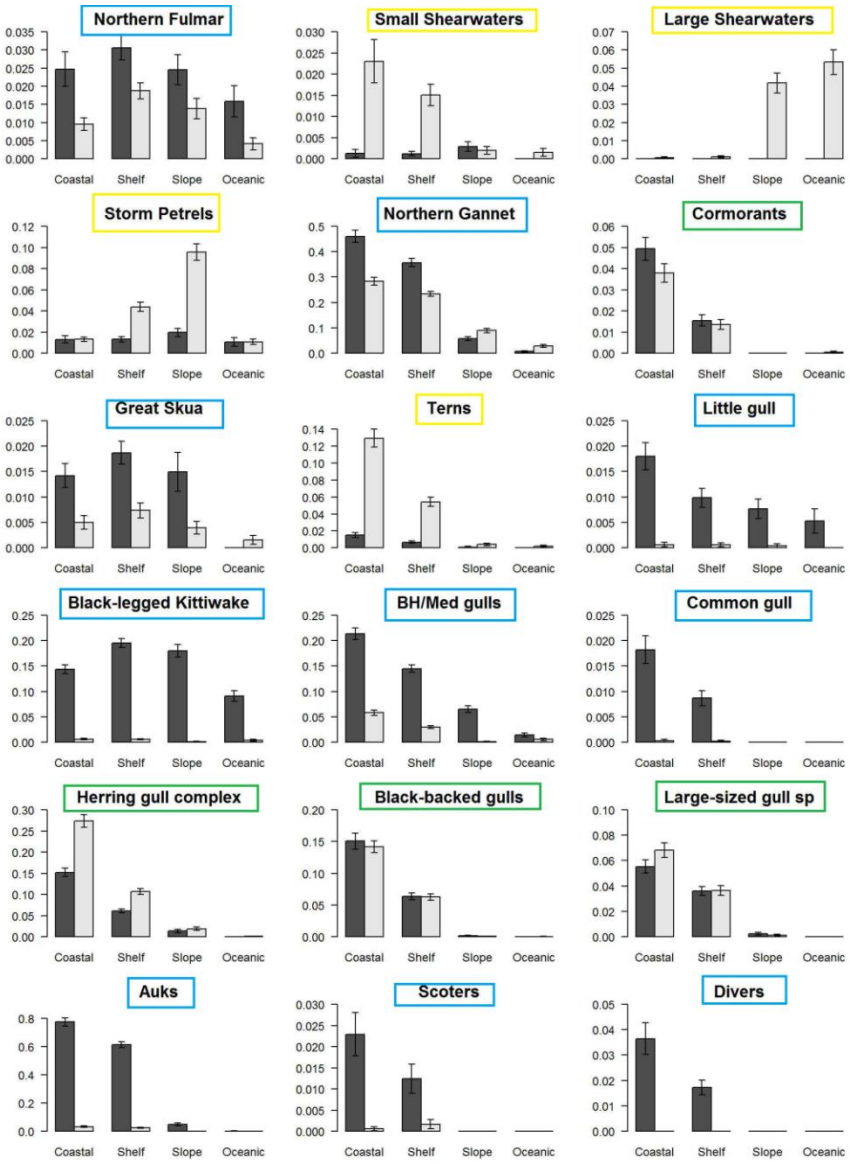


Figure 27 : Mean density of observations by sector and by season for marine birds species in Altantic. Winter appears in dark grey, summer in light grey. Red frame: higher abundance in winter.(Pettex et al. 2014)

Remark : divers are also more abundant in winter in French waters, but are not mentioned earlier because they are not present in the Bay of Biscay.

Fisheries have a considerable influence at different levels on the distribution of seabirds at sea on account of the supply of discards that are used as food for scavenging species. Several studies of offshore seabirds in the Gulf of Cadiz (ICES IXaS), Galicia (ICESIXaN), and Cantabrian Sea (ICES VIIIc) describe seasonal distributional patterns of species and their relationships with fishing discards availability and fishing boats distribution (ICES 2007). The spatial distribution of the scavengers was generally greatly driven by the distribution of the demersal trawl fleet. The most common species showed high freqencies of occurrence at trawlers, ranging from 71% to 95% of the hauls. (ICES 2016b)

5.2 Status and trends for marine birds

5.2.1 MSFD and OSPAR criteria and indicators used to assess marine birds

Marine birds status are assessed by France, Portugal and Spain under Marine Strategy Framework Directive (MSFD), OSPAR Regional Sea Convention, Habitats Directive for specific species listed in Annex II, IV, V and Birds Directive for all migratory wild species.

Criteria and indicators used to describe marine birds (2017) are found in the Table 16 below. Indicators used in the MSFD framework are the same as OSPAR indicators.

MSFD Descriptor	MSFD criteria	MSFD / OSPAR Indicators
Descriptor 1: Biodiversity	D1C1 (1.3) Mortality rate per species from incidental by-catch	*B5: accidental by-catch
	D1C2 (1.2) Population abundance	*B1: Marine birds abundance OM_Indicateur RNF limicoles côtiers
	D1C3(1.3.1) Population demographic characteristics	*B3: Breeding status of marine birds
	D1C4 (1.1) Spatial distribution of the species	None yet (France)
	D1C5 (new) Expansion and condition of suitable habitats for monitored species	None yet (France)

Table 16: MSFD Descriptors, criteria as in MSFD Decision 2017/848. MSFD indicators suggested by France in 2017 for MSFD 2018 IA.OSPAR most recent indicators.

Indicators 'Marine Bird Abundance' and 'Marine Bird Breeding Success or Failure' for the Bay of Biscay and Iberian Coast were not assessed in OSPAR Intermediate Assessment of 2017, because data from Contracting Parties were not available.

5.2.2 IUCN Conservation Status

Annex X. Marine bird species in OSPAR Region IV provides the latest available IUCN conservation status at European scope (or world scope if the information was not found). The most critical species regarding IUCN European status are:

- → 1 is Critically Endangered (Balearic shearwater *Puffinus mauretanicus)*
- → 3 are Endangered (Atlantic Puffin *Fratercula arctic,* Northern Fulmar *Fulmarus glacialis,* and White-faced strom-petrel *Pelagodroma marina*)
- → 6 are Vulnerable (Desertas Petrel *Pterodroma deserta*, Long-tailed Duck *Clangula hyemalis*, Great Northern diver *Gavia immer*, Velvet Scoter *Melanitta fusca*, Eurasian ostralgus *Haematopus ostralegus,* Eurasian ostralgus *Haematopus ostralegus*)
- → 11 are Near Threatened

A description of IUCN conservation categories is provided in Annex VII. IUCN Conservation Status criteria.

5.2.3 Birds Directive Conservation status

Annex X. Marine bird species in OSPAR Region IV provides the latest information about Marine Burds cited in the Birds Directive. This status relateds 89 species of marine birds.

5.3 Pressures known to have impacts on marine birds

Major pressures to known to have impacts on marine birds that are mentioned in MSFD Initial Assessments or in many other sources such as BirfLife website are the following:

- → Seabird by-catch (Extraction of or mortality to wild species) (Fisheries by-catch, reduction of prey)
- → Input of non-indigenous species (e.g. predation by introduced mammals)
- → Input of substances (e.g. acute pollution events such as oil spills)
- → Input of marine litter (D10)
- → Disturbance
- → Climate change

5.4 Significant areas for marine birds

The coastal area as well as the continental shelf is very important in terms of abundance of many marine birds (Pettex et al. 2014)

5.4.1 Special Protection Areas (Natura 2000 sites for birds)

The littoral of the Bay of Biscay is a major migration path, especially for marine and coastal birds. Many protection areas were created after their identification as wintering or migratory stop areas. Some Natura 2000 sites were designated mostly because of their importance for bird species: Special Protection Areas[13], designated under the Birds Directive.

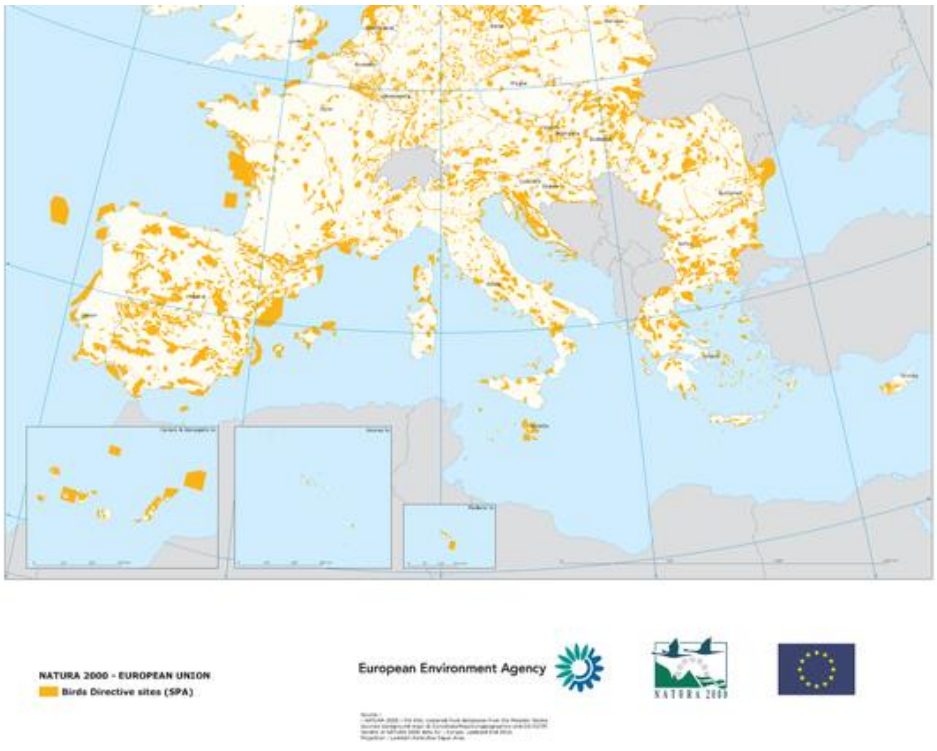


Figure 29 : Special Protection Areas in European Union (2016). Source: EEA

Although the European wide assessment indicates individual country progress, it also reveals that further work is needed by nearly all countries in offshore site identification. Even in the high

[13] English: Special Protection Areas (SPA), French: Zones de Protection Spéciale (ZPS), Spanish: Zonas de Especial Protección para las Aves (ZEPA), Portuguese: Zonas de Proteção Especial (ZPE)

achieving countries such as Germany, where 35% of the marine area is designated for seabirds, the more distant offshore areas are not protected. Countries need to invest further in seabird tracking and offshore surveying to identify sites beyond their territorial waters. In addition, many sites in many countries are still lacking management plans- a vital component to move marine Natura 2000 sites beyond simply being 'paper parks'.[14]

5.4.2 Important Bird and Biodiversity Areas (IBAs)

Some areas have a functional importance and are not part of the Natura 2000 network. They can be nesting areas, migratory stops, wintering areas, etc.

Important Bird and Biodiversity Areas (IBAs) are designated by BirdLife International. IBAs identification can be a basis for SPAs designation under Birds Directive.

IBAs designation is achieved through the application of quantitative ornithological criteria, grounded in up-to-date knowledge of the sizes and trends of bird populations. The criteria ensure that the sites selected as IBAs have true significance for the international conservation of bird populations, and provide a common currency that all IBAs adhere to, thus creating consistency among, and enabling comparability between, sites at national, continental and global levels.

Figure 30 below shows the marine Important Bird and Biodiversity Areas, from the web data viewer of BirdLife International.

Figure 30 : Important Marine IBAs. Source : Marine IBA e-atlas of BirdLife International

Criteria for designation as IBA (at the European Union level) are, for example:

- → Species with an unfavourable conservation status in Europe
- → Presence of species of global conservaton concern
- → Concentration of a species threatened at the European Union level
- → Congregations of migratory species not threatened at the EU level
- → Etc.

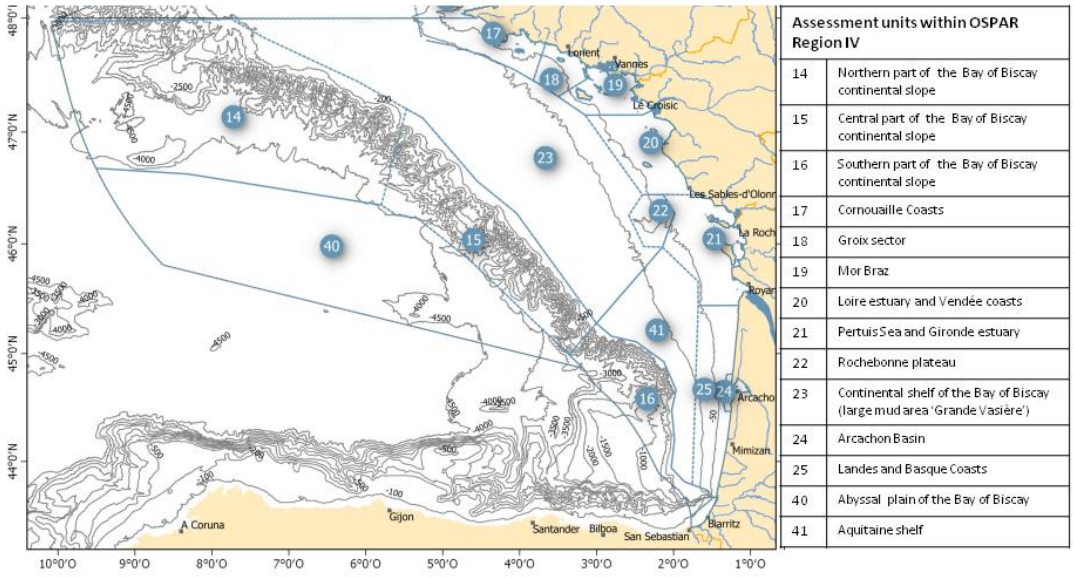
(More details at http://datazone.birdlife.org/site/ibacriteuro)

[14] BirdLife International (2014) Natura 2000 at sea: good progress but more to do. From http://www.birdlife.org on 04/12/2017

5.4.3 Ecological challenges and/or challenge areas for marine birds in France, as identified in the MSFD process

For the second round of MSFD implementation (definition of 'Environmental Targets' to eventually reach 'Good Environmental Status', GES), France identified and prioritized 'ecological challenges'. Ecological challenges are considered as elements or marine ecosystems for which GES should be reached or maintained. Among these ecological challenges, some are considered to be prioritized following three criteria: representativity, sensitivity, functional importance.

Ecological challenge and/or challenge area of 'major' and 'high' importance, within OSPAR Region IV, are listed in Table 17. Ecological challenges are mentioned for each assessment area, as shown in Figure 31.



Assessment units within OSPAR Region IV	
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18	Groix sector
19	Mor Braz
20	Loire estuary and Vendée coasts
21	Pertuis Sea and Gironde estuary
22	Rochebonne plateau
23	Continental shelf of the Bay of Biscay (large mud area 'Grande Vasière')
24	Arcachon Basin
25	Landes and Basque Coasts
40	Abyssal plain of the Bay of Biscay
41	Aquitaine shelf

Figure 31 : Assessment areas for the identification of ecological challenges in French MSFD process that are within OSPAR Region IV.

Degree of importance	Assessment areas		Ecological challenges and/or challenges area relative to marine birds			
			Colonial coastal birds (gulls, terns and avocets) and feeding areas	Bird colonies and feeding areas	Wintering site	Maximum density nd functional areas for non-breeding period
Major importance (and below)	17	**Cornouaille coasts**		Major : breeding for Roseate tern (*Sterna dougallii); High: Larus fuscus, Thalasseus sandvicensis; Medium: Larus marinus, Larus argentatus;* Low: Common shag, Common tern		Major: high density of many species; High: Balearic shearwater
	19	**Mor Braz**		Major : Lesser black-backed gull; High: Great black-backed gull; Medium: Cormorant, Herring gull, Common shag, Common tern	High: avocet, Black-tailed godwit , dunlin, Brent goose, Northern pintail , Northern shoveler, Horned grebe , Common spoonbill	Major: high density of many species, Balearic shearwater ; High: wintering Red-breasted merganser and Gaviidae
	20	**Loire estuary and Vendée coasts**	Major : Avocet, Black-tailed godwit , Common redshank , Black-winged stilt	Mediterranean gull , Sandwich tern , Common tern	High : Avocet, , Herring gull , Common teal, Black-tailed godwit	High: Densité toutes espèces, Balearic shearwater
	25	**Landes and Basque coasts**				Major : high densities for many species High: Balearic shearwater
High importance (and below)	14	**Northern part of the Bay of Biscay continental slope**				High : maximal density areas for many species, importance for northern fulmar wintering (Fulmarus glacialis)
	15	**Central part of the Bay of Biscay continental slope**				High : high densities for many species

	16	**Southern part of the Bay of Biscay continental slope**				High : high densities for many species
	18	**Groix sector**		Medium: Herring gull Low: Lesser black-backed gull, Great black-backed gull Common shag , Common tern		High: high density for many species, Balearic shearwater
	22	**Rochebonne plateau**				High: maximal densities for many species in non-breeding period
	24	**Arcachon basin**	Moyen : Common pied oystercatcher	Fort : Sandwich tern ; Faible : Yellow-legged gull	: Fort : Brent goose ,Dunlin, Ringed plover , Common spoonbill , Northern shoveler , Black-tailed godwit	
	21	**Pertuis sea and Gironde estuary**	Fort : Black-winged stilt Moyen : Avocet Faible : Kentish plover	Moyen : Common tern	Fort : Avocet, Black-tailed godwit, Bar-tailed godwit , Northern pintail , Grey plover , Common shelduck, Sanderling, Red knot , Brent goose , Northern shoveler , Ringed plover , Common spoonbill, Turnstone, Curlew	Fort : Densité toutes espèces, Balearic shearwater *, Wintering for Common scoter and Great northern diver

Table 17 : Ecological challenges and/or challenge areas relative to marine birds identified in the French MSFD process(Ministère de l'Environnement, de l'Energie et de la Mer et Agence Française Biodiversité 2017). Only areas within OSPAR Region IV are mentionned

In a consequence of an évaluation of Natura 2000 network, it has been highlighted that lacks exist in knowledge, evaluation and protection of mobile species at sea. In order to improve the network, the French ministry of environment has define, with the MFSD intial assessment, some “Grands Secteurs” (big sectors). Those areas are used as basis, for mobile species, in order to designe new Natura 2000 at sea sites.

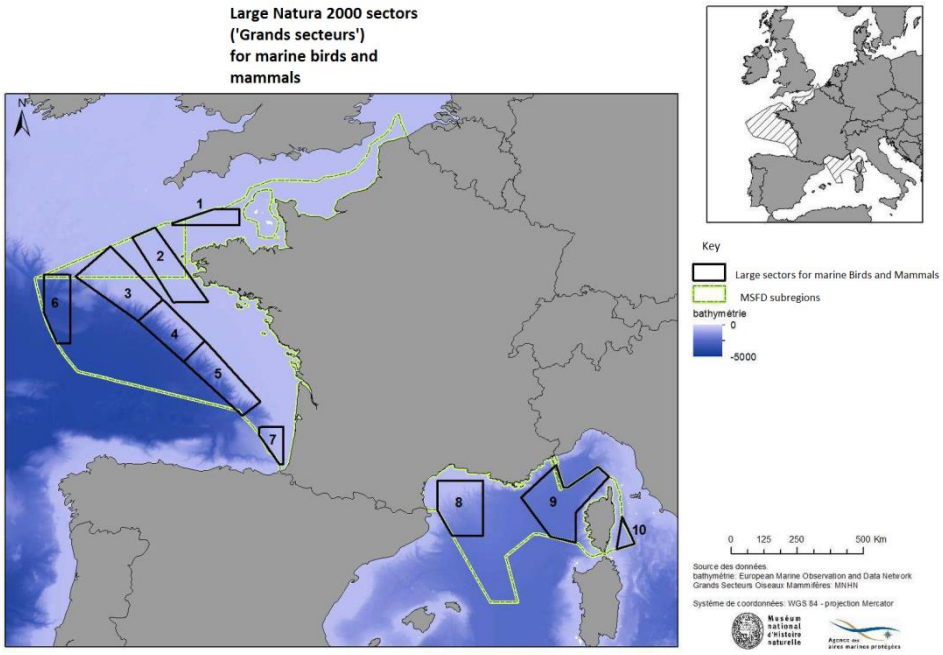

Figure 32: Large Natura 2000 sectors (‘Grands secteurs’) for marine birds and mammals. (Pettex et al. 2014)

5.4.4 Significant areas for marine birds in Spain

No information was found through this assessment.

5.4.5 Significant areas for marine birds in Portugal

Figure 33 shows the latest ICNF (Institute for Nature and Forest Conservation, 2017) designated IBA's in marine areas of Portugal mainland. Is important to highlight the importance of estuary systems (Ria de Aveiro, Figueira da Foz, Sado, Tejo and Ria Formosa) as specially Important areas of nidification for many marine birds species. Other important areas in the Portuguese sea are located in Aveiro-Nazaré, Berlengas and Farilhões, Cabo Raso, Southwest coast and Sagres.

Figure 33 : Important Birds Areas for Portugal mainland (Instituto da Conservação da Natureza e das Florestas/SNIMAR, 2017)

6 Marine turtles (Descriptor 1)

The two existing marine turtle families Dermochelydae and Cheloniidae are found in OSPAR Region IV. Marine turtles are long-lived predators. They were once key species in the sense of species that are important to ecosystem structure and function(Bjorndal et Jackson 2002).

They can also be considered as pollution bioindicator species concerning ecosystem health since their long lifespan allows accumuluation of diverse contaminants. (Aguirre et Lutz 2004)

6.1 List of marine turtle species, regulatory and conservation status

Table 18 below shows the five marine turtle species occurring in OSPAR Region IV, as well as information of their regulatory and occurence status.

Species (Scientific Name)				*Caretta caretta*	*Chelonia mydas*	*Dermochelys coriacea*	*Eretmochelys imbricata*	*Lepidochelys kempii*
English common name				Loggerhead sea turtle	Green sea turtle	Leatherback turtle	Hawksbill turtle	Kemp's Ridley
Commonness (global occurrence and/ or locally abundance)				yes	yes	yes	yes	yes
Regulatory status		**OSPAR List**		yes	no	yes	no	no
		Habitats Directive (Annex II or IV)		II, IV	II, IV	IV	IV	IV
		Bonn		I, II	I, II	prI, II	I, II	I, II
		Bern		II	II	II	II	II
		CITES		I	I	no	I	no
Occurrence	**Biscay/Iberian waters**	**France**	**(Bay of Biscay)**	Occasional (***)	Occasional (*)	Present (***)	Occasional (***)	Occasional (***)
		Spain	**(cantabrian sea and Galicia)**	Common, rare (*)	Occasional (*)	Occasional, rare (*)	Occasional, rare (*)	Occasional, rare (*)
		Portugal (mainland)		Visitant, common(*)	Occasional, rare (**)	Visitant, common (**)	Occasional, rare (**)	Visitant or occasional, rare (**)

Table 18 : List of marine turtle species in Bay of Biscay and Iberian Coast region, regulatory and occurrence status. Source: MSFD Advice Manual and Background Document (OSPAR Intersessional Correspondence Group on the Coordination of Biodiversity Assessment and Monitoring 2012). /:information not found or not existing

Sources of information:

(*) information from national Red Lists

(**) for Portugal (Loureiro, et al., 2008)

(***) for France : INPN MNHN

6.1.1 Regulatory status of marine turtle species

All five species are protected by Bonn and Bern Conventions, and all are in Annex IV to Habitats Directive. Loggerhead turtle *Caretta caretta* is also listed in both Annex II to Habitats Directive and OSPAR List of Threatened and/or Declining species. Two species are protected by CITES (their trade is regulated by CITES and must be verified by the necessary permits).

Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals)
Appendix I (Endangered species): **All five species**
Appendix II (Migratory species conserved through Agreements): **All five species**
Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats)
Appendix II (Strictly protected fauna species): **All five species**
Habitat Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora)
Annex II (species of community interest whose conservation requires the designation of special areas of conservation) ***Caretta caretta* and *Chelonia mylas***
Annex IV (species of community interest in need of strict protection): **All five marine turtle species**
OSPAR Convention
Loggerhead turtle *Caretta caretta* and Leatherback turtle *Dermochelys coriacea*
CITES
Appendix I: species are rare or endangered. Trade for primarily commercial purposes is prohibited **Chelonia mydas and Eretmochelys imbricata**

Table 19: Regulatory status of marine turtle species occuring in OSPAR Region IV.

Remark: The two species listed in Annex II to Habitats Directive are not in the French national list for Natura 2000 sites, because they are scarcely observed in the Bay of Biscay. No Natura 2000 site was designated for these two species in French waters of the Bay of Biscay.

6.1.2 Distribution, abundance and ecology of marine turtle species

6.1.2.1 *Bay of Biscay*

Available data are very few in the Bay of Biscay, but show that *Caretta caretta* and *Dermochelys coriacea* seem to regularly occur in this area. The population size in unknown due to insufficient data(Agence des Aires Marines Protégées et Ifremer 2012). No breeding area for marine turtles was identified in the Bay of Biscay (Agence des Aires Marines Protégées et Ifremer 2012)

6.1.2.2 *Iberian coasts*

According to the 2017 National Report of Parties on the Implementation of the Convention on the Conservation Migratory Species (Bonn Convention) of Portugal mainland waters (Loureiro 2017), the population size as well as the distribution of all five marine turtle species are unknown. (*Caretta caretta, Chelonia mydas*, *Dermochelys coriace, Eretmochelys imbricate, Lepidochelys kempii.)*

Dermochelys coriacea Leatherback turtle: is probably the most common species in Portugal mainland waters (Loureiro et al. 2008).

Caretta caretta is only sporadically found near Portugal mainland coasts.(Loureiro et al. 2008). The Portuguese coast does not hold nidification beaches. The species is present through migratory patterns along the Portuguese EEZ (Loureiro 2017). Strandings reveal a seasonal migration pattern for the species with higher peaks between spring and summer. The most area for *Caretta caretta* seems to be the Algarve region (southern coast).

There are seven species of sea turtles most of which are distributed in tropical and sub-tropical waters. All are listed as threatened on the IUCN Red list (Table 20).

Common name	Species name	IUCN status
Leatherback turtle	*Dermochelys coriacea*	Critically Endangered
Hawksbill turtle	*Eretmochelys imbricata*	Critically Endangered
Kemp's ridley turtle	*Lepidochelys kempii*	Critically Endangered
Loggerhead turtle	*Caretta caretta*	Endangered
Green turtle	*Chelonia mydas*	Endangered
Olive ridley turtle	*Lepidochelys olivacea*	Vulnerable
*Flatback turtle	*Natator depressus*	Data deficient

Table 20 : IUCN Red list threat status for all marine turtle species

*The flatback turtle is the only one that does not occur in the Atlantic Ocean

The concept of RMU (Regional Management Units,(Wallace et al. 2010)) in marine turtles was created based on different biological and reproductive parameters and on heavily utilized areas at different spatial scales aiming to improve conservation strategies and research challenges (Wallace et al. 2010). The Atlantic RMUs that can be observed in north Iberian Peninsula waters are listed in Table 21, although the genetic origin and nesting sites of the observed and stranded animals is not determined.

Common name	Species name	RMUs
Leatherback turtle	*Dermochelys coriacea*	Atlantic Northwest
Kemp's ridley turtle	*Lepidochelys kempii*	Atlantic Northwest
Loggerhead turtle	*Caretta caretta*	Atlantic Northwest, Atlantic Northeast, Mediterranean
Hawksbill turtle	Eretmochelys imbricata	Atlantic East; Atlantic W
Green turtle	*Chelonia mydas*	Mediterranean; Atlantic, East;

Table 21 : Possible RMUs origin of marine turtles observed in north Iberian Peninsula

Therefore, reducing the distribution and information on sea turtle species to the Iberian North Atlantic region would not adjust to the reality of these populations since are highly migratory species that travel long distances, both under Spanish waters or elsewhere international waters.

6.2 Conservation Status of marine turtles

Given that marine turtles do not breed in the North-East Atlantic and occur in very low densities over very large areas, it is probably unrealistic to attempt to collect abundance data that could be used to provide indicators of population distribution/size or condition (OSPAR Intersessional Correspondence Group on the Coordination of Biodiversity Assessment and Monitoring 2012).

IUCN and Habitats Conservation Status show either poor conservation status or insufficient data for marine turtles (Table 22)

Scientific Name		*Caretta caretta*	*Chelonia mydas*	*Dermochelys coriacea*	*Eretmochelys imbricata*	*Lepidochelys kempii*
Common Name		Loggerhead sea turtle	Green sea turtle	Leatherback turtle	Hawksbill turtle	Kemp's Ridley
IUCN Conservation Status*	(Global scope)	VU	EN	VU	CR	CR
France	IUCN (national)	DD	NA	DD	NA	DD
	Habitats Directive	U2	U2	U2	NA	NA
Spain	IUCN (national)	EN	EN	CR	DD	DD
	Habitats Directive	Unknown	Unknown	Unknown	Unknown	/
Portugal	IUCN (national)	NA	/	/	/	/
	Habitats Directive	NA	NA	NA	NA	/

Table 22 : Marine turtle species IUCN Conservation Status and Habitats Directive Conservation Statuses. U2: Unfavourable-Bad. CR: Critically Endangered. EN: Endangered. VU: Vulnerable. DD: Data Deficient. NA: Not assessed. /: information not found or not existing.

6.3 Pressures known to have impacts on marine turtles

The OSPAR MSFD Advice Manual and Background Document (OSPAR Intersessional Correspondence Group on the Coordination of Biodiversity Assessment and Monitoring 2012) as well as IUCN status assessments highlight two pressures that most affect marine turtles in OSPAR Region IV: fisheries bycatch and marine litter.

→ **Extraction of, or mortality/injury to wild species' including target and non-target species**
→ **Input or marine litter** (resulting in entanglement or ingestion of litter)

Other pressures highly affect marine turtles through nesting sites damage, but do not concern OSPAR Region IV since it does not host nesting sites. Among them: coastal Development affecting critical turtle habitat, direct utilization of turtles or eggs for human use (i.e. consumption, commercial products)

6.4 Significant areas for marine turtles

No nesting area was identified in OSPAR Region IV.

In the Bay of Biscay France as identified one ecological challenges and/or challenge areas relative to marine turtles for MSFD implementation. It is the abyssal plain of the Bay of Biscay because it's an area of concentration of *Dermochelys coriacea* ('High' importance degree)(Ministère de l'Environnement, de l'Energie et de la Mer et Agence Française Biodiversité 2017).

In Iberian waters, marine turtle species are mostly observed in Algarve region (south Portugal). This area could be important for *Caretta caretta* (Loureiro 2017).

The information from which data on sightings and strandings of sea turtles in the Iberian North Atlantic region is limited. Main species observed are loggerhead and leatherback with few records of the other species (Instituto Espanol de Oceanografia et Asistencia Tecnica TRAGSATEC SA 2012). A

summary of the information in the area based on observations but mainly on stranded animals follows in Table 23

	Galicia		Asturias	Cantabria		
	Antiguo	1990-2011	2000-2005	1980-2005	TOTAL	% Especie
Dermochelis coriacea	51	214	5	12	282	48.45
Caretta caretta	28	207	5	41	281	48.28
Chelonia mydas		7	2	1	10	1.72
Eritmochelis imbricata	5				5	0.86
Lepidochelis kempi	2		1	1	4	0.69
Total	514		13	55	582	
Porcentaje de cada CCAA	88.32		2.23	9.45		

Table 23 : Summary of marine turtle collected in the North Atlantic region (no data from Basque Country). In (Instituto Espanol de Oceanografia et Asistencia Tecnica TRAGSATEC SA 2012)

Loggerhead, *Caretta caretta*

In the waters of the Bay of Biscay and Galicia, where it is common but not very abundant can be found specimens of American origin. In general, small individuals arrive on these coasts, sometimes due to the effect of low temperatures on young individuals (Caminas 2004).

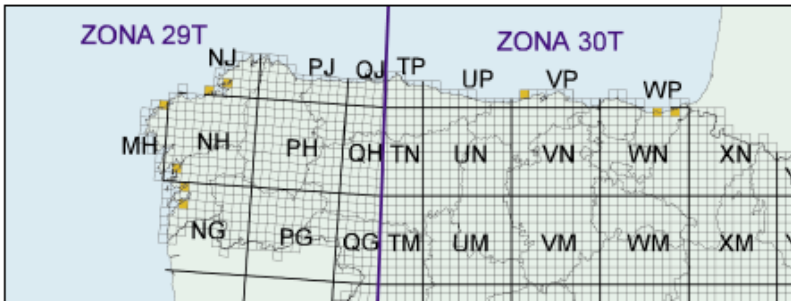

Figure 34 : Distribution of stranded Loggerhead (Caminas 2004)

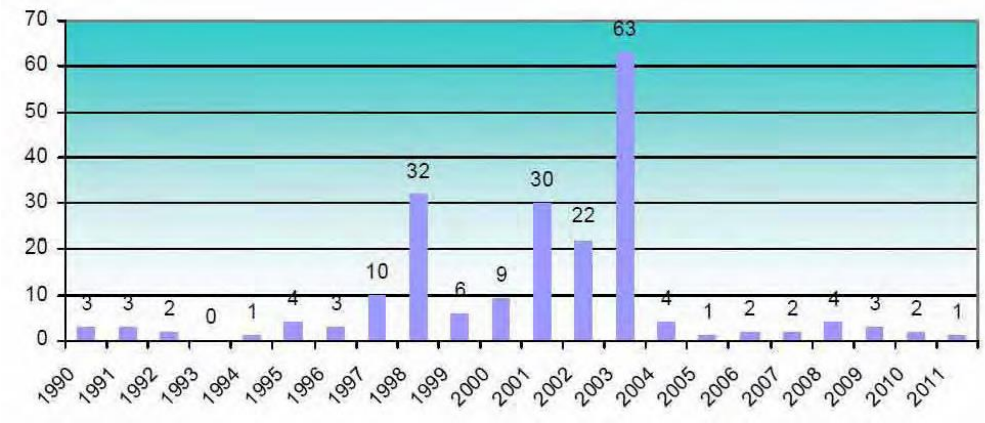

Figure 35 : Annual records of loggerhead turtle, C. caretta (1990-2011). Data from CEMMA

Leatherback *Dermochelys coriacea*

The leatherback turtle is a cosmopolitan species. It has been observed in latitudes of 60º N in Alaskan waters and up to latitude 71º N in the Eastern Atlantic. Its main habitat is the oceanic waters and the open sea.

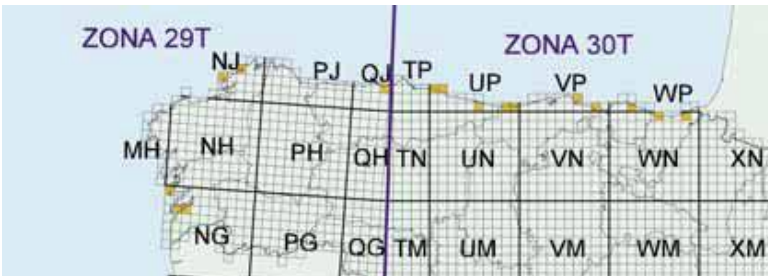

Figure 36 : Distribution of Dermochelys coriacea until 2001. (Caminas 2004)

In north Atlantic Iberian region this species is common and most of the stranded marine turtles are leatherbacks. As represented the species is registered annually.

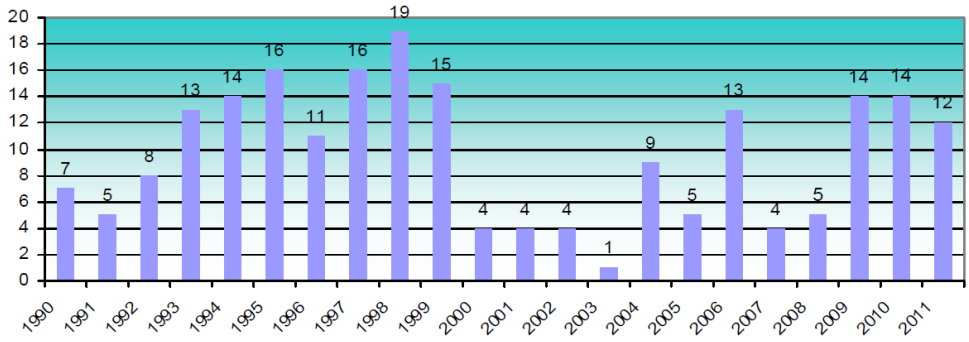

Figure 37 : Annual records of leatherback turtle, D. coriacea, (1990-2011). Data from CEMMA

Green turtle *Chelonia mydas*

This species in Spanish waters is very scarce. In the northeastern demarcation there are 11 strandings in Galicia and 2 in Asturias possibly coming from the beaches of the western-central Atlantic

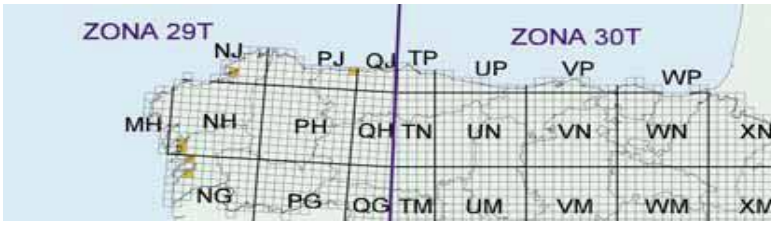

Figure 38 : Distribution of Chelonia mydas until 2001. (Caminas 2004)

Hawksbill turtle Eretmochelys imbricata

The specimens found in Spanish waters could be native to the Caribbean. The few specimens that have reached the Spanish coasts usually appear dead or in very bad conditions.

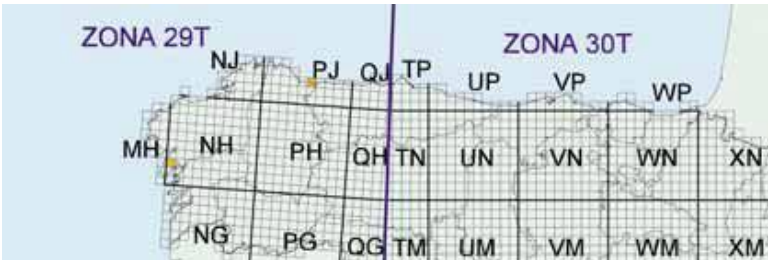

Figure 39 : Distribution of Eretmochelys imbricata until 2001. (Caminas 2004)

Kemp's ridley turtle Lepidochelys kempii

In Spain there are only seven observations (Figure 40), 4 of which correspond to the North Atlantic region: two in Galicia (Núñez 1988), one in Asturias (Perez, Valdès, et Pis-Millan 2001), one in the Gulf of Biscay (Caminas 2004).

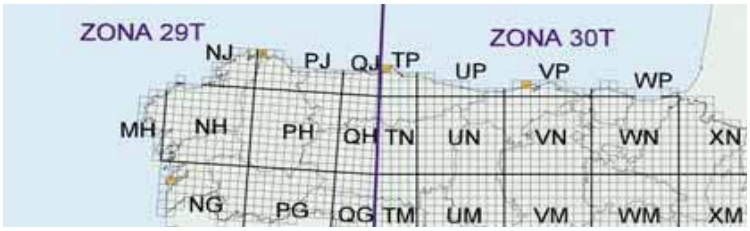

Figure 40 : Distribution of Lepidochelys kempii until 2001. (Caminas 2004)

From the data provided by the Maritime Museum of the Cantabrian Sea of the turtle's locations throughout the recorded period, a map with these distributions has been made (Figure 41).

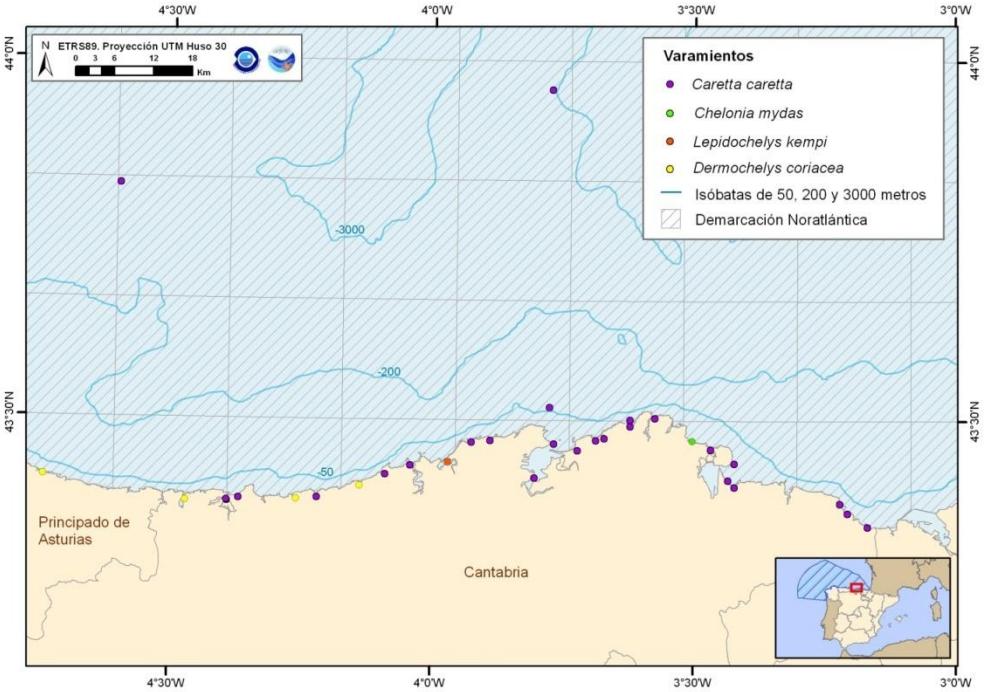

Figure 41 : Strandings marine turtles registered by the Maritime Museum of Santander. Period 1980-2005.

7 Cephalopods (Descriptor 1)

Species of the mollusk class Cephalopoda are characterized by bilateral body symmetry, a prominent head, and a set of tentacles. This section focuses on MSFD Descriptor 1 'Biodiversity'. Further information on commercially-exploited species is provided in the following part (MSFD Descriptor 3 'Commercially-exploited species').

7.1 Overview of cephalopods communities in OSPAR Region IV

Within this ecoregion the topographic diversity and the wide range of substrates result in many different habitats for cephalopods. In this region, the most abundant and commercially exploited species are long-finned squid *Loliginidae* and cuttlefish *Sepiidae*. Abundance of short-finned squid *Ommastrephidae* increases westwards towards Galicia, and decreases to the south of the Iberian coast. *Octopodidae* are abundant and heavily exploited along the Iberian coast by a large artisanal fleet, with concomitant social relevance. There are indications of a decline in octopus biomass index in Galicia and an increase off western Portugal. Stocks of both long-finned squid and short-finned squid have declined in the southern Bay of Biscay. (ICES 2016b)

Two functional groups ('ecotypes') of cephalopods can be distinguished: coastal and continental shelf pelagic cephalopods, and deep pelagic cephalopods (see Table 24).

Coastal and continental shelf pelagic cephalopods include for example *Loligo vulgaris* and *Alloteuthis spp* in Portuguese waters (Ministério da Agricultura, do Mar, do Ambiente, e do Ordenamento do Territorio, 2012). The spawning period of the coastal and continental shelf pelagic functional group is closely associated to gravel and coarse sand that are favourable to fix the eggs (Ministério da Agricultura, do Mar, do Ambiente e do Ordenamento do Território 2012).

Deep pelagic cephalopods include for example *Illex coindetii* or *Todaropsis eblanae*. *Illex coindetii* is distributed in East Atlantic between 60ºN and 17ºS; and 30ºW and the Mediterranean Sea. This species occurs between 100 m and 400 m deep, and makes daily vertical migrations in the water column, being close to the seabed during the day and dispersing in the water column during the night. *Todaropsis eblanae* has a continuous distribution in the East Atlantic and Mediterranean between 20 and 780m deep. The reproduction period occurs throughout the year, however the spawning period peak is between march and september. *Todaropsis eblanae* feeds on fishes, crustaceans and cephalopods (Ministério da Agricultura, do Mar, do Ambiente e do Ordenamento do Território 2012).

Functional Groups ('Ecotypes')	Species (Scientific Name)	English common name	Particular sensitivity towards specific human pressures/ activities	Commonness (global occurrence and/ or locally abundance)	Biscay/Iberia		
					FR	SP	PT
Coastal/shelf benthic cephalopods	Eledone cirrhosa	Curled octopus	directed fishing	yes	?	x	x
Coastal/shelf benthic cephalopods	Galiteuthis armata	Armed cranch squid			?		x
Coastal/shelf benthic cephalopods	Gonatus steenstrupi	Atlantic armhook squid			?		x
Coastal/shelf benthic cephalopods	Histioteuthis bonnellii	Umbrella squid			?		x
Coastal/shelf benthic	Histioteuthis reversa	Reverse jewell			?		x

cephalopods		squid					
Coastal/shelf benthic cephalopods	Martialia hyadesi	Sevenstar flying squid			?		
Coastal/shelf benthic cephalopods	Megalocranchia sp	Glass squid			?		x
Coastal/shelf benthic cephalopods	Octopus vulgaris	Common octopus	directed fishing	yes	x	x	x
Coastal/shelf benthic cephalopods	Rondeletiola minor	Lentil bobtail squid	bycatch	yes	?	x	x
Coastal/shelf benthic cephalopods	Sepia officinalis	Common cuttlefish	directed fishing	yes	x	x	x
Coastal/shelf benthic cephalopods	Sepietta oweniana	Common bobtail squid	bycatch	yes	?	x	x
Coastal/shelf benthic cephalopods	Sepiola sp	Bobtail squid	bycatch	yes	x	x	x
Coastal/shelf pelagic cephalopods	Illex coindetii	Broadtail shortfin squid	directed fishing	yes	?	x	x
Coastal/shelf pelagic cephalopods	Loligo forbesii	Forbe's squid	directed fishing	yes	?	x	x
Coastal/shelf pelagic cephalopods	Loligo vulgaris	European squid	directed fishing	yes	x	x	x
Coastal/shelf pelagic cephalopods	Todarodes sagittatus	European flying squid	directed fishing	yes	?	x	x
Coastal/shelf pelagic cephalopods	Todaropsis eblanae	Lesser flying squid	directed fishing	yes	?	x	x
Deep-sea pelagic cephalopods	Architeuthis dux	Giant squid			?		x
Deep-sea pelagic cephalopods	Bathypolypus sponsalis	Globose octopus			?		x
Deep-sea pelagic cephalopods	Haliphron atlanticus	Seven-arm octopus			?		x
Deep-sea pelagic cephalopods	Opistoteuthis agassizii				?		x
Deep-sea pelagic cephalopods	Stauroteuthis syrtensis				?		
Deep-sea pelagic cephalopods	Taningia danae	Dana octopus squid			?		x
Deep-sea pelagic cephalopods	Teuthowenia megalops	Atlantic cranch squid			?		x

Table 24 : Occurrence/relevance of invertebrates cephalopods in OSPAR region IV (OSPAR Intersessional Correspondence Group on the Coordination of Biodiversity Assessment and Monitoring 2012)

7.2 Regulatory status of cephalopod species

No cephalopod species is listed in OSPAR List of Threatened and/or Declining Species, in Annex II or Annex IV to Habitats Directive. Two species are listed in the global UICN Red List as Vulnerable: *Opisthoteuthis calypso* and *Opisthoteuthis massyae*.

7.3 Status, trends, and Conservation Status of cephalopod species

According to MSFD Decision 2017/848, species groups to be assessed:

→ Coastal/shelf cephalopods
→ Deep-sea cephalopods

Cephalopods status is assessed by France, Portugal and Spain under Marine Strategy Framework Directive (MSFD) and OSPAR Regional Sea Convention. Conservation Status is assessed by IUCN at global, European and national levels. Since no cephalopod species is listed in Habitats Directive, no Conservation Status is assessed in this framework.

Most recent criteria and indicators used to describe cephalopods are found in Table 25 below. However, these indicators have not been assessed yet.

MSFD Descriptor	MSFD criteria	MSFD and OSPAR Indicators
Descriptor 1: Biodiversity	D1C1 (1.3) Mortality rate per species from incidental by-catch	None yet (France)
	D1C2 (1.2) Population abundance	*Fish Ceph1
	D1C3(1.3.1) Population demographic characteristics	*Fish Ceph 6 *Fish Ceph 2 PC_Méthode des percentiles (France)
	D1C4 (1.1) Spatial distribution of the species	*Fish Ceph 7 *Fish Ceph 8
	D1C5 (new) Expansion and condition of suitable habitats for monitored species	None yet (France)

Table 25: MSFD Descriptors, criteria as in MSFD Decision 2017/848. MSFD and OSPAR indicators, and MSFD indicators suggested by France in 2017 for MSFD 2018 IA.

Due to a lack of knowledge, the ecological status of cephalopods and their trends haven't been evaluated in the French MFSD evaluation for 2018 (Thiriet et al. 2017).

7.4 Pressures known to have impacts on cephalopods

Main pressures known to have impacts on cephalopod species include:

→ Fishing (*'Extraction of, or mortality/injury to wild species')*
→ By catch *('Extraction of, or mortality/injury to wild species')*

7.5 Significant areas for cephalopod species

7.5.1 Ecological challenges and/or challenge areas for cephalopods in France, as identified in the MSFD process

For the second round of MSFD implementation, France identified and prioritized 'ecological challenges'. Ecological challenges are considered as elements or marine ecosystems for which Good Environmental Status should be reached or maintained. Among these ecological challenges, some are considered to be prioritized following three criteria: representativity, sensitivity, functional importance.

Ecological challenges and/or challenge areas of 'high' importance within OSPAR Region IV are listed in Table listed in Table 26. Ecological challenges are mentioned for each assessment area, as shown in

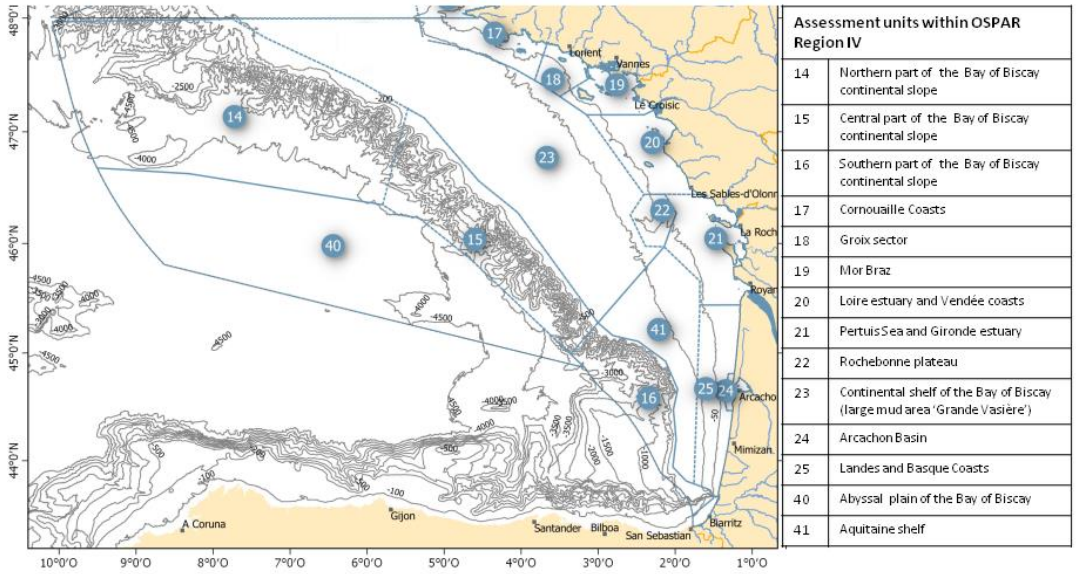

Figure 42.

The identified ecological challenges correspond to spawning areas for Common cuttlefish *Sepia officinalis*.

Degree of importance	Assessment areas		Ecological challenges and/or challenges area relative to cephalopods
	Number	Name	
High importance (and below)	17	Cornouaille coasts	Spawing areas for Common cuttlefish (*Sepia officinalis*)
	18	Groix sector	
	19	Mor Braz	
	20	Loire estuary and Vendée coatss	
	21	Pertuis sea and Gironde estuary	
	24	Arcachon basin	

Table 26: Ecological challenges and/or challenge areas relative to cephalopods identified in the French MSFD process (Ministère de l'Environnement, de l'Energie et de la Mer et Agence Française Biodiversité 2017). Only areas within OSPAR Region IV are mentionned in this table

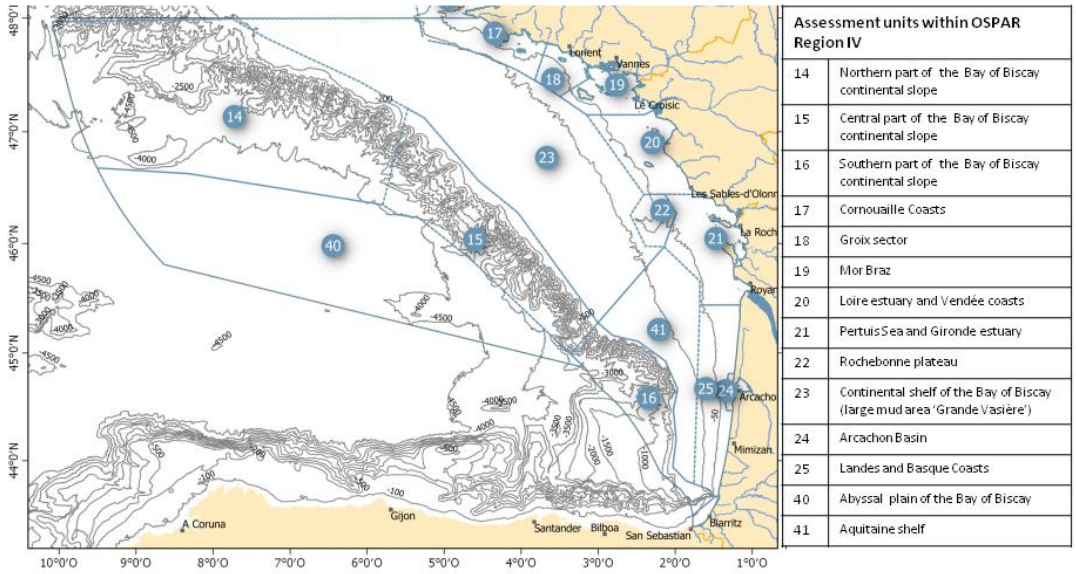

Figure 42: Assessment areas for the identification of ecological challenges in French MSFD process that are within OSPAR Region IV.

7.5.2 Significant areas for cephalopods in Spain

As in the case of fish and demersal cephalopods the biodiversity of this ecotype was based on the information from the bottom trawl surveys, considering the species with representative sampling along the time series used (1990-2010), the cephalopod species that were condiedered in the assessment were *Eledone cirhosa*, *Illex coindetti* and *Todaropsis eblanae*. Other species are fished mainly in artisanal and coastal fisheries that were not considered in the assessment due to the lack of information for these fisheries. Most of the information on the catches of cephalopod species as *Octopus vulgaris* and *Sepia officinalis* are managed by the regional administrations, and the inclusion of this information will be accomplished within the next assessment cycle.

7.5.3 Significant areas for cephalopods in Portugal

The loliginid squid Loligo vulgaris is one of the cephalopod species that is most exploited in Portuguese fisheries [together with the octopod Octopus vulgaris, the sepiid Sepia officinalis, and the ommastrephids Illex coindetii and Todaropsis eblanae, ranking third in volume after O. vulgaris and S. officinalis. The

Figure 43 represents the fishing effort affecting these species.

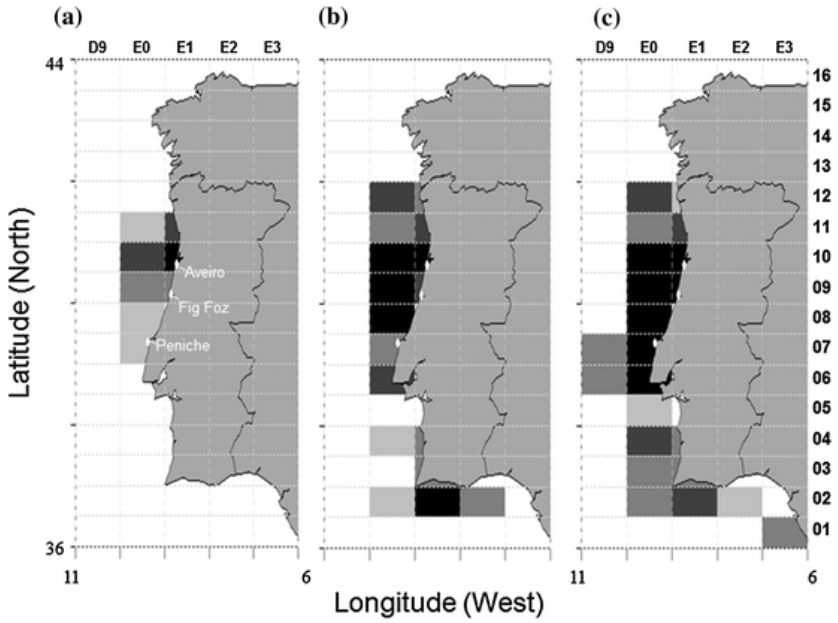

Figure 43 : Map of trawling intensity in number of VMS points for 2003 in ICES division IXa (rectangles identified from top and right axes): a) targeting squid; b) with squid as by-catch while targeting octopus; c) with squid as by-catch while targeting horse mack (Pilar-Fonseca et al. 2014)

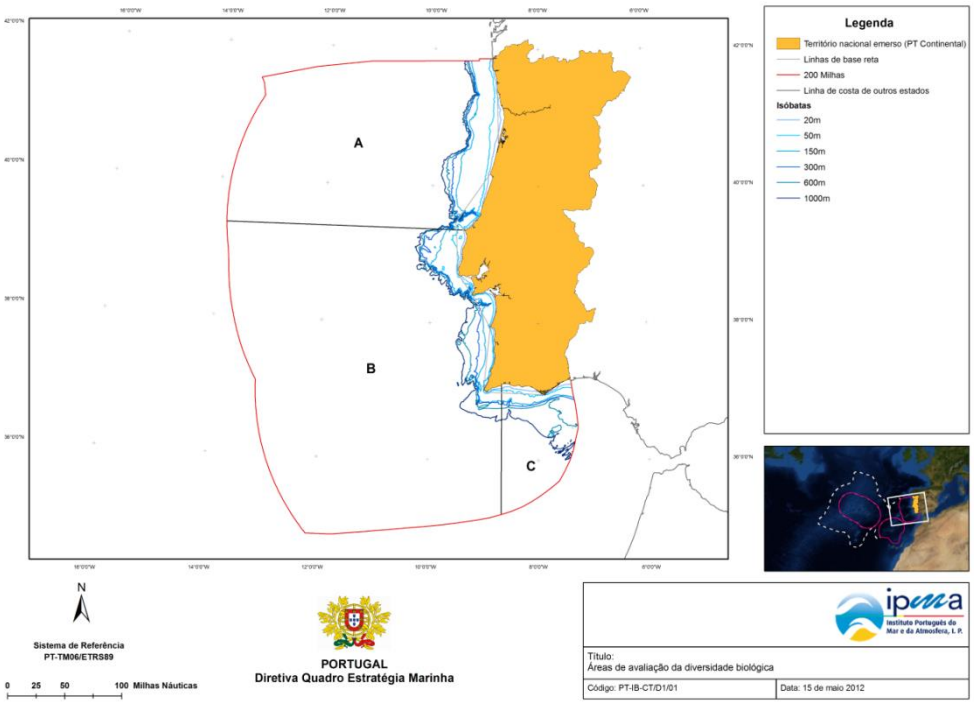

Figure 44 : Evaluation áreas of Descriptor 1 for portuguese mainland subdivision. Area A (Caminha to Nazaré Canyon); Area B (Nazaré Canyon to Ponta da Piedade, Lagos); Area C (Ponta da Piedade to Vila Real de Santo António) (Ministério da Agricultura, do Mar, do Ambiente e do Ordenamento do Território 2012)

In is showned the evaluation areas assessed in Descriptor 1 (Biodiversity). In the Portuguese mainland MSFD evaluation, Descriptor 1, use two functional groups of cephalopods in the evaluation (Coastal and platform pelagic cephalopods; Deep water pelagic cephalopods).

7.5.3.1 *Coastal and platform pelagic cephalopods*

To evaluate the conservation status of this functional group the folowing species where selected:

→ *Loligo vulgaris*
→ *Alloteuthis spp.*

Considering the annual values obtained (1987-2011) (Figure 45) for the functional group coastal and platform pelagic cephalopods the relative abundance shows a growing trend in areas A, B and a decrease trend for area C.

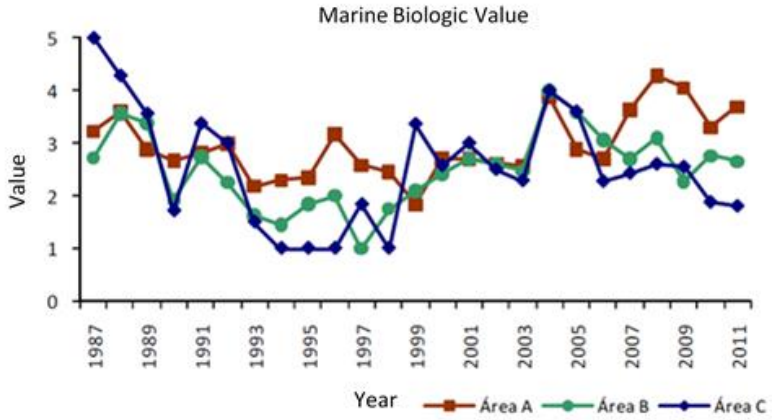

Figure 45 : Estimation, by year and evaluation area, of the indicator of Conservation status of the abundance and/or biomass of the functional group to the period 1987 to 2011. (Ministério da Agricultura, do Mar, do Ambiente e do Ordenamento do Território 2012)

7.5.3.2 *Deep water pelagic cephalopods*

To evaluate the conservation status of this functional group the folowing species where selected:

→ *Illex coindetii*
→ *Todaropsis eblanae*

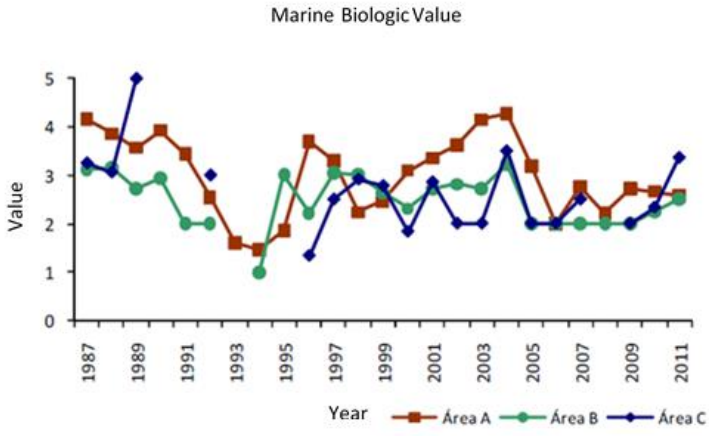

Figure 46 : Estimation, by year and evaluation area, of the indicator of Conservation status of the abundance and/or biomass of the functional group to the period 1987 to 2011. (Ministério da Agricultura, do Mar, do Ambiente e do Ordenamento do Território 2012)

The present trend of this functional group, in terms of relative abundance is unknown, however appears to be stable (Figure 46). The relative abundance for the next years is unknown, due to the lack of knowledge of the major factors that affect the migration of individuals

8 Fish species (Descriptor 1) including commercially-exploited species (Descriptor 3)

This section depicts the situation of finfish, crustaceans, elasmobranchs and mollusk species in OSPAR Region IV. A previous section is specifically dedicated to mollusk cephalopods.

Fish species are assessed in the MSFD framework under Descriptor 1 'Biodiversity' and Descriptor 3 'Commercially-exploited species'. This section considers both commercially exploited and non-commercially exploited species.

'Commercially exploited species' is understood as species that are targeted by professional and recreational fisheries, and are indigenous to the region. It doesn't take into account non-indigenous species and species exploited by aquaculture. Therefore, 'commercially exploited' has to be understood here as 'selectively extracted'. This part also mentions species for which exploitation is currently prohibited, according to Article 12 of Council Regulation (EU) 2017/127[15].

8.1 Overview of fish communities in OSPAR Region IV

Fish diversity is quite high in relation to the co-occurrence of subtropical, temperate, and boreal species, with relative abundances following latitudinal gradients.

Fish species can be classified in functional groups such as coastal fish, pelagic shelf fish, demersal shelf fish, deep-sea fish (MSFD Decision 2017/848). Pelagic fish inhabit the pelagic zone (water column), and demersal fish live on or near the seabed and feed on bottom-living organisms and other fish.

Diadromous fish species are a specific group of species that live partly in fresh water and partly in salted water according to their life cycle stage, and can be benthic or pelagic.

The main pelagic species in OSPAR Region IV are sardine (*Sardina pilchardus*), anchovy (*Engraulis encrasicolus*), mackerel (*Scomber scombrus*), horse mackerel (*Trachurus trachurus*), and blue whiting (*Micromesistius poutassou*) (ICES, 2008). To the southwest of the Iberian Peninsula, other mackerels and horse mackerels such as the chub mackerel (*Scomber japonicus*), the Mediterranean horse mackerel (*Trachurus mediterraneus*), and the blue jack mackerel (*T. picturatus*) are also common. Seasonally, albacore (*Thunnus alalunga*) occur along the shelf break. Immature northern bluefin tuna (*Thunnus thynnus*) migrate to the feeding areas in the innermost part of the Bay of Biscay, from late spring to mid-autumn, returning to the Gulf of Cadiz and Atlantic Moroccan coasts in winter(ICES 2008).

Throughout the OSPAR Region IV, the demersal fish community is organized according to depth, bottom, and latitude and is stable over time despite variations and trends in species abundance. In general, the same species composition and population structures occur on the French and the Cantabrian shelves (ICES 2005). However, some differences were found in the shelf off the Gironde estuary, which seems to be the southern limit of cold-water species, such as herring (*Clupea harengus*), haddock (*Melanogrammus aeglefinus*), saithe (*P. virens*), Norway pout (*Trisopterus esmarkii*), dab (*Limanda limanda*), sprat (*Sprattus sprattus*), and whiting (*Merlangius merlangus*).. More than 200 species occur in the northeast Bay of Biscay. Only five species make up more than 50% of the total biomass and abundance of demersal fish. Species richness is highest in coastal shallow waters, down to 50 m. Strong environmental gradients occur in the Cantabrian Sea and affect the fish distribution. Due to the narrow and steep shelf, depth is the most influential factor

[15] Council regulation (EU) 2017/127 of January 2017 fixing the fishing opportunities for certain fish stocks and groups of fish stocks applicable in Union waters and, for Union fishing vessels, in certain non-Union waters

determining the assemblages observed in this area. The physical and faunal variability are larger in both the coastal and shelf break strata (ICES 2008).

Diadromous fishes in OSPAR Region IV include for example European sturgeon *A. sturio*, Allis shad *A. alosa*, sea lamprey *Petromyzon marinus*, and Atlantic salmon *Salmo salar*.

The main elasmobranch species in the region are the rays, *Raja clavata, R. montagui,* and *R. miraletus* and the catsharks, *Scyliorhinus canicula* and *Galeus melastomus*, at the coast and on the inner and outer shelf, respectively (Sánchez et al., 2005a). Widely migratory sharks occur in this region such as blue shark (*Prionace glauca*), shortfin mako (*Isurus oxyrnchus*), porbeagle (*Lamna nasus*), tope (*Galeorhinus galeus*), and spurdog (*Squalus acanthias*). Some are taken in trawl and longline tuna, swordfish, and scabbardfish fisheries.(ICES 2008).

Regarding trends in species richness and diversity both have remained quite stable during the 1990s. Off Portugal richness decreases slightly with depth, from the coastline to the shelf break (200–300 m), steadily increasing thereafter down the slope. Based on bottom-trawl surveys richness was higher in winter compared to summer and autumn. On the upper slope the fish community is dominated by blue whiting (*Micromesistius poutassou*). Horse mackerel (*Trachurus trachurus*) is more important in autumn assemblages, whereas the boarfish (Capros aper) dominates in summer. The importance of Sparids in the fish community increases to the south. The shallow fish community of the Gulf of Cadiz has some affinities with subtropical and tropical fish communities. The scabbardfish *Lepidopus caudatusis* is abundant in deeper waters (ICES 2008).

8.2 Examples of non-commercially exploited fish species

Functional Groups ('Ecotypes')	Species (Scientific Name)	English common name	Particular sensitivity towards specific human pressures/ activities	Commonness (global occurrence and/ or locally abundance)	Biscay/Iberia			Comments on individual species
					FR	SP	PT	
Coastal demersal bony fish	Hippocampus guttulatus (synonym: Hippocampus ramulosus)	Long-snouted seahorse		yes	x	x	x	Listed on Barcelona Convention
Coastal demersal bony fish	Hippocampus hippocampus	Short-snouted seahorse		yes	x	x	x	Listed on Barcelona Convention
Deep sea demersal bony fish	Hoplostethus atlanticus	Orange roughy	target/bycatch	yes	x		x	
Deep sea demersal elasmobranch	Centrophorus granulosus[16]	Gulper shark	bycatch		x	x	x	
Deep sea pelagic elasmobranch	Carcharodon carcharias[17]	Great White Shark			x (rare)			
Deep sea pelagic elasmobranch	Cetorhinus maximus[18]	Basking shark	bycatch	yes	x	x	x	

Table 27: Examples of Non-commercially exploited fish species (excluding species with prohibited fisheries), and occurence/relevance in OSPAR Region IV (OSPAR Intersessional Correspondence Group on the Coordination of Biodiversity Assessment and Monitoring 2012)

8.3 Main commercially exploited fish species in OSPAR Region IV

The main species of OSPAR IV region are drawn from STECF Fleet Economic Performance assessment in 2016 (Jardim et al. 2017). The 30 first species in terms of landing value and landing weight in OSPAR IV region are listed in Table 28 below (the ranking is based on 2014 data).

An estimation of the fishing fleet for each country in Europe could be found in the 2016 Annual Economic Report on the EU Fishing Fleet (STECF Expert Working Group 2016).

[16] Council Regulation (EU) 2016/2285 of 12 December 2016 fixing for 2017 and 2018 the fishing opportunities for Union fishing vessels for certain **deep-sea fish stocks** and amending Council Regulation (EU) 2016/72. For thoses species, the authorized fishing stock is 10t in 2017 and 2018.

[17] Council Regulation (EU) 2016/2285 of 12 December 2016 fixing for 2017 and 2018 the fishing opportunities for Union fishing vessels for certain **deep-sea fish stocks** and amending Council Regulation (EU) 2016/72. For thoses species, the authorized fishing stock is 10t in 2017 and 2018.

[18] Council Regulation (EU) 2016/2285 of 12 December 2016 fixing for 2017 and 2018 the fishing opportunities for Union fishing vessels for certain **deep-sea fish stocks** and amending Council Regulation (EU) 2016/72. For thoses species, the authorized fishing stock is 10t in 2017 and 2018.

Among major species in OSPAR IV Region in 2014 (Table 28), there are pelagic finfishes such as:, Sardine (*Sardina pilchardus*) ranked 2nd for both value and weight, Anchovy (*Engraulis encrasicolus*) ranked 4th and 7th, Atlantic mackerel (*Scomber scombrus*) ranked 5th and 8th and Altantic horse mackerel (*Trachurus trachurus*) ranked 14th and 8th.

There are also demersal species: European Hake (*Meluccius merluccius*) ranked 1st in terms of landing value and 4th in terms of weight, Common sole (*Solea solea*) ranked 6th and 16th, Megrim (*Lepidorhombus whiffiagonis*), Four-spot megrim (*Lepidorhombus boscii*), Anglerfish or Monkfish (*Lophius piscatorius and L. budegassa*) ranked 9th and 11th, , and European Seabass (*Dicentrarchus labrax*) ranked 7th and 17th. Demersal fisheries also target crustaceans such as Norway lobster (*Nephrops norvegicus*) ranked 8th and 19th or deep-water rose shrimp (*Parapeneus longirostris)* ranked 16th and 38th.

Main commercial species also include cephalopods, such as Common octopus (*Octopus vulgaris*) ranked 3rd and 9th, or Common cuttlefish (*Sepia officinalis*) ranked 11th and 12th. *Loligo spp* is also mentioned in (ICES 2008) as an important commercial cephalopod.

Table 28 contains mollusk bivalves, such as Striped venus (*Chamelea gallina*) ranked 18th and 15th, or Common edible cockle (*Cerastoderma edule*) with high landed weight and lower value (ranked 21st and 300th).

Among main commercial species listed in Table 28, there are elasmobranchs such as the Blue shark (*Prionace glauca*) ranked 49th and 22nd.

One species of algae appears in Table 28, with high landing weight but lower value: Tangle, also known as kelp (*Laminaria digitata*), ranked 20th in terms of weight and 834th in terms of value.

Some species are not very important at the OSPAR IV Region scale, but are of high interest at the local scale, on a socio-economical criteria basis. In French coasts of the Bay of Biscay, scallop (*Pecten maximus*) and glass eel (*Anguilla anguilla*) are of local importance, even though less important at the OSPAR IV broader scale. Similarily, tuna species such as Bluefin tuna are regularly fished in Bay if Biscay and have a big socio-economical importance (Cort 2017), even if they are not listed as occurring in Region OSPAR IV and in the following Table 28.

RANKING IN TERMS OF LANDINGS VALUE (based on 2014 results)				**RANKING IN TERMS OF LANDINGS WEIGHT (based on 2014 results)**		
Rank	**Name of species and FAO code**	**Landing value (€) 2014**		**Rank**	**Name of species and FAO code**	**Landings weight (kg) 2014**
1	European Hake (*Merluccius merluccius*) - HKE	93 434 669		1	Chub mackerel (*Scomber japonicus*) - MAS	63 307 560
2	Sardine (*Sardina pilchardus*) - PIL	77 577 896		2	Sardine (*Sardina pilchardus*) - PIL	62 473 351
3	Common octopus (*Octopus vulgaris*) - OCC	62 048 126		3	Atlantic mackerel (*Scomber scombrus*) - MAC	61 831 585
4	European Anchovy (*Engraulis encrasicolus*) - ANE	51 636 899		4	European hake (*Merluccius merluccius*) - HKE	33 241 127
5	Atlantic mackerel (*Scomber scombrus*) - MAC	50 120 969		5	Jack and horse mackerel (*Trachurus spp*) - JAX	30 255 291
6	Common sole (*Solea solea*) - SOL	50 084 609		6	Blue whiting (*Micromesistius poutassou*) - WHB	29 310 568
7	European seabass (*Dicentrarchus labrax*) - BSS	45 893 980		7	European Anchovy – *Engraulis encrasicolus* - ANE	28 155 995
8	Norway lobster (*Nephrops norvegicus*) -	35 092 454		8	Atlantic horse mackerel (*Trachurus*	23

	NEP	
9	Monkfishes nei (*Lophius spp*) - MNZ	27 884 782
10	Blue whiting (*Micromesistius poutassou*) - WHB	26 871 551
11	Common cuttlefish (*Sepia officinalis*) - CTC	25 177 368
12	Chub mackerel (*Scomber japonicus*) - MAS	24 228 592
13	Atlantic horse mackerel (*Trachurus trachurus*) - HOM	21 767 398
14	Jack and horse mackerel (*Trachurus spp*) -JAX	21 448 032
15	Anglerfishes nei (*Lophiidae*) -ANF	17 085 229
16	Deep-water rose shrimp (*Parapenaeus longirostris*) - DPS	14 623 851
17	John dory (*Zeus faber*) - JOD	11 313 434
18	Striped venus (*Chamelea gallina*) - SVE	11 129 895
19	Meagre (*Argyrosomus regius*) - MGR	10 959 612
20	Surmullet (*Mullus surmuletus*) - MUR	10 681 014
21	Gilthead seabream (*Sparus aurata*)- SBG	10 115 571
22	Pullet carpet shell (*Venerupis pullastra*) -CTS	9 298 111
23	European conger (*Conger conger*) - COE	9 229 176
24	Inshore squids nei (*Loliginidae*) – SQZ	8 777 288
25	Pollack (*Pollachius pollachius*) - POL	7 560 242
26	Pouting (*Trisopterus luscus*) - BIB	7 370 504
27	Megrims nei (*Lepidorhombus spp*) – LEZ	7 197 234
28	White seabream (*Diplodus sargus*) – SWA	6 918 266
29	Common prawn (*Palaemon serratus*) - CPR	6 424 081
30	Black scabbardfish (*Aphanopus carbo*) - BSF	6 070 283

	trachurus) HOM	343 266
9	Octopus vulgaris (*Common octopus*) - OCC	14 228 009
10	Bogue (*Boops boops*) - BOG	11 636 139
11	Monkfishes nei (*Lophius spp*) - MNZ	6 858 196
12	Common cuttlefish (*Sepia officinalis*) - CTC	6 014 878
13	European conger (*Conger conger*) - COE	5 543 065
14	Pouting (*Trisopterus luscus*) - BIB	4 972 261
15	Striped venus (*Chamelea gallina*) - SVE	4 740 466
16	Common sole (*Solea solea)* - SOL	4 722 641
17	European seabass (*Dicentrarchus labrax*) - BSS	4 064 972
18	Anglerfishes nei (*Lophiidae*) -ANF	3 557 574
19	Norway lobster (*Nephrops norvegicus*) - NEP	3 027 027
20	Tangle (*Laminaria digitata*) - LQD	2 719 430
21	Common edible cockle (*Cerastoderma edule*) - COC	2 435 442
22	Blue shark *(Prionace glauca*) - BSH	2 327 230
23	Edible crab (*Cancer pagurus*) - CRE	2 295 939
24	Northern shortfin squid (*Illex illecebrosus*) - SQI	2 160 304
25	Black scabbardfish (*Aphanopus carbo*) - BSF	2 133 217
26	Blue jack mackerel (*Trachurus picturatus*) - JAA	1 954 432
27	Pollack (*Pollachius pollachius*) - POL	1 916 147
28	Spinous spider crab (*Maja squinado*) - SCR	1 793 297
29	Meagre (*Argyrosomus regius*) - MGR	1 783 289
30	Whiting (*Merlangius merlangius*) - WHG	1 699 509

Table 28: 30 first species in OSPAR IV region, in terms of landings value and weight (ranking based on 2014 data). Species appearing in both columns are highlighted in orange. Data for all assessed species are available in STECF Fleet Economic Performance assessment of 2016[19]

A comprehensive list of commercial species in the OSPAR IV (circa 1700 species) region can be found in STECF Fleet Economic Performance assessment of 2016[32].

8.4 Regulatory status of fish species

The main international and Community regulatory frameworks for fish species include CITES, Bern Convention, OSPAR List of Threatened and/or Declining Species and Habitats Directive.

8.4.1 OSPAR List of Threatened and/or declining species

OSPAR Threatened and/or Declining fish Species in OSPAR Region IV are the following (Table 29). The full OSPAR List of Threatened and/or Declining Species occurring in Region IV is provided in Annex VI. OSPAR List of threatened and/or declining species in the OSPAR IV Region (2008-6).

[19] https://stecf.jrc.ec.europa.eu/dd/fleet

Common name	Scientific name	Under threat and/or decling in Region IV
Acipenser sturio	Sturgeon	yes
Alosa alosa	Allis shad	yes
Anguilla anguilla	European eel	yes
Centroscymnus coelolepis	Portuguese dogfish	yes
Centrophorus granulosus	Gulper shark	yes
Centrophorus squamosus	Leafscalegulper shark	yes
Cetorhinus maximus	Basking shark	yes
Dipturus batis (synonym: *Raja batis*)	Common skate	yes
Raja montagui (synonym: *Dipturus montagui*)	Spotted ray	yes
Gadus morhua	Cod	no
Hippocampus guttulatus (synonym: *Hippocampus ramulosus*)	Long-snouted seahorse	yes
Hippocampus hippocampus	Short-snouted seahorse	yes
Lamna nasus	Porbeagle	yes
Petromyzon marinus	Sea lamprey	yes
Raja clavata	Thornback ray	no
Rostroraja alba	White skate	yes
Salmo salar	Salmon	yes
Squalus acanthias [Northeast Atlantic]	Spurdog	yes
Squatina squatina	Angel shark	yes

Table 29: OSPAR Threatened and/or declining fish species in the OSPAR IV region

8.4.2 Habitats Directive

OSPAR Region IV hosts species listed in Annex II to Habitats Directive (species of Community interest whose conservation requires the designation of Special Areas of Conservation) such as *Lampetra fluviatilis, Petromyzon marinus, Acipenser sturio, Salmo salar* (only in fresh water), and *Alosa spp*. It also hosts species listed in Annex IV (species of Community interest in need of strict protection) such as *Acipenser sturio*. All these species are diadromous.

8.5 Status, trends, and Conservation Status of fish species

8.5.1 Status, trends, conservation status of non-commercially exploited fish species

8.5.1.1 *Status and trends as assessed in MSFD*

According to MSFD Decision 2017/848, fish species functional groups to be assessed under Descriptor 1 'Biodiversity are:

- → Coastal fish
- → Pelagic shelf fish
- → Demersal shelf fish
- → Deep-sea fish

Fish species ecological statuses are assessed by France, Portugal and Spain under Marine Strategy Framework Directive (MSFD) and OSPAR Regional Sea Convention. MSFD and OSPAR criteria and indicators used to describe fish species (2017) are found in the Table 30 below.

MSFD Descriptor	MSFD criteria	MSFD and OSPAR Indicators
Descriptor 1: Biodiversity	D1C1 (1.3) Mortality rate per species from incidental by-catch	None yet (France)
	D1C2 (1.2) Population abundance	*Fish Ceph1
	D1C3(1.3.1) Population demographic characteristics	*Fish Ceph 6 *Fish Ceph 2 PC_Méthode des percentiles (France)
	D1C4 (1.1) Spatial distribution of the species	*Fish Ceph 7 *Fish Ceph 8
	D1C5 (new) Expansion and condition of suitable habitats for monitored species	None yet (France)

Table 30: MSFD Descriptors, criteria as in MSFD Decision 2017/848 (MSFD/OSPAR most recent indicators) and indicators suggested by France in 2017 for MSFD 2018 IA.

8.5.1.2 *Conservation status of non-commercially exploited species*

The available information about Conservation Status in the international scale are detailed in Annex XIV. Internationally protected fish species.

The 'conservation challenge' for elasmobranch species, based on Conservation Status as well as other indicators for elasmobranch species, including commercial and non-commercial species, was assessed in French waters. Results are shown in Annex XI. Ranking of conservation challenge for elasmobranch species in French Altantic waters.

8.5.2 Status, trends, conservation status of commercially exploited fish species

8.5.2.1 *Basis for stock assessment of commercially-exploited fish species*

The relevant scale for analysis of fisheries is the **fish stock**, rather than the species. A stock is an exploited part of the population that has its own dynamics with no or few relation with adjacent stocks. It is defined as a species living in a given region. There can be several stocks for one species. Stocks often span the limits of marine sub-regions.

Fisheries stocks are assessed and managed by different organizations such as the International Council for Exploration of the Sea (ICES), or the International Commission for the Conservation of Atlantic Tunas, or national bodies such as Ifremer in France.

Stocks assessed by ICES in the Bay of Biscay and Iberian Waters ecoregion (broadly corresponding to OSPAR IV region) are listed inAnnex XV. Stock assessment.

International advisory bodies
1) ICES (International Council for the Exploration of the Sea) Advisory body for the European Commission to set Total allowable catches (TACs). Also provides assessment of stocks not subject to TACs and quotas. 2) **STECF (Scientific, Technical and Economic Committee for Fisheries)** Advisory body for the European Commission to set Total allowable catches (TACs), amon other studies. Does not conduct stock assessments.
Regional fisheries management organizations
3) ICCAT (International Commission for Conservation of Atlantic Tunas) Inter-governmental fishery organization responsible for the conservation of tunas and tuna-like species (e.g. swordfish) in the Atlantic Ocean. Also conducts stocks assessments. 4) **NEAFC (North East Atlantic Fisheries Commission)** Does not conduct stock assessments.

5)	**NASCO (North Atlantic Salmon Conservation Organization)** Does not conduct stock assessments.
Other structures	
6)	France: Ifremer
7)	Spain : IEO http://www.ieo.es/area-pesquerias`
8)	Portugal : IPMA - www.ipma.pt
9)	**Atlantic States Marine Fisheries Commission** http://www.asmfc.org/about-us/boards-committees-panels

Table 31: Main advisory bodies and fisheries management organizations in OSPAR Region IV

The International Council for the Exploration of the Sea (ICES) assesses 36 fish stocks in the Bay of Biscay and Iberian Waters ecoregion. The list of commercially-exploited stocks assessed by ICES in this ecoregion is provided in Annex XV. Stock assessment. A species assessed by ICES is economically significant and is of European importance (for example, very local shellfish populations are not assessed). ICES assessments are made on stocks for which data are available. ICES is currently expanding the number of stocks assessed with methods for Data Limited Stocks (DLS) evaluation.

ICES Sub-areas and Divisions are shown in Figure 47. OSPAR IV Region broadly corresponds to ICES ecoregion 'Bay of Biscay and Iberian Waters'. More precisely, it corresponds to ICES divisions VIIIa, b, c, d and IXa.

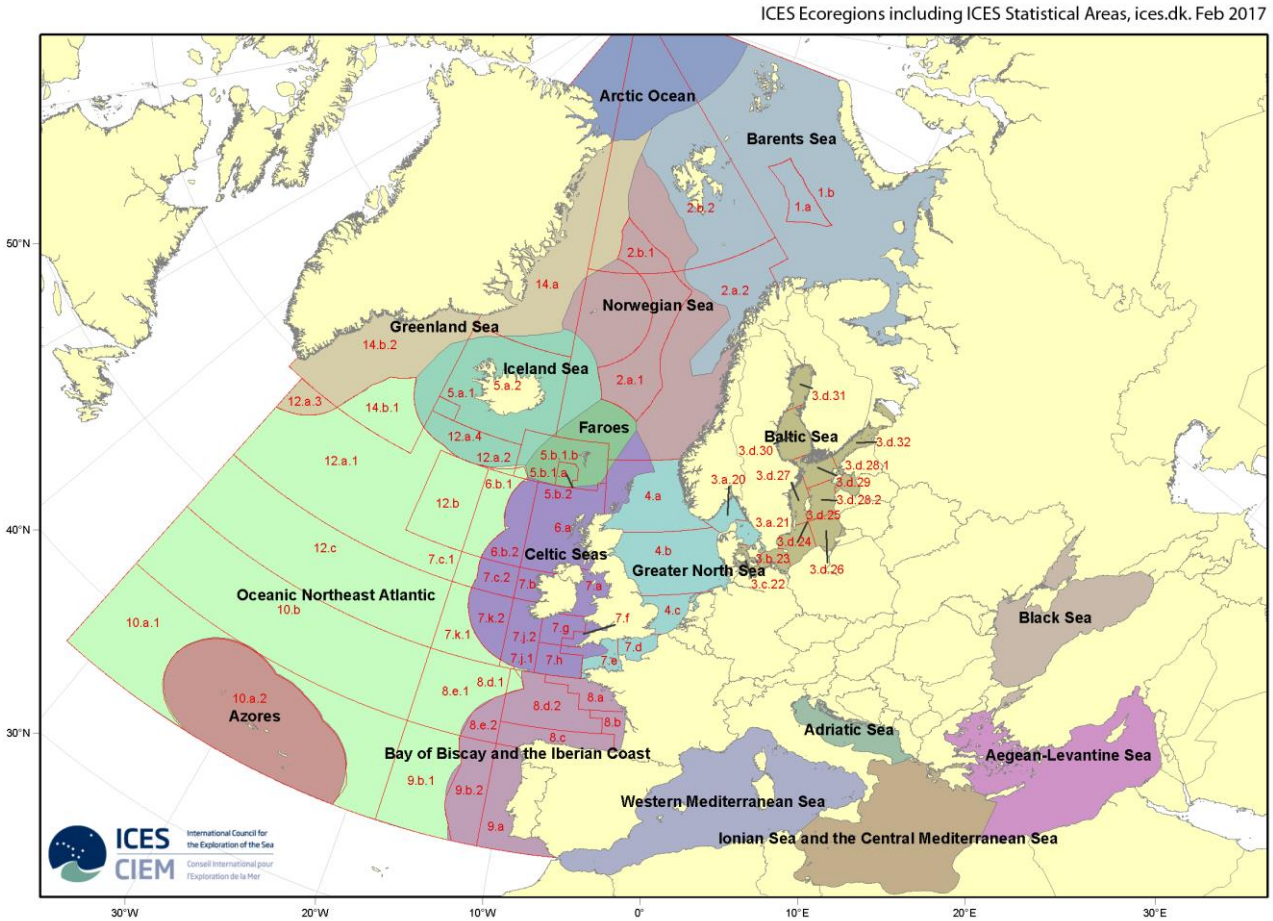

Figure 47: Names of ICES Sub-areas and Divisions in the FAO fishing area 27.

The OSPAR IV region corresponds to : **Subarea VIII (Divisions VIIIa,b,c,d, excluding VIIIe) and Subarea IX (IXa, excluding IXb)**. If there is an additional number on an area in this map, it's a NEAFC regulatory area. Among stocks that are assessed by ICES (Annex XV. Stock assessment) in the 'Bay of Biscay and Iberian Waters ecoregion', some stocks are distributed across borders.

8.5.2.2 *Stock assessment for commercially-exploited fish species in the Bay of Biscay and Iberian Waters Region*

8.5.2.2.1 Stocks assessed by ICES

In 2015, estimates of F and F_{MSY} were available for only 9 stocks assessed by ICES in the Bay of Biscay and Iberian Waters ecoregion (Jardim et al. 2017).

Two indicators can be calculated for each stock: F (fishing mortality) and B (or SSB, spawning stock biomass). These indicators can be compared to reference points, if existing: Maximum Sustainable Yield (MSY) and Precautionary Approach (PA) points. The MSY reference points are more constraining than the PA reference points (F_{MSY} <Fpa and B_{MSY}>Bpa).

F< FMSY : One of the condition to fall under Common Fisheries Policy requirements	F_{MSY}	F> FMSY : Overexploited	F_{pa}	F>Fpa : Outside safe biological limits

B<Bpa: Outside safe biologicallimits	B_{pa}	B>Bpa : one of the condition to fall under Common Fisheries Policy requirements

Summary of stock status (as mentioned in STECF, 2017[34])	
Safe Biological Limits	F>Fpa and/or B<Bpa
Common Fisheries Policy requirements	F< F_{MSY} and B>B_{PA}
Overexploited	F>F_{MSY}

Figure 48: Stock status (F, B) as compared to reference values (MSY and PA)

Among the 9 stocks assessed by ICES in Bay of Biscay and Iberian Waters ecoregion, for which F and F_{MSY} were available in 2015:

→ 4 stocks are overexploited (they have F>F_{MSY})
→ 1 stock is outside safe biological limits (it has F>F_{pa} or B<B_{pa})
→ 4 are outside Common Fisheries Policy (CFP) requirements (they have F> FMSY or B<BPA)

Over exploited stocks in 2015

Hake (*Merluccius merluccius*) is a major commercial species in OSPAR IV region. It was ranked 1st and 4th in terms of landings value and weight in 2014. There are two different Hake stocks in OSPAR IV region: (1) northern stock (greater North sea, Celtic seas and northern Bay of Biscay) and (2) southern stock (Cantabrian sea and Atlantic Iberian waters). The southern stock is therefore distributed both on Spanish and Portuguese waters. The southern stock was overexploited in 2013, 2014 and 2015 (F>F_{MSY}), but was inside safe biological limits (F<F_{pa} and B>B_{pa}).

Megrim and Four-spot Megrim (both included in 'Megrim nei') (*Lepidorhombus whiffiagonis and L. boscii*) are a major commercial species in OSPAR IV region. It was ranked 27th and 34th in terms of landing value and weight in 2014. There are three different stocks for this species: (1) *Lepidorhombus whiffiagonis* in Divisions 7b-k and 8a,b,d (west and southwest of Ireland, Bay of Biscay), (2) Four-spot megrim *Lepidorhombus boscii* in Divisions 8c and 9a (Cantabrian sea and Atlantic Iberian waters), and (3) Megrim *L. Whiffiagonis* in Divisions 8c and 9a (Cantabrian sea and Atlantic Iberian waters).The second and third stocks are distributed on both Spanish and Portuguese waters. They were both overexploited in 2013, 2014 and 2015 (F>F_{MSY}).

→ Sole in Divisions VIIIa, b (Bay of Biscay) was also overexploited in 2015.

Stocks outside CFP requirements in 2015

→ Hake in Division VIIIc and IXa (Southern stock)
→ Four-spot megrim (Lepidorhombus boscii) in Divisions VIIIc and IXa
→ Megrim (Lepidorhombus whiffiagonis) in Divisions VIIIc and IXa
→ Sole in Divisions VIIIa.b (Bay of Biscay)

Stocks outside biological safe limits in 2015

In addition to being over exploited and outside CFP requirements, Sole (Solea solea) in Divisions VIIIa, b (Bay of Biscay) is outside biological safe limits. Sole is a main commercial species in OSPAR IV region (ranked 6th and 16th in terms of landings value and weight in 2014). This species is divided in two stocks: (1) Sole in Divisions 8a,b (northern and central of the Bay of Biscay) and (2) Sole in Divisions 8c and 9a (cantabrian sea and Iberian waters). The second stock is distributed on both Spanish and Portuguese waters, while the first is on French waters only. This stock (northern and central Bay of Biscay) was overexploited I 2013, 2014, and 2015 as well as at risk of stepping outside safe biological limits. No stock assessment is available for Sole Divisions 8c and 9a.

8.5.2.2.2 Stocks assessed by ICCAT

The International Commission for the Conservation of Atlantic Tunas (ICCAT) assessed species in OSPAR IV Region (Annex XV. Stock assessment).

8.5.2.2.3 Stocks assessed in the MSFD framework in France

In the MSFD framework, for the second implementation of Initial Assessment (due in 2018), France has assessed some fish stocks against the 'Good Environmental Status' (GES). GES is defined by two indicators (F, fishing mortality and B, spawning stock biomass) that must be at Maximum Sustainable Yield (MSY) levels.

MSFD Good Environmental Status (GES)	Stocks assessed by France under MSFD Descriptor 3
GES not reached	→ Megrim (*Lepidorhombus whiffiagonis)* in Divisions VIIb,k and VIIIa,b,d(Celtic sea and Bay of Biscay) → Sole (*Solea solea*) VIIIa,b → Horse mackerel (*Trachurus trachurus*) II,IV,V,VI,VII,VIIIabcde → Atlantic mackerl (*Scomber scombrus*) II,III,IV,VI,VII,VIII → Blue whiting (*Micromesistius poutassou)* I-IX, XII, XIV → Albacore (*Thunnus alalunga*) Atlantic Nord → Spiny dogfish (*Squalus acanthias)* Northeast Atlantic
GES reached	→ European Hake (*Merluccius merluccius)* II,III,IV,V,VI,VII,VIIIa,b,d (northern stock) → Bluefin tuna (*Thunnus thynnus)* East Atlantic and Mediterranean → Swordfish (*Xiphias gladius)* Northatlantic

Table 32: Stocks considered for assessment of MSFD Descriptor 3 'Commercially exploited species' in France, for which assessment is available, and comparison to 'Good Environmental Status' (set as MSY).

8.5.2.2.4 Stocks assessed in the MSFD framework in Spain

The Spanish MSFD assessment for the Descriptor 1 biodiversity in the case of the demersal fish and elasmobranch ecotype was based on the information obtained from the IBTS surveys and considered several indicators, among them the distribution range and the distribution patterns were applied to the set of species for which the sampling was considered representative enough. These

species were classified as opportunist or vulnerable depending on their life cycle characteristics (see Table 33 and Table 34 with the whole set of species considered).

In the case of the vulnerable species an increasing or steady % of squares coverage was considered as an indication of good environmental status, while a decreasing pattern was considered failure. In the case of opportunist species increasing patterns were considered a failure while steady or decreasing was considered fulfilment of the conditions for good environmental status (see Figure 49 and Figure 50).

Specie	Environmental status	Trend % squares
Buglossidium luteum	1	S
Cepola macrophthalma	0	D/S
Chelidonichthys cuculus	1	I/S
Chelidonichthys gurnardus	1	I/S
Chelidonichthys lucernus	1	I/S
Chelidonichthys obscurus	1	I/S
Conger conger	1	I/S
Galeus melastomus	1	I
Helicolenus dactylopterus	1	I
Lepidorhombus boscii	1	S
Lepidorhombus whiffiagonis	0	D/S
Leucoraja naevus	1	I
Lophius budegassa	0	D
Lophius piscatorius	1	I/S
Merluccius merluccius	1	S
Mullus surmuletus	1	I
Phycis blennoides	1	S
Raja clavata	1	I
Raja montagui	1	I
Scorpaena loppei	1	S
Scyliorhinus canicula	1	I/S
Scyliorhinus stellaris	0	D
Solea solea	1	I/S
Zeus faber	1	I/S

Table 33 : Environmental status regarding distribution pattern of the species considered as sensible. 1 indicates fulfilment considering time series conditions, 0 indicates failure. Trend of the percentage of sampling squares coverage is shown as S: steady, I: i

Species	Environmental status	Trend % squares
Argentina sphyraena	1	S
Arnoglossus imperialis	0	I
Arnoglossus laterna	1	S
Blennius ocellaris	1	S
Boops boops	1	I/S
Callionymus lyra	1	I/S
Callionymus maculatus	1	D/S
Capros aper	1	S
Eledone cirrhosa	1	I/S
Gadiculus argenteus	1	D/S
Gaidropsarus macrophthalmus	1	D
Illex coindetii	1	I/S
Lesueurigobius friesii	1	S
Microchirus variegatus	1	S
Micromesistius poutassou	1	S
Pagellus acarne	1	I/S
Serranus cabrilla	1	S
Todaropsis eblanae	1	I/S
Trachinus draco	0	I
Trachurus trachurus	1	S
Trisopterus luscus	1	D/S
Trisopterus minutus	1	I/S

Table 34 : Environmental status regarding distribution pattern of the species considered as opportunist. 1 indicates fulfilment considering time series conditions, 0 indicates failure. Trend of the percentage of sampling squares coverage is shown as S: steady, I

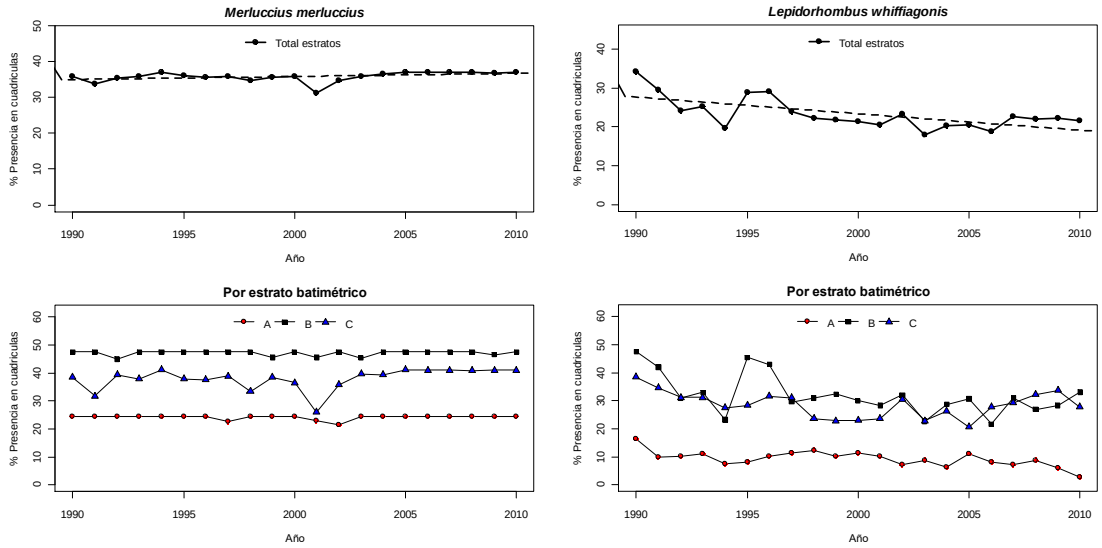

Figure 49 : Examples of fulfilment (Merluccius merluccius) an failure (Lepidorhombus whiffiagonis) to attain the conditions to good environmental status in the case of sensible species. % of squares with presence along the time series.

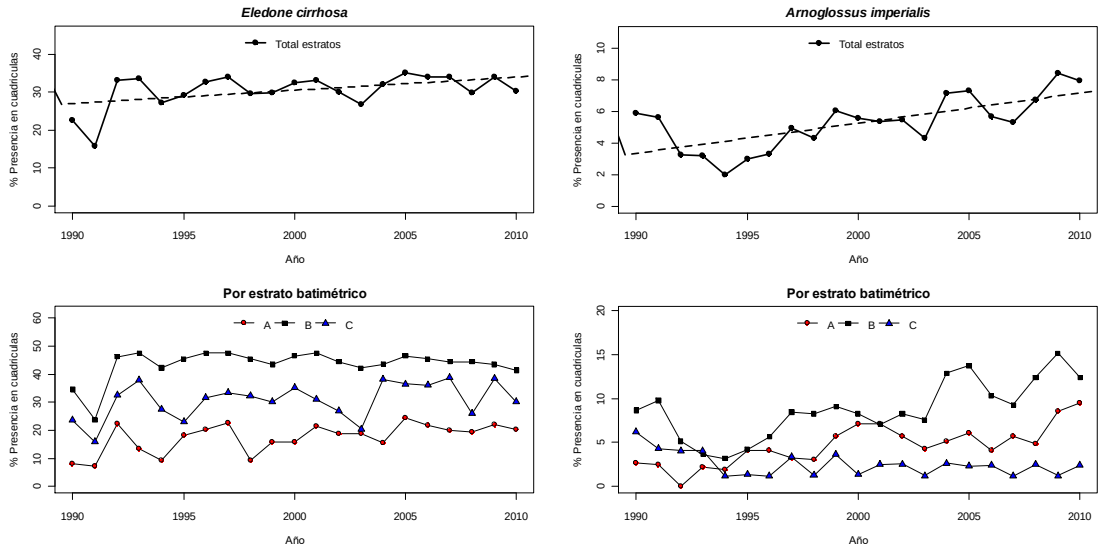

Figure 50 : Examples of fulfilment (Eledone cirrhosa) an failure (Arnoglossus imperialis) to attain the conditions to good environmental status in the case of sensible species. % of squares with presence along the time series.

8.5.2.2.5 Conservation Status of commercially-exploited species

In addition to stock assessment by international bodies such as ICES or ICCAT, other approaches exist to assess commercial species status, such as IUCN conservation status (IUCN Red Lists).

Many diadromous fish species (those that migrate between freshwater and marine habitats at different stages of their lifecycle) have been strongly declining. For example, Sturgeon *Acipenser sturio and* Eel *Anguilla Anguilla* have a 'Critically Endangered' IUCN status at global scope. Atlantic salmon *Salmo salar* has a 'Vulnerable' IUCN Status at Europe scope. Four diadromous species have been identified by OSPAR as under threat and in decline in Region IV (European sturgeon *A. sturio*, Allis shad *A. alosa*, sea lamprey *Petromyzon marinus*, and Atlantic salmon *Salmo salar*).

The 'conservation challenge' for elasmobranch species, based on Conservation Status as well as other indicators for elasmobranch species, including commercial and non-commercial species, was

assessed in French waters. Species of sharks and rays with serious conservation challenges were identified in France in order to prioritize actions (Stéphan et al. 2016). The identified species need further knowledge and implementation of conservation measures (or enhancement of the existing). Three indicators were used: 'conservation status' (based on ICES, ICCAT, IUCN evaluations or expert advice), 'biological vulnerability' (intrinsic popualtion growth capacity), and 'responsibility of the marine subregion' (based on the spatial distribution of the species in different regions of French waters).

The ranking of conservation challenge for 33 elasmobranch species in the French Atlantic sector (Bay of Biscay and Celtic seas subregions, the former being outside OSPAR Region iV) is found inAnnex XI. Ranking of conservation challenge for elasmobranch species in French Altantic waters. The three highest conservation challenge ranks in Atlantic French waters were identified for the following species: White skate *Rostroaja alba*, Angel shark *Squatina squatina* and Common skate complex *Dipturus batis* in ICES division VIII (Bay of Biscay). These three species are listed in OSPAR Convention, and their fishing is prohibited in OSPAR Region IV (Council regulation 2017/127).

Some ray species that are currently commercially exploited in OSPAR Region IV have a high 'conservation challenge rank', such as blue shark *Prionace glauca*, Blonde ray *Raja brachyura* in ICES division VIII (Bay of Biscay), or cuckoo ray Leucoraja naevus in ICES division VIII.

8.6 Significant areas for fish species

8.6.1 Essential Fish Habitats for commercially-exploited species in France

8.6.1.1 *Concept of Essential Fish Habitats for fisheries resources*

The Essential Fish Habitats (EFH) approach is very interesting to understand and protect fisheries resources species. The NOAA (National Oceanic and Atmospheric Administration, USA) defines EFH as « waters and substrate necessary to fish for spawning, breeding, feeding for growth to maturity » (National Oceanic and Atmospheric Administration 2007). The term "fish" here means finfish, mollusks, crustaceans, and all other forms of marine animal and plant life other than marine mammals and birds. Each EFH area is quite restricted but of high importance, given that its deterioration or removal would have consequences on population renewing.

Life cycle and Essential Fish Habitats

Each phase of a species life cycle determines the renewing of the resource. Deterioration or removal of these functional areas, due to impossibility to access or disappearing, may cause a decrease in the fisheries resource.

"Functional area" or Essential Fish Habitat (EFH)	**Life cycle stage**
Egg laying area	Embryonic development
Larval drift area	Larval stage
Nursery area	Juvenile stage
Spawning areas	Adult stage: Reproduction (emission of gametes)
Feeding areas	Adult stage: Feeding

Table 35: Essential Fish Habitat types and correspondence life cycle stages

Remark: for many species, egg laying areas are the same as spawning areas. Therefore, "spawning area" is often used to describe both were reproduction and egg laying take place. Crustaceans, for example, transport their eggs to a more appropriate place, sometimes for many months.

In addition to the Essential Fish habitats cited in the Table 35 above, migration pathways could also be considered as EFHs. Many species change location between different phases of their life cycle. For non sedentary species, one or several migrations occur between life stages. They can be passive (larval drift) or active (juveniles recruiting), following migration paths. However, some species have limited diffusivity such as sessile species or little motile species; for example, algae, ichtyofauna of coral reefs, lamellibranch molluscs or gastropods. For these species, only the larval pelagic stage is clearly distinct from the fixed or little mobile benthic ulterior stages.

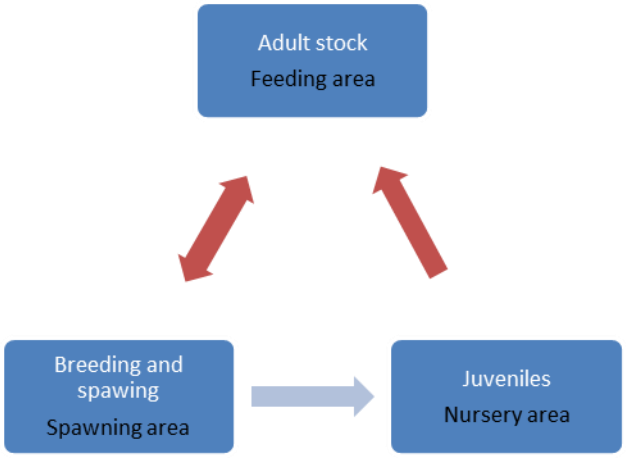

Figure 51: Diagram of the life cycle of a fisheries resource species. Adapted from (Harden Jones 1968)

Red arrows represent active migration paths; the blue arrow represents larval stage and passive larval drift area.

Each phase of a species life cycle determines the renewing of the resource. Deterioration or removal of these functional areas, due to impossibility to access or disappearing, may cause a decrease in the fisheries resource.

There are necessary environmental conditions for each stage such as physical, chemical and food resources conditions, presence of fellows for reproduction, continuity on migration paths. Perturbations in spawning areas, larval drift area or juvenile nursery can decrease **juvenile recruiting**. Perturbations in spawning area can decrease **reproduction efficiency**. Perturbations in adult feeding area can decrease **biomass**. Changes in migration paths environment can cause **discontinuity** in the life cycle.

8.6.1.2 *Important and Priority Essential Fish Habitats for fisheries resources*

A recent law in France (law n°2016-1087 of August, 8th 2016[20]) created a new category of Marine Protected Area (MPA), 'Area for Conservation of Fisheries Resources' (Zone de Conservation Halieutique). These areas should correspond to Essential Fish Habitats that have a high contribution to population renewing[21].

In Spain marine protected areas are being developed within the frame of the INTEMARES project (http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=6101), which aims to create and increase the Natura 2000 networks sites in the sea.

[20] Loi n°2016-1087 pour la reconquête de la biodiversité, de la nature et des paysages

[21] Remark: According to the French Law on Biodiversity, Areas for Conservation of Fisheries Resources (ACFR) can be defined between salty limit of the water and the 12 nautical miles limit. Therefore, EFHs in open sea cannot be defined as ACFR, despite the importance of their preservation. However, territorial waters have EFHs that concern a large majority of exploited species.

Considering the northern Spanish shelf there is a Marine Protected area, “el Cachucho” that covers le Danois bank, a seamount off the Asturias coast. Other areas are also being studied to develope and define new protected areas.

In Portugal, the Plans for the Management of Protected Areas (Planos de Ordenamento das Áreas Protegidas - POAP) establish the regimes for safeguarding natural resources and values and the management regime compatible with the sustainable use of protected areas, including the maritime areas contiguous to the terrestrial areas. In these maritime areas are identified the uses and activities to be interdicted, conditioned and promoted, depending on the protection regime (total, partial and complementary). In this context, among other measures were established measures for the management and control of fishing activity which also pass through the complete prohibition of fishing. Thus, in Portugal, the marine areas identified in these POAPs, with total or partial protection status, correspond to areas that contribute to the preservation of biodiversity and renewal of the marine species population, contributing to the renewal of the fishing resources .

In order to identify these Areas for Conservaion of Fisheries Resources, a study was recently conducted in France to spot important Essential Fish Habitats (EFH) for fisheries resources. EFHs that were considered are **spawning areas, nurseries**, and **migration paths for amphihalin species or tropical species (reef species)**. Important EFHs are **EHFs that have a high contribution to population renewing.**

The first part of this study (Delage et Le Pape 2016) lays down criteria to qualify EFH as ‘important’. The second part gives an inventory of known EFHs in French waters (outermost waters excluded) and identifies some important EFHs(Regimbart, Guitton, et Le Pape 2017). In the future, MPAs of the new category ‘Area for Conservation of Fisheries Resources’ will be designated among these ‘important EFHs’.

The first part of the study concluded that criteria to assess importance of Essential Fish Habitats can applied to nurseries, spawning areas, and migration paths of diadromous fish. These criteria allow to assess the EFH contribution to population renewing, in terms of production of fisheries resource (biomass, abundance, growth) and contribution to the next life stage (mortality, fitness, inter-habitat connectivity). These criteria concern both contribution per surface unit, and total contribution taking the area into account. Criteria used to qualify an EFH as ‘important’ are found in Annex XVI. Criteria that can be used to assess importance of Essential Fish Habitats.

8.6.1.3 *Important Essential Fish Habitats for fisheries resources in France (results)*

A study recently conducted in France helped identify important Essential Fish Habitats (EFH)(Regimbart, Guitton, et Le Pape 2017). Important EFHs were identified following either quantitative analysis studies or expert judgments. The study found out that there are only a few studies allowing identification of important EFHs in a quantitative manner in the Bay of Biscay.

Spawning areas of Sardine (*Sardina pilchardus*) and Anchovy (*Engraulis encrasicolus*) were mapped using geostatistical interpolation of scientific fishing campaigns. Egg laying areas of Sole (*Solea solea*) were identified by modeling.

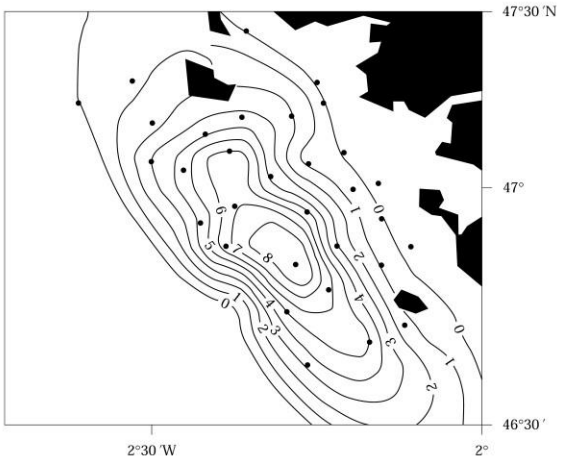

Figure 52 : Sole spawning areas (map indicating the number of egg each 10 m3)((Petitgas 1997) in (Regimbart, Guitton, et Le Pape 2017)

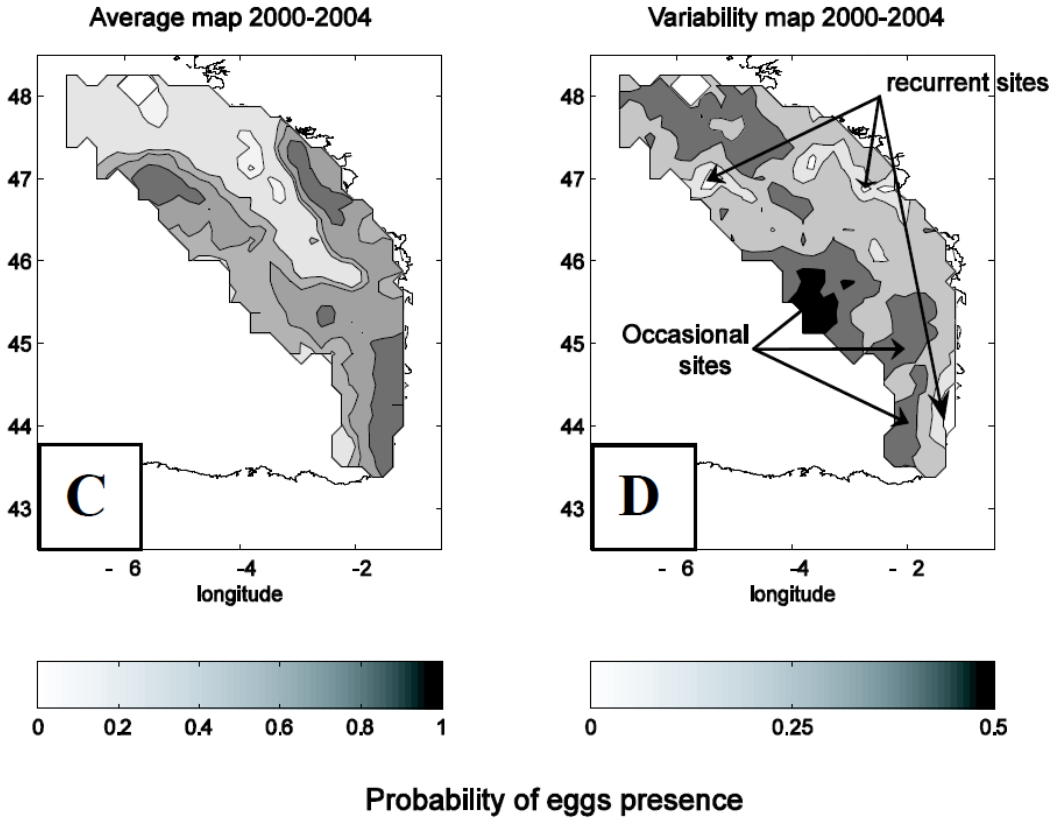

Figure 53 : Anchovy spawning areas (Bellier, Planque, et Petitgas 2007) in (Regimbart, Guitton, et Le Pape 2017)

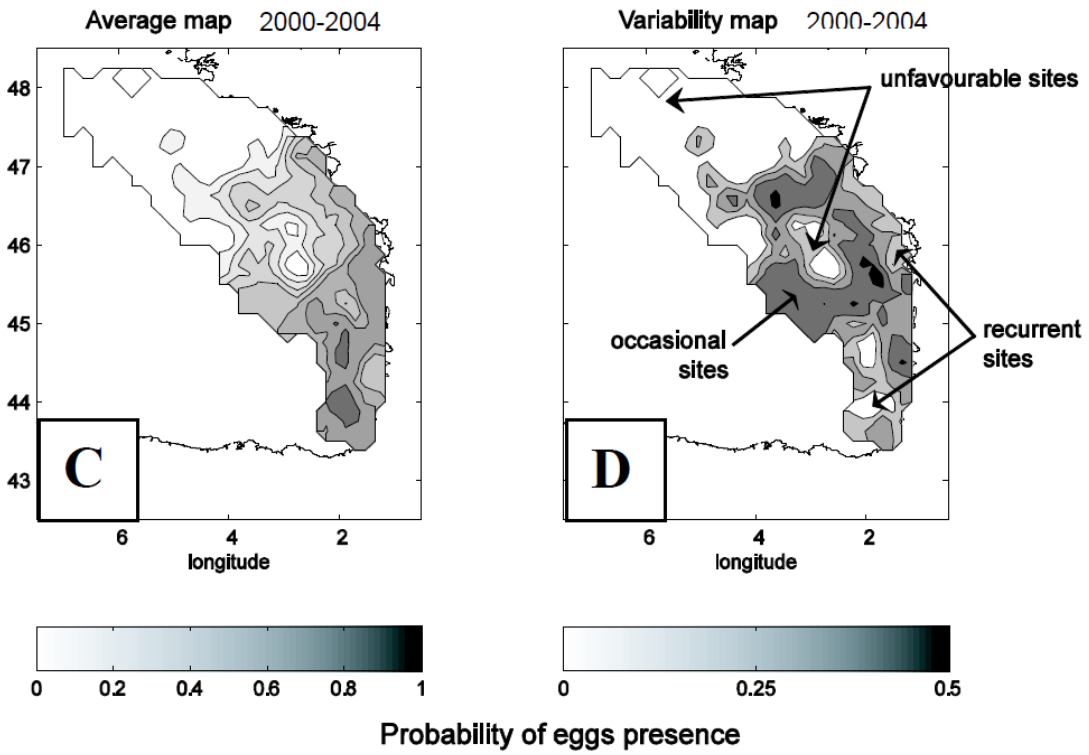

Figure 54 : Sardine sapwning areas (Bellier, Planque, et Petitgas 2007) in (Regimbart, Guitton, et Le Pape 2017)

Nurseries have been mapped from predictive models for only three flatfishes: wedge sole (*Dicoglossa cuneata*), plaice (*Pleuronectes platessa*), and Sole (*Solea solea*)

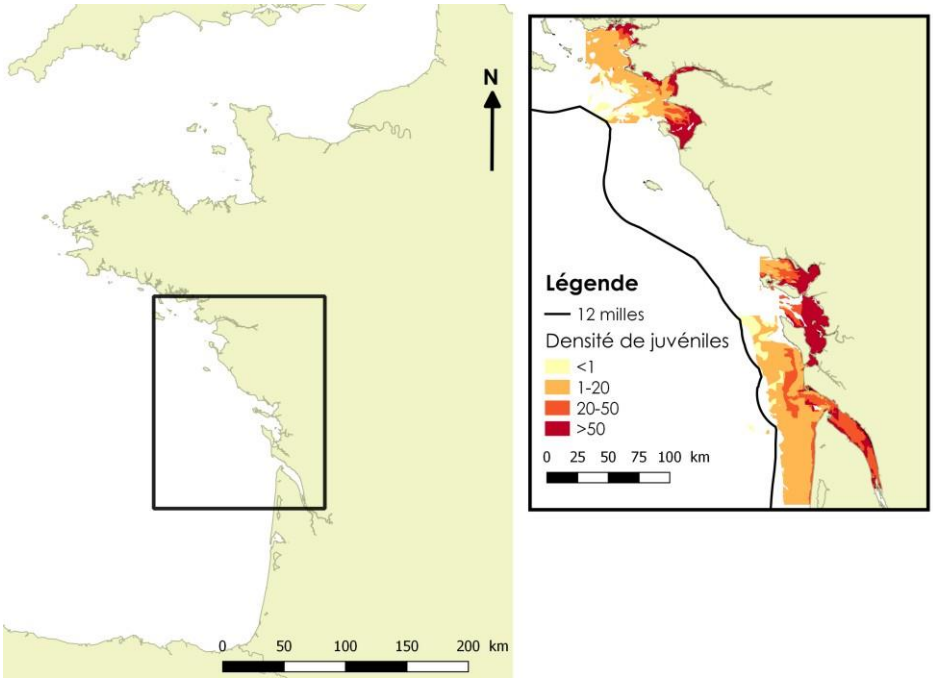

Figure 55 : Nurseries of thre flatfishes (Trimoreau et al. 2013) in (Regimbart, Guitton, et Le Pape 2017)

In addition to quantitative analysis, important EFHs for fisheries resources were identified using expert judgment. Important spawning areas for fisheries and mportant nurseries are shown in the following table:

Species	Approximate location	Type of areas
Araignée de mer *Maja brachydactyla*	South Brittany	Spawning
Bar *Dicentrarchus labrax*	Open sea of Vendée coast (near statistical rectangle 21E6), open sea of Oléron island	Spawning
Barbue *Scophthalmus rhombus*	Bay of Douarnenez	Spawning
Capelan *Trisopterus minutus*	From Quiberon to the inside of Morbihan Gulf, Loire Estuaries	Spawning
Chinchard *Trachurus trachurus*	Bay of Biscay, Open sea of Vendée coast to open sea of Arcachon basin	Spawning
Maquereau *Scomber scombrus*	Bay of Biscay, around the continental slope and around the plateau in front of the Vendée coast to open sea of Arcachon basin	Spawning
Merlu *Merluccius merluccius*	Open sea of Gascogne Gulf	Spawning
Raie brunette *Raja undulata*	Arcachon Basin	Spawning
Seiche *Sepia officinalis*	Morbihan Gulf, Bay of Vilaine, Pertuis	Spawning
Sprat *Sprattus sprattus*	Morbihan and Vendée coast, at the estuarie of Garonne, area located around Belle-Ile	Spawning
Merlan *Merlangius merlangus*	South of Belle-Ile	Spawning
Tacaud *Trisopterus luscus*	Betwen estuarie of Gironde and north of estuarie of Loire	Spawning
Aloses *Alosa sp.*	Estuarie of Gironde	Nurserie
Anchois *Engraulis encrasicolus*	Coast of bay of Biscay (From Vilaine bay to Gironde estuarie)	Nurserie
Anguille *Anguilla anguilla*	Morbihan Gulf, Estuarie of Gironde, Arcachon basin	Nurserie
Bar *Dicentrarchus labrax*	Estuaries and bays, including Aulne estuarie, Morbihan Gulf, Vilaine estuarie, Loire estuarie, pertuis breton and antioche, Sèvre Niortaise estuarie, Gironde estuarie, Arcachon basin	Nurserie
Barbue *Scophthalmus rhombus*	Bay of Douarnenez, Arcachon basin	Nurserie
Baudroie commune *Lophius piscatorius*	Bay of Biscay	Nurserie
Chinchard *Trachurus trachurus*	Bay of Biscay	Nurserie
Crevettes (grise, bouquet)	Morbihan Gulf, Vilaine estuarie, Loire estuarie, Bay of Bourgneuf, pertuis breton and antioche, Gironde estuarie, Landes coast	Nurserie
Daurade royale *Sparus aurata*	Arcachon basin	Nurserie
Griset *Spondyliosoma cantharus*	Morbihan Gulf, Vilaine estuarie, Bay of Bourgneuf, Gironde	Nurserie

	estuarie, Arcachon basin	
Grondin rouge *Aspitrigla cuculus*	From the end of Brittany to the beginning of Manche	Nurserie
Hareng *Clupea harengus*	Gironde estuarie	Nurserie
Langoustine *Nephrops norvegicus*	Big mudflat of bay of Biscay	Nurserie
Maigre *Argyrosomus regius*	Gironde estuarie	Nurserie
Maquereau *Scomber scombrus*	Bay of Biscay	Nurserie
Merlan *Merlangius merlangus*	Morbihan Gulf, Vilaine estuarie, Loire estuarie, Bay of Bourgneuf, pertuis breton and antioche, Gironde estuarie	Nurserie
Merlu *Merluccius merluccius*	Open sea of bay of Biscay, Vilaine estuarie, Loire estuarie, pertuis breton and antioche	Nurserie
Plie *Pleuronectes platessa*	Bay of Douarnenez	Nurserie
Raie bouclée *Raja clavata*	Bay of Douarnenez	Nurserie

Table 36 : Approximate location of important areas identified by experts judgement (Regimbart, Guitton, et Le Pape 2017)

8.6.2 Significant areas for fish species in Spain

The initial assessment done by Spain for the biodiversity of the fish ecotype did not include an analysis of essential fish habitats within Spanish waters. In the case of demersal fishes and elasmobranches it was based on the analyses on the variations of the distribution range and the distritubion pattern of the characteristic fish and elasamobranch species. The analyses were done based on the presence/absence of the species during the bottom trawl surveys performed yearly on the Northern Spanish shelf.

Nevertheless studies concerning essential fish habitats in the area have been performed specially in the case of hake nurseries, initially published by (Sánchez et Gil 2000) and are being revised with more recent data and methods (Pennino et al. 2018). As shown in the figures below changes in the distribution of recruitment and patterns evolve with time and this information is also used for spatial management and to define new protection measures for recruits from the impact of fisheries. Currently some seasonal bans for trawl fisheries are still in force, drawn from the initial results, possible changes in these bans will be considered according to the new findings.

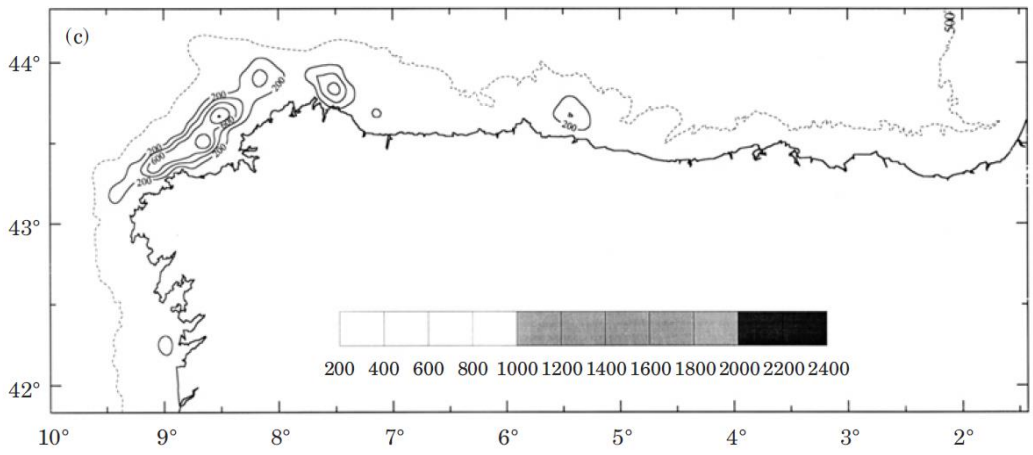

Figure 56 : Hake recruitment (number/h) estimated by kriging (c) in October of 1995. Taken from (Sánchez et Gil 2000)

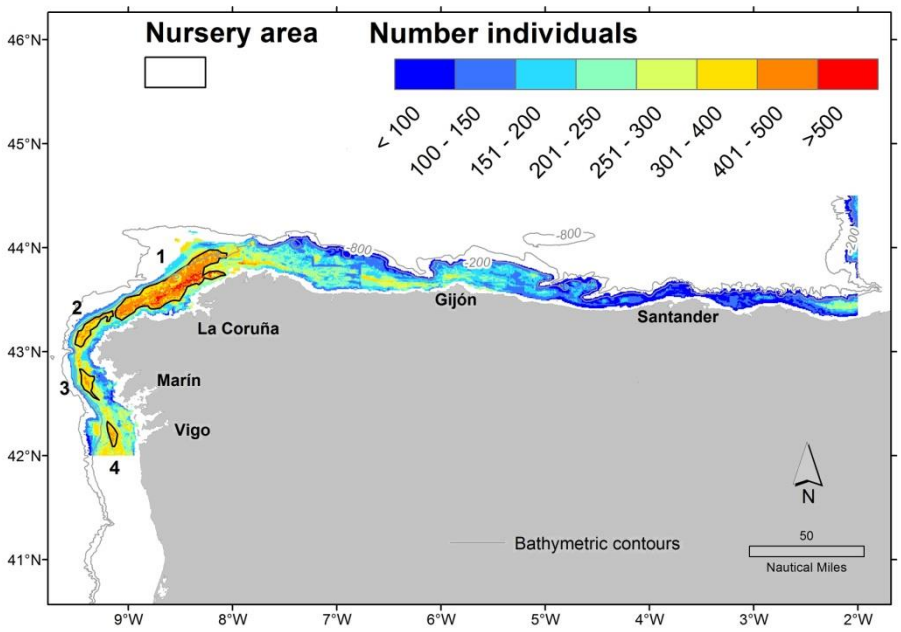

Figure 57 : Spatio-temporal abundance model output for European hake (Merluccius merluccius) recruits showing average posterior mean abundance estimates (1997-2016) and the four persistent nursery areas identified. Taken from (Pennino et al. 2018)

8.6.3 Significant areas for fish species in Portugal

Among the most common fishes along the North Atlantic coasts that use estuaries and bays as nursery areas are sea bass, *Dicentrarchus labrax*, flounder, *Platichthys flesus* and sole, *Solea solea*. Throughout the Portuguese estuaries, several studies were carried out in order to evaluate the abundance patterns of these species, as well as the nursery role of these Portuguese coastal waters for the Douro estuary (Vasconcelos 2001); for the Ria de Aveiro (Serrano Gordo 1989); for the Modego estuary (Jorge, Monteiro, et Lasserre 2002); for the Tejo estuary (H. Cabral et Costa 1999, 2001; H. Cabral 2003) and for the Sado estuary (H. N. Cabral 2000); for the Mira estuary (Costa, Santos, et Cabral 2001) (Figure 58).

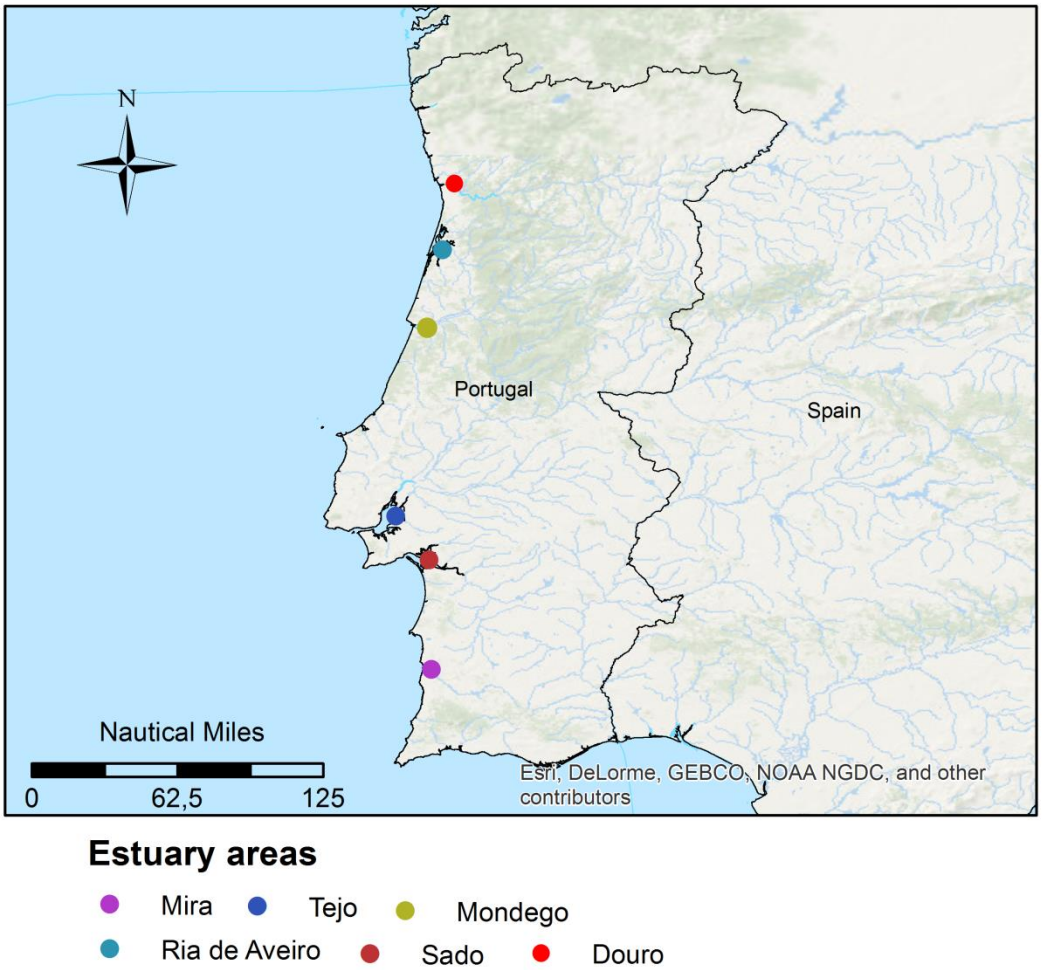

Figure 58 : Important Estuary Areas of Portugal for fish nursery considered in the lieterature. Source : spatialized through ArcGIS by University of Aveiro, 2017.

The young-of-the-year of these fish species enter in estuaries and concentrate in nursery grounds in late spring, where they remain until the end of autumn, dispersing afterwards to deeper areas (Kelley 1988; Dorel et al. 1991). Competition between these species may take place, although it seems to be rare and prevented by abundant food resources, or even by resource partitioning produced by the likely competitors (Amara et al. 2001; Costa, Santos, et Cabral 2001), namely spatial and temporal segregation within the nursery areas.

8.6.4 Conclusion on significant areas for fish species in OSPAR Region IV

The huge diversity of fish species involves a huge diversity in areas important for their conservation. Targetted fish species are much more studied than the others and the evaluation of stocks and important areas leads to a global knowledge on them. Despite the number of different areas identified, we can observe that coastal waters, especially estuaries, are designated as very important areas, playing a major role as nurseries.

8.7 Pressures known to have impacts on fish species

The major pressure on commercially exploited species is the **targeted fishery** (*Extraction of or mortality/injury to wild species)***.**

Pressures on non-commercially exploited species that are mentioned by the IUCN Red List website or in other sources include for example:

→ **By catch** *(Extraction of, or mortality/injury to, wild species, including target and non-target*

species)

- → **Depletion of key predator and prey species, and consequent food web effects** *(Extraction of, or mortality/injury to, wild species, including target and non-target species)*
- → **Barriers to migration** (especially for migratory diadromous fishes such as the Eel or Sturgeon)
- → **Pollution** *(Input of substances)*
- → **Extraction of material** (for example, extraction of gravel in the Garonne threatening the Sturgeon)

To some extent, we can mention climate change as a pressure influencing distribution areas of fish species (Punzon et al. 2016; Persohn 2009).

9 Ecosystems, including food webs (Descriptor 4)

9.1 Overview, status, trends

9.1.1 Overview of ecosystems in the OSPAR IV Region

Food webs are networks within which organisms are related by feeding relationships(OSPAR Commission 2017). Foodwebs are assessed under MSFD Descriptor 4. This descriptor addresses the functional aspects of marine food webs, especially the rates of energy transfer within the system and levels of productivity in key components, and ecosystem structure in terms of size and abundance of individuals.

9.1.2 Criteria and indicators used to assess ecosystems

The following aspects are to be assessed in the framework of MSFD : Ecosystem structure, functions and processes, comprising:

- → Physical and hydrological characteristics
- → Chemical characteristics
- → Biological characteristics
- → Functions and processes

Ecosystems and food webs status are assessed by France, Portugal and Spain under Marine Strategy Framework Directive (MSFD) and OSPAR Regional Sea Convention. Many indicators are used to do so, some being common to both MSFD and OSPAR.

Criteria and indicators used to describe food webs (2017) are found in the Table 37 below.

MSFD Descriptor	MSFD criteria	MSFD/OSPAR Indicators
Descriptor 1 : Biodiversity Descriptor 4 : Ecosystems, including food webs	D4C1 (4.3.1) Diversity (species composition and their relative abundance) of the trophic guild	None yet (France)
	D4C2 (4.3.1) : Balance of total abundance between the trophic guilds	*FW4 (changes in average trophic level of marine predactors) *FW6 *FW7 *FW8 *FW5-PH1 (changes in plankton functional groups –life forms)
	D4C3 (4.2.1): Size distribution of individuals across the tophic guild	*FW3 *Fish Ceph 3
	D4C4 (4.1.1) : Productivity of the trophic guild	*FW2 (production of phytoplankton) *FW9 Energy density of fourages fishes *FW1

Table 37: MSFD Descriptors, criteria as in Commission Decision (EU) 2017/848; MSFD indicators suggested by France in 2017 for MSFD 2018 IA; OSPAR most recent indicators.

9.1.3 Status and trends of ecosystems and food webs

OSPAR's Intermediate Assessment 2017 adopted three food webs indicators (EcApRHA, 2017; OSPAR IA, 2017):

→ Size Composition in Fish Communities
→ Change in Mean Trophic Level of Marine Predators
→ Production of Phytoplankton

The first indicator represents the average length of fish (bony fish and elasmobranchs) and provides information on the size composition within communities of fish. The assessment of typical length of the demersal fish in the Bay of Biscay and Iberian Coast "has increased in this region due to long-term increases in northerly sub-divisions in shelf waters to the west of France and in the coastal area of the Sea of Cadiz. Many sub-divisions to the west of Portugal have also shown increases, in contrast to decreases in some areas to the south. The pelagic fish assemblage generally showed no long-term change. However, decreases to a low state relative to previously observed size structure were identified in northerly sub-divisions in shelf waters to the west of France (OSPAR Commission 2017).

The Trophic Level (TL) is the position of an organism in a food web, and the Mean Trophic Level indicator (MTL) reflects the average trophic level of the species present in a food web. According to OSPAR's Intermediate Assessment, the assessment of changes to MTL in the Bay of Biscay showed no apparent change in overall food web structure resulting from fishing pressure over recent decades. However there were some signs of increase in the biomass of marine predators(OSPAR Commission 2017).

Phytoplankton Primary Production (PP) is the rate at which phytoplankton produces organic matter. This organic matter will be available for higher trophic levels, and for this reason, PP is fundamental for the structure and function of the ecosystem. A Pilot Assessment of Production of Phytoplankton was undertaken in the scope of OSPAR's Intermediate Assessment to examine how the primary production of phytoplankton changes over time, and the results show site-specific changes, however the current dataset does not allow a generalised conclusion across OSPAR regions. This pilot assessment also demonstrates interannual variability within study sites and variability between them. Furthermore, phytoplankton primary production in coastal waters shows higher variability than in offshore areas (OSPAR Commission 2017).

9.2 Pressures known to have impacts on ecosystems and food webs

According to (ICES 2016b) the four most important pressures in Bay of Biscay and Iberian Coast ecoregion food webs are: selective extraction of species, nutrient and organic enrichment, introducing contaminating compounds, and introduction of non-indigenous species. These pressures are mainly linked to the following activities: fishing, coastal discharges, maritime transport, tourism and recreation, and aquaculture.

Pressures	Main activity contributing to this pressure	Impacts on food webs
Selective extraction of species	→ Fishing → Tourism and recreation → Aquaculture	"Fishing can disturb the foodweb. Predator–prey relationships can change, depending on the species and on the amount of food (prey) that is available for a given predator. Poor management of fishing for one species could have an adverse effect on the whole foodweb."
Nutrient and organic enrichment	→ Coastal discharges → Maritime transport → Tourism and recreation → Aquaculture	"This pressure produces effects on the plankton community and on the overall productivity of the system."

Introducing contaminating compounds	→ Coastal discharges → Maritime transport	"Introduction of contaminating compounds, due primarily to coastal discharges and maritime transport (shipping). This pressure can affect all ecosystem components but may accumulate in the foodweb, having an effect in particular on higher trophic levels (mammals and birds). Some of these compounds may be very stable and remain in the ecosystem for many decades after their introduction."
Introduction of non-indigenous species	→ Maritime transport → Aquaculture	"Introduction of non-indigenous species happens primarily through shipping and aquaculture and may affect the benthic community and foodwebs."

Table 38: Most important pressures in Bay of Biscay and Iberian Coast ecoregion and their impacts on food webs (ICES 2016b)

Fishing is the human activity which places the greatest pressures on fish stocks[22] and consequently has direct effects on food webs. Fishing is usually size-selective so larger individuals generally suffer greater rates of mortality. Therefore exploited fish populations and communities contain relatively fewer large fish and the average size of these individuals is reduced. This may in turn have an indirect impact on their prey populations. Fishing intensity may be too high on specific components such as small pelagic fish (e.g. herring, sardine, anchovy, etc.), leading to dramatic effects on the food web as these species are, typically, important prey for many other species, including sea mammals. Conversely, a removal of a predatory fish component can result in completely different effects. The abundance (and distribution) of carefully selected populations can help describe food web status and/or levels of human perturbation. In addition, there are numerous indirect effects of fishing, such as changes in abundance/productivity, or the effects of destructive fishing practices leading to a deterioration of habitat (e.g. sea floor).

Food web components are also subject to environmental and climate variation and other natural drivers, which sometimes makes the precise attribution of cause and effect difficult.

Pollution of the marine environment, by chemical substances for instance or by marine litter, is another direct pressure on marine food webs. Chemical substances, which accumulate in marine organisms – even the tiniest organisms present at the bottom of the food chain – will eventually find their way to the top of the food chain and contaminate top predators, such as large fish and marine mammals."

9.3 Significant areas for ecosystems and food webs

For the second round of MSFD implementation (definition of 'Environmental Targets' to eventually reach 'Good Environmental Status', GES), France identified and prioritized 'ecological challenges'. Ecological challenges are considered as elements or marine ecosystems for which GES should be reached or maintained. Among these ecological challenges, some are considered to be prioritized following three criteria: representativity, sensitivity, functional importance.

[22] http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-4/index_en.htm

Degree of importance	Assessment areas		Ecological challenge and/or challenge area relative to ecosystems and food webs (Primary and secondary production, espèces fourrages)
High	22	Rochebonne plateau	**Biomass and energetic density**
Strong	40	Abyssal plain	**Forage species : Krill**
Not determined	14	Northern part of the Bay of Biscay continental slope	**Forage species : micronekton**
	15	Central part of the Bay of Biscay continental slope	**Forage species : micronekton**
	20	Loire estuary and Vendée coats	**Forage species : Brown shrimp (*Crangon crangon)***

Table 39: Ecological challenges and/or challenge areas relative to ecosystems and food webs as identified in the MSFD second implementation in France, 2017

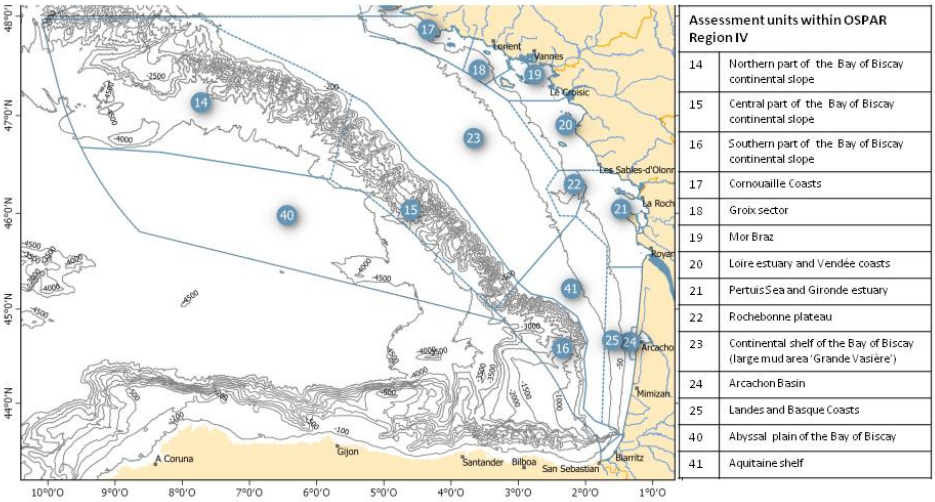

Figure 59: Assessment areas for the identification of ecological challenges in French MSFD process that are within OSPAR Region IV.

10 Conclusion

The bottom topography of Region IV and coastlines are highly diversified, including the continental shelf and slope and parts of the abyssal plain. Ecosystems in Region IV are very rich, support a rich fish fauna and have a particular importance for migratory birds.

The Bay of Biscay and Iberian Coast region extends from 48°N to 36° N and from 11° W to the coastlines of France, Portugal and Spain. The bottom topography of Region IV is highly variable, from continental shelf to abyssal plain. In Region IV some remarkable topographic features such as seamounts, banks and submarine canyons can be found. The coastline is also highly diversified with estuaries, rias and wetlands, which all support extremely productive ecosystems.

The Bay of Biscay and Iberian Coast region is situated in temperate latitudes with a climate that is strongly influenced by the inflow of oceanic water from the Atlantic Ocean and by the large scale westerly air circulation which frequently contains low pressure system. Large storms occur in the Bay of Biscay, especially during the winter months.

Region IV is highly diverse, having habitats and species protected under international and Community regulations, such as Bonn Convention, Bern Convention, OSPAR Convention, CITES Convention, Habitats Directive or Birds Directive.

Region IV has many different types of coastal habitats, such as rocky cliffs, shingles, rocky shores, sandy and muddy shores, coastal lagoons and estuaries. Many of these habitats are of Community interest (listed in Habitats Directive), or are in the OSPAR List of Threatened and/or Declining Habitats, such as biogenic maerl beds or *Zostera* beds. The wide continental shelf in the northern part of the Bay of Biscay has very large areas of sublittoral mudflats. The continental slope and especially canyons (e.g. Cap Breton, Aviles, etc.), or banks (e.g. Galicia bank) host sensitive habitats such as coral reefs or sponge aggregations. Threats to benthic habitats include physical pressures such as abrasion, marine pollution, eutrophication etc.

Several pelagic habitats were identified, such as river plums and enclosed bays that are areas of high primary and secondary production.

A large variety of marine mammal species, both boreal and temperate, have been reported in the region. Some species are protected under international and Community regulation, such as Bonn, Bern or OSPAR Convention or the Habitats Directive. Most species are under threats such as by-catch, marine litter or marine pollution. The continental slope and the south of the Bay of Biscay, as well as seamounts (e.g. Gorringe Bank) in Iberian waters are of major importance for marine mammals.

The coasts of the Bay of Biscay and the western Iberian Peninsula are used by several seabird species for breeding. Several species are even resident in some areas. Even if the seabird community is dominated by sea gulls, the Iberian Peninsula is at a strategic geographical position regarding the migratory behaviour of other seabird species. The nesting seabird community is very poor in comparison with other European Atlantic areas, but it improves appreciably during migrations and winter. The autumn passage of species such as Balearic shearwater (‘Critically Endangered’) or great cormorant is particularly important in the region. Threats to seabirds include marine litter, by-catch, disturbance etc.

Five species of marine turtles occur in Region IV, even though they are quite rare and do not nest in this region. They all have a poor Conservation Status. The main threats to marine turtles are by-catch and marine litter.

As for fish, many species reach their southern or northern limits of distribution in the Bay of Biscay due to oceanographic conditions such as the Albacore or the bluefin tuna which live in subtropical areas of the western Atlantic and make annual migrations to the Bay of Biscay. The majority of fish in Region IV are species living near the bottom of the sea (for example sole, dogfish or blue whiting) with limited geographical range, unless they are deep-water species. Pelagic fish such as sardine or mackerel have wide geographic distribution from Africa to Northern Europe. Region IV includes functional areas for fish species such as muddy areas near river plums and bays that can be major spawning areas (anchovy, sardine, sole…) or nurseries (plaice, sole, sea bass…).

All the stakes on the components can be categorized:

- → As a non mobile stakes, take into account by each country
- → As a mobile stakes

Those stakes raised the thematic of transboundary sharing of our approachs and measures in order to have a coherent management of the marine environment at a European point of view. The articulation between MSP and the national environmental politics is a thematic raised by this inventory of common stakes. National environmental politics at sea is mostly take into account in the Marine Protected Areas (MPA). The articulation between those two public policies is coherent to take into consideration the current MPA network (Figure 60) and the future MPA's : as examples in Portugal (Figure 61) and France (Figure 62).

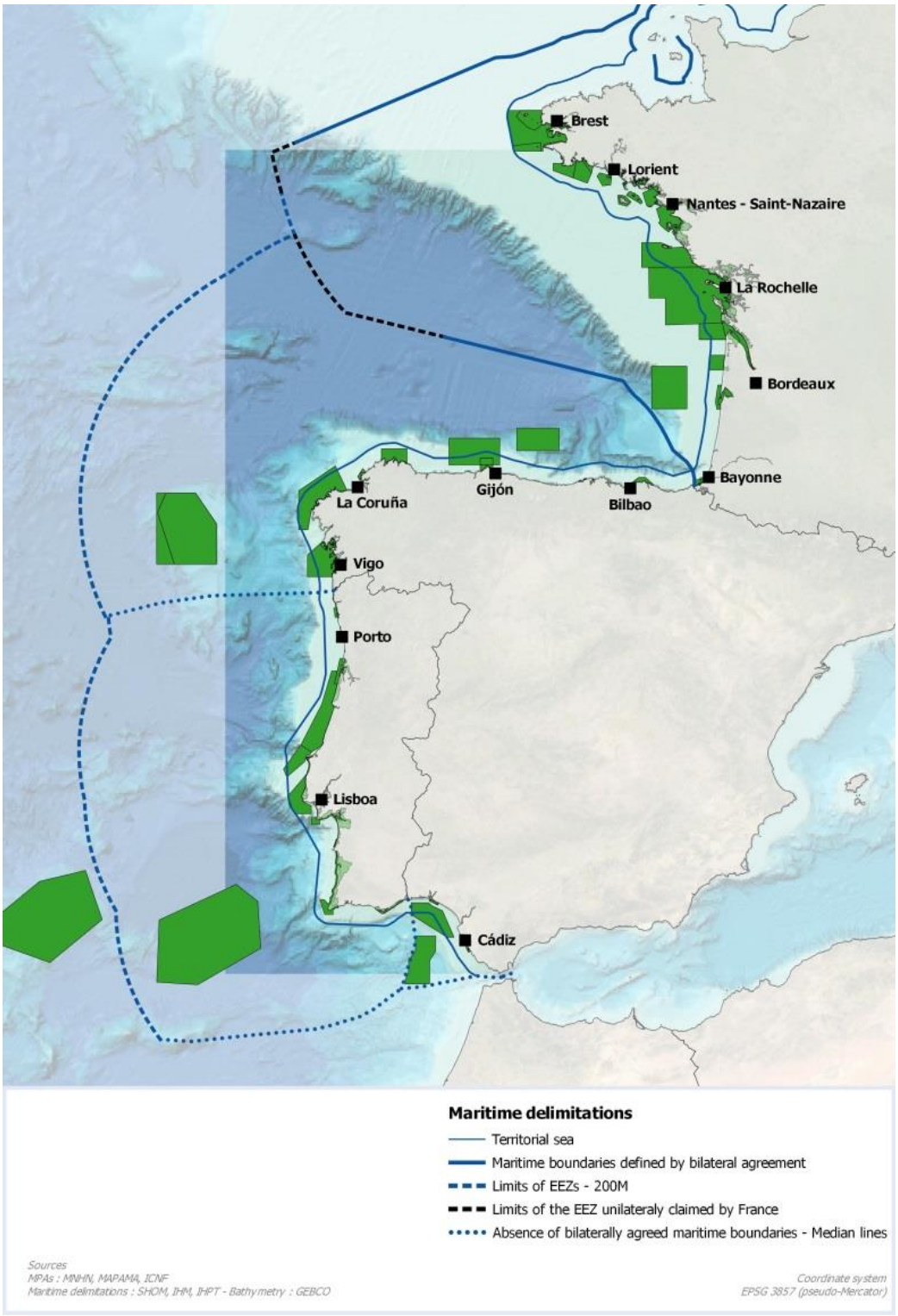

Figure 60 : Current MPA Network

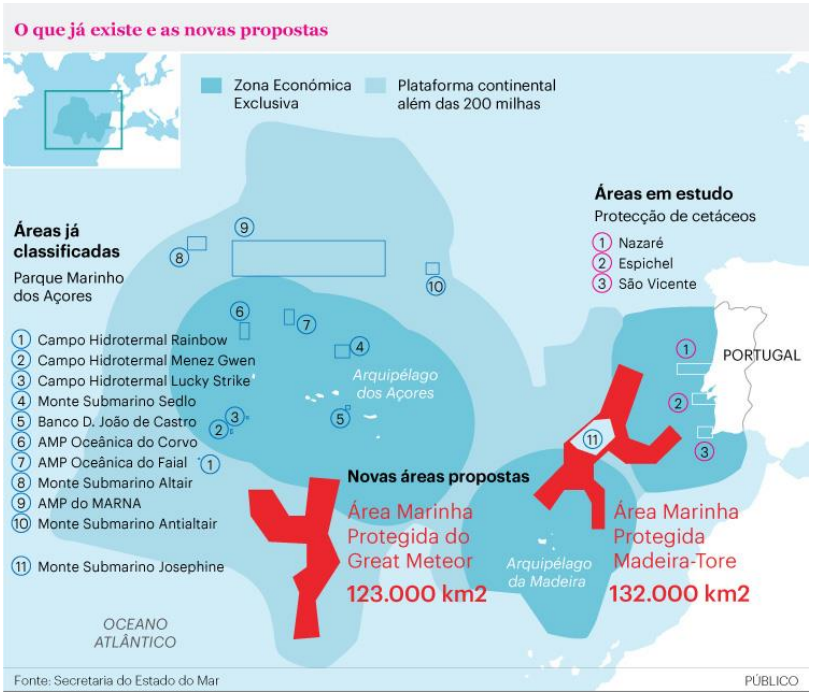

Figure 61: Proposed MPA's in Portugal. (MSFD Programme of Measures)

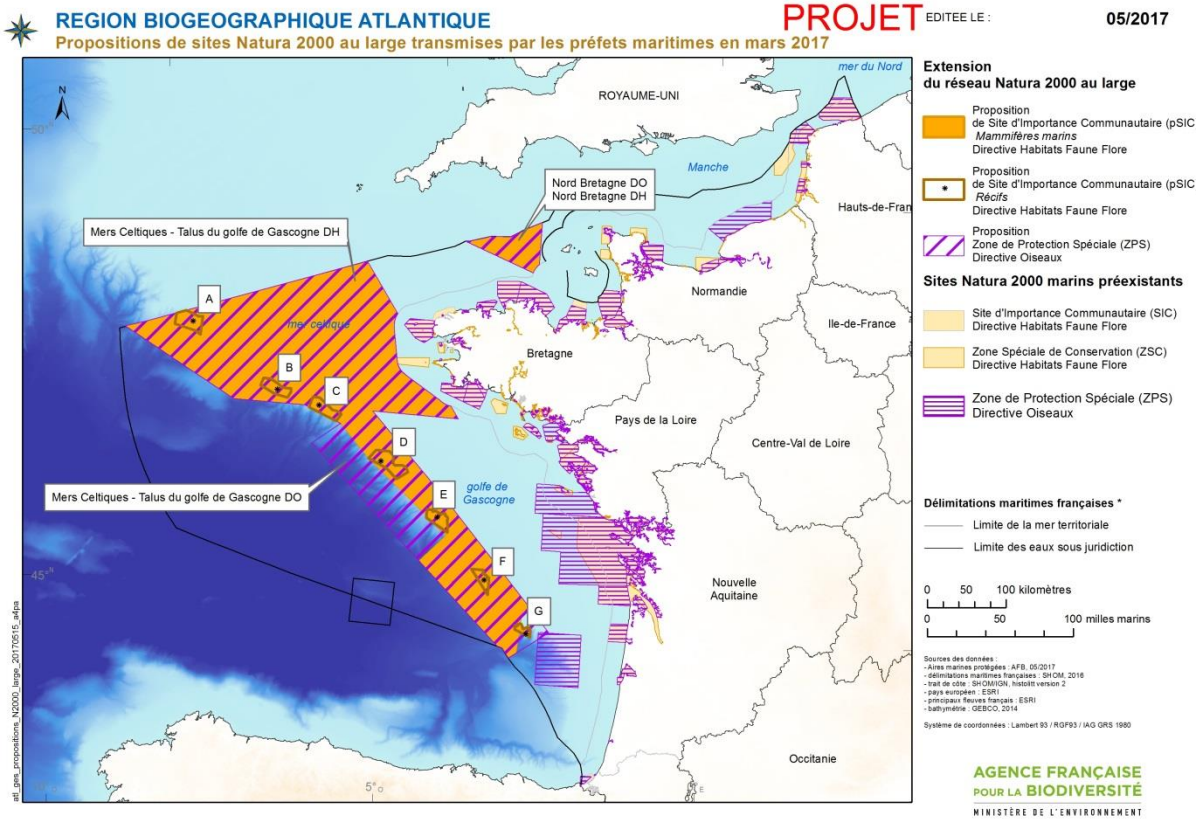

Figure 62 : Proposed MPA's in France

Those MPA and projected MPA are also an Ecosystem based policies (like MSFD) and interact with offshore activites described in part Pressures-Impacts.

11 ANNEXES

11.1 Annex I. MSFD Benthic broad habitat types as defined in Commission Decision (EU) 2017/848

Broad habitat types including their associated biological communities which equate to one or more habitat types of the European nature information system (EUNIS) habitat classification[23].

BROAD Habitat type	Relevant EUNIS habitat codes (version 2016)
Littoral rock and biogenic reef	MA1, MA2
Littoral sediment	MA3, MA4, MA5, MA6
Infralittoral rock and biogenic reef	MB1, MB2
Infralittoral coarse sediment	MB3
Infralittoral mixed sediment	MB4
Infralittoral sand	MB5
Infralittoral mud	MB6
Circalittoral rock and biogenic reef	MC1, MC2
Circalittoral coarse sediment	MC3
Circalittoral mixed sediment	MC4
Circalittoral sand	MC5
Circalittoral mud	MC6
Offshore circalittoral rock and biogenic reef	MD1, MD2
Offshore circalittoral coarse sediment	MD3
Offshore circalittoral mixed sediment	MD4
Offshore circalittoral sand	MD5
Offshore circalittoral mud	MD6
Upper bathyal rock and biogenic reef	ME1, ME2
Upper bathyal sediment	ME3, ME4, ME5, ME6
Lower bathyal rock and biogenic reef	MF1, MF2
Lower bathyal sediment	MF3, MF4, MF5, MF6
Abyssal	MG1, MG2, MG3, MG4, MG5, MG6

Table 40: Benthic broad habitat types as listed in Table 2 of the Commission Decision (EU) 2017/848 of 17 May 2017

The MSFD defines predominant habitat types broadly as corresponding to EUNIS level 2 habitat typologies. In EUNIS typology, marine habitats (A) are divided in 8 categories (A1, A2, etc. , A8), with 7 catagories concerning benthic habitats and one concerning pelagic habitats. Classification of benthic habitats in each category can reach up to 5 levels. Each level corresponds to a criteria (WHICH?) and helps build up the hierarchy of the typology. The first 3 levels are based on abiotic criteria, and biologic criteria are used from the fourth. The higher the level, the more precise the habitat description is.

However, the marine section of the EUNIS typology has been revised in 2016.

Criteria for OLD EUNIS classification and examples

[23] Evans, D. (2016). Revising the marine section of the EUNIS Habitat classification – Report of a workshop held at the European Topic Centre on Biological Diversity, 12 & 13 May 2016. ETC/BD Working Paper NA/2016.

Physical criteria			Biological criteria	
Level 1	Level 2	Level 3	Level 4	Level 5
A.Marine habitats	A1 Littoral rock and other hard substrata	A1.1 High energy littoral rock	A1.11 Mussel and/or barnacle communities	A1.111 *Mytilus edulis* and barnacles on very exposed eulittoral rock
A.Marine habitats	A5 Sublittoral sediment	A5.6 Sublittoral biogenic reefs	A5.63 Circalittoral coral reefs	A5.631 Circalittoral *Lophelia pertusa* reefs

Remark : The assessment of MSFD habitats includes both "predominant seabed and water column types" often referred to as "Predominant Habitat Types", and "Special Habitat Types" which refer especially to those recognized or identified under Community legislation (the Habitats Directive) or international conventions (e.g. OSPAR, Barcelona) as being of special scientific or biodiversity interest. **There is some overlap between "Predominant Habitat Types" and "Special Habitat Types", for example the Annex I habitat type "1170 Reefs" includes several "Predominant Habitat**

11.2 Annex II. Description of OSPAR Listed Habitats occurring in Region IV

16 habitat types are listed in OSPAR List of Threatened and/or Declining Habitats. All of them can be found with a description following this link (https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats)

Habitat: Carbonate Mounds **OSPAR Regions where it occurs:** I**,** V **OSPAR Regions where under threat and/or in decline:** V[8] **Background Document** **Recommendation**
Habitat: Coral Gardens **OSPAR Regions where it occurs:** I**,** II, III, IV, V **OSPAR Regions where under threat and/or in decline:** I, II, III, IV, V **Background Document** **Recommendation**
Habitat: *Cymodocea* Meadows **OSPAR Regions where it occurs:** IV **OSPAR Regions where under threat and/or in decline:** IV **Background Document** **Recommendation**
Habitat: Deep-Sea Sponge Aggregations **OSPAR Regions where it occurs:** I**,** III, IV, V **OSPAR Regions where under threat and/or in decline:** I, III, IV, V **Background Document** **Recommendation**
Habitat: Intertidal *Mytulis edulis* Beds on Mixed & Sandy Sediments **OSPAR Regions where it occurs:** II, III **OSPAR Regions where under threat and/or in decline:** II, III **Background Document** **Recommendation**
Habitat: Intertidal Mudflats **OSPAR Regions where it occurs:** I, II, III, IV **OSPAR Regions where under threat and/or in decline:** I, II, III, IV **Background Document** **Recommendation**
Habitat: Littoral Chalk Communities **OSPAR Regions where it occurs:** II **OSPAR Regions where under threat and/or in decline:** II **Background Document** **Recommendation**
Habitat: *Lophelia pertusa* Reefs **OSPAR Regions where it occurs:** I, II, III, IV, V **OSPAR Regions where under threat and/or in decline:** I, II, III, IV, V **Background Document** **Recommendation**
Habitat: Maerl Beds **OSPAR Regions where it occurs:** I, II, III, IV, V **OSPAR Regions where under threat and/or in decline:** III **Background Document** **Recommendation**
Habitat: *Modiolus modiolus* beds **OSPAR Regions where it occurs:** I, II, III, IV, V **OSPAR Regions where under threat and/or in decline: I, I**I, III, IV, V **Background Document** **Recommendation**
Habitat: Oceanic Ridges with Hydrothermal Vents

OSPAR Regions where it occurs: I, V **OSPAR Regions where under threat and/or in decline:** V **Background Document** **Recommendation**
Habitat: *Ostrea edulis* Beds **OSPAR Regions where it occurs:** II, III, IV **OSPAR Regions where under threat and/or in decline:** II, IV **Background Document** **Recommendation**
Habitat: *Sabellaria spinulosa* Reefs **OSPAR Regions where it occurs:** I, II, III, IV, V **OSPAR Regions where under threat and/or in decline:** II, III **Background Document** **Recommendation**
Habitat: Seamounts **OSPAR Regions where it occurs:** I, IV, V **OSPAR Regions where under threat and/or in decline:** I, IV, V **Background Document** **Recommendation**
Habitat: Sea-Pen & Burrowing Megafauna Communities **OSPAR Regions where it occurs:** I, II, III, IV **OSPAR Regions where under threat and/or in decline:** II, III **Background Document** **Recommendation**
Habitat: *Zostera* Beds **OSPAR Regions where it occurs:** I, II, III, IV **OSPAR Regions where under threat and/or in decline:** I, II, III, IV **Background Document** **Recommendation**

The OSPAR Regions are:

I **the Arctic**: the OSPAR maritime area north of latitude 62°N, but also including Iceland and the Færoes;

II **the Greater North Sea**: The North Sea, the English Channel, the Skagerrak and the Kattegat to the limits of the OSPAR maritime area, bounded on the north by latitude 62°N, on the west by longitude 5°W and the east coast of Great Britain, and on the south by latitude 48°N;

III **the Celtic Seas**: the area bounded by, on the east, longitude 5°W and the west coast of Great Britain and on the west by the 200 metre isobath (depth contour) to the west of 6°W along the west coasts of Scotland and Ireland;

IV **the Bay of Biscay/Golfe de Gascogne and Iberian coasts**: the area south of latitude 48°N, east of 11°W and north of latitude 36°N (the southern boundary of the OSPAR maritime area);

V **the Wider Atlantic**: the remainder of the OSPAR maritime area

	Habitat	Regions where habitat occurs (○) and has been recognised by OSPaR to be threatened and/or declining (●)					Key pressures
		I	II	III	IV	V	
Coastal habitats	Littoral chalk communities		●				
	Intertidal *Mytilus edulis* beds on mixed and sandy sediments		●	●			
	Intertidal mudflats	●	●	●	●		
	Ostrea edulis beds		●	●	●		
	Zostera beds	●	●	●	●		
	Cymodocea meadows[1]				●		
Shelf sea habitats	*Modiolus modiolus* beds	●	●	●	●		
	Sabellaria spinulosa reefs	○	●	●	○	○	
	Maerl beds	○	○	●	○	○	pH↘
	Sea-pen and burrowing megafauna communities	○	●	●	○		
Deep-sea habitats	*Lophelia pertusa* reefs	●	●	●	●	●	pH↘
	Coral gardens[1]	●	●	●	●	●	pH↘
	Carbonate mounds	○				●	
	Deep-sea sponge aggregations	●		●	●	●	
	Oceanic ridges with hydrothermal vents/fields	○				●	
	Seamounts	●			●	●	

Key TO TABLES 10.2 and 10.3: Climate change; pH↘ pH changes; Hydrological changes; Hazardous substances; Oil pollution; Nutrient and organic enrichment; Litter; Underwater noise; Barriers to species movement; Death or injury by ship strikes; Siltation rate changes; Habitat damage; Habitat loss; Microbial pathogens; Introduction of non-indigenous species and translocations; Removal of target and non-target species; Predation; Loss of prey species; Threats outside the OSPAR area

Figure 63 : OSPAR List of threatened and/or declining habitats adopted in 2003 (1habitats added in 2008) and the current key pressures with impacts on the habitats listed (OSPAR Commission 2010).

The following descriptions of OSPAR habitats are extracted from the background documents for each habitats.

11.2.1 Coral gardens

Description. The main characteristic of a coral garden is a relatively dense aggregation of colonies or individuals of one or more coral species. Coral gardens can occur on a wide range of soft and hard seabed substrata. For example, soft-bottom coral gardens may be dominated by solitary scleractinians, sea pens or certain types of bamboo corals, whereas hard-bottom coral gardens are often found to be dominated by gorgonians, stylasterids, and/or black corals. The biological diversity of coral garden communities is typically high and often contains several species of coral belonging to different taxonomic groups, such as leather corals (Alcyonacea), gorgonians (Gorgonacea), sea pens (Pennatulacea), black corals (Antipatharia), hard corals (Scleractinia) and, in some places, stony hydroids (lace or hydrocorals: Stylasteridae). However, reefforming hard corals (e.g. *Lophelia, Madrepora* and *Solenosmilia*), if present, occur only as small or scattered colonies and not as a dominating habitat component. The habitat can also include relatively large numbers of sponge species, although they are not a dominant component of the community. (Source: fOSPAR Commission, 2010. Background Document for Coral gardens)

Location. Coral gardens occur in deep seabed habitats such as deep-sea rock and artificial hard substrata, deep-sea sand, etc. The occurrence and distribution of coral gardens in the North East Atlantic is insufficiently known. Continental slope and canyons may be particularly relevant as a

megahabitat for the distribution of coral gardens. Coral gardens occur on Le Danois Bank area in the Cantabrian sea.

Coral gardens do not qualify to the criteria 'Global/ regional importance' and 'Rarity'. This habitat has a significant probability of decline. It is very sensitive, based on longevity, unknown reproductive patterns, uncertain recovery and vulnerability to fishing impacts. It is currently threatened, in particular considering the relatively high fishing pressure in deep waters in this region.

Threats to the coral garden habitat come on different scales and from different sources: global warming, collecting, silting, research.

11.2.2 Deep-Sea Sponge Aggregations

Description. Deep sea sponge aggregations are principally composed of sponges from two classes: Hexactinellida and Demospongiae.

Location. They are known to occur between water depths of 250-1300m* (Bett et Rice 1992), where the water temperature ranges from 4-10°C and there is moderate current velocity (0.5 knots). Deep-sea sponge aggregations may be found on soft substrata or hard substrata, such as boulders and cobbles which may lie on sediment. Iceberg plough-mark zones provide an ideal habitat for sponges because stable boulders and cobbles, exposed on the seabed, provide numerous attachment/settlement points (B. Bett, pers comm.). Deep-sea sponges have similar habitat preferences to cold-water corals, and hence are often found at the same location.

Deep-sea Sponge Aggregations does not qualify to the criteria 'global/regional importance'. This habitat is rare, restricted to particular areas where hydroraphic conditions are favourable. There is no quantitative data on decline. Sponges are sensitive to increased turbidity and likely pollution. The dominant species are long-lived, slow growing and therefore slow to recover from impacts. Physical disturbance of the seabed from bottom fishing operations is the main threat, and there is a potential threat from bioprospecting. The mean threat is physical disturbance of the seabed from bottom fishing operations

Threats to the deep-sea sponge aggregation habitat come on different scales and from different sources, main threats being global warming and bottom trawling fisheries.

11.2.3 Intertidal Mudflats

Description. There are two sub-types of Intertidal mudflats based on the predominant salinity regimes: marine and estuarine. The agreed OSPAR habitat working definition is as follows: "Intertidal mud typically forms extensive mudflats in calm coastal environments (particularly estuaries and other sheltered areas), although dry compacted mud can form steep and even vertical faces, particularly at the top of the shore adjacent to salt marshes. Intertidal mudflats support communities characterised by polychaetes, bivalves and oligochaetes. Mudflats are highly productive areas which support large numbers of birds and fish. They provide feeding and resting areas for internationally important populations of migrant and wintering waterfowl, and during neap low tides provide the only readily available food source. At high tide they are important nursery areas for flatfish. The most important marine predators on intertidal sand and mudflats are particularly the flatfish *Solea solea* (sole), *Limanda limanda* (dab), *Platichthys flesus* (flounder) and *Pleuronectes platessa* (plaice) which feed on polychaetes, bivalves and tidally active crustaceans.

Location. This habitat is present anywhere with sheltered gently-sloping seabeds and medium to large tidal ranges. They occur predominantly in estuaries and the adjacent sedimentary coastal areas, in sheltered marine bays and semienclosed areas behind barrier islands including lagoons. As such

they are amongst the most widespread marine and estuarine habitats and cover areas from a few hectares to several square kilometres within a site and several times this within any geographical area.

This habitat does not qualify to the criteria 'Global/regional importance', 'Rarity' and 'Sensitivity'.

However, it has a high ecological significance: Intertidal mud flats are important in the functioning of estuarine systems and may have a disproportionately high productivity compared to subtidal areas. Intertidal mudflats have a low species diversity but huge overall invertebrate productivity, resulting in an important and perpetually exploited food source for waders, waterfowl and fish. *Concerning* decline, reduction in the area of intertidal mudflats has occurred in many parts of the OSPAR area and is particularly alarming for estuarine intertidal mudflats which are favoured for land claim.

The main threats are habitat degradation through nutrient changes or community shifts, habitat disruption and smothering, habitat loss or alteration, habitat loss through sea level rise or removal of target species, pollution, disturbance to species. Causes of these threats are: land/riverine runoff and industrial domestic effluent discharge, collecting, dredging, invasion by alien species, climate change, barrages and reservoirs, agricultural reclamation, urban and transport infrastructure, shellfish fisheries, oil/tar/chemicals substances and recreational use.

11.2.4 Lophelia pertusa Reefs

Description. *Lophelia pertusa* (L., 1758), a cold-water, reef-forming coral, has a wide geographic distribution ranging from 55°S to 70°N, where water temperatures typically remain between 4 - 8°C. These reefs are generally subject to moderate current velocities (0.5 knots). The biological diversity of the reef community can be three times as high as the surrounding soft sediment (Frid et al. 2003), suggesting that these cold-water coral reefs may be biodiversity hotspots. Characteristic species include other hard corals, such as *Madrepora oculata* and *Solenosmilia variabilis*, the redfish *Sebastes viviparous* and the squat lobster *Munida sarsi*. *L.pertusa* reefs occur on hard substrata; this may be *Lophelia* rubble from an old colony or on glacial deposits. For this reason, *L.pertusa* reefs can be associated with iceberg plough-mark zones.

Location. The majority of records occur in the North-east Atlantic.These reefs occur within a depth range of 200 -> 2000 m on the continental slope. *L.pertusa* occurs along the continental margin of the Bay of Biscay as patch-reefs. *L.pertusa* occurrence may be underestimated in the deeper zone.

Global/regional importance: The OSPAR area appears to be particularly important for *L.pertusa* because of the high proportion of the known occurrences of these reefs in the North-east Atlantic. This habitat is sensitive: the delicate structure of *L.pertusa* makes these coral reefs particularly vulnerable to physical damage. The habitat is in significant decline in OSPAR region I. The principal threat to L.pertusa is physical damage by fishing gear. Petroleum industry developments with associated discharges of drilling mud and drill cuttings may also negatively affect the corals

Threats to L. pertusa reefs are damage or loss of species, contamination, deposited sediment, nutrient changes (eutrophication) and hazardous substances. Human activities responsile for these pressures are fishing, oil and gas exploration, dumping of solid waste and dredged material, land-based activities, tourism and recreation activities, scientific sampling.

11.2.5 Maerl Beds

Maërl is a collective term for various species of non-jointed coralline red algae (Corallinaceae) that live unattached. These species can form extensive beds, mostly in coarse clean sediments of gravels and clean sands or muddy mixed sediments, which occur either on the open coast, in tide-swept channels or in sheltered areas of marine inlets with weak current. As maërl requires light to photosynthesize, the depth of live beds is determined by water turbidity, from the lower shore to 40 m or more. Maërl beds may be composed of living or dead maërl or varying proportions of both.

Maerl beds have a patchy distribution in the OSPAR area.

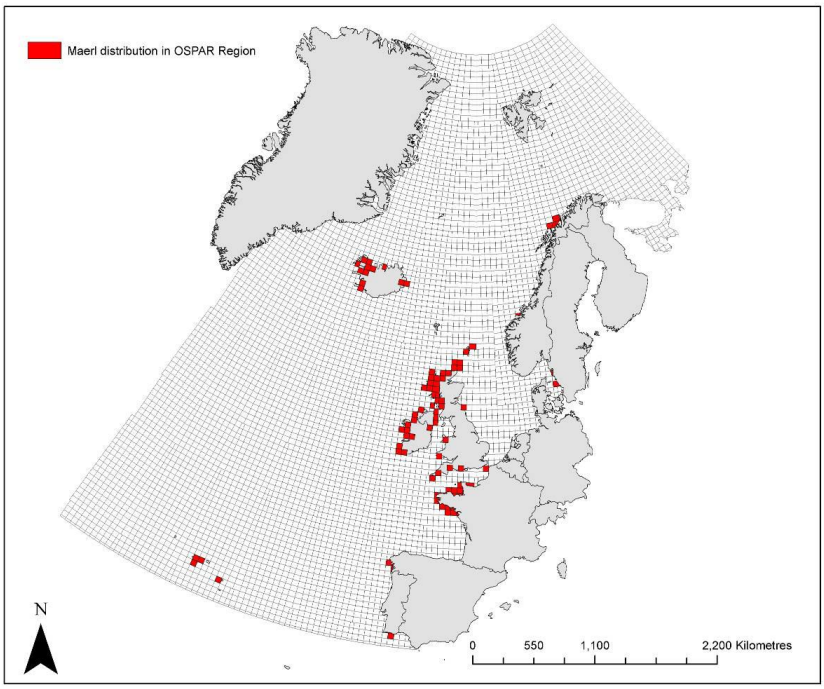

Figure 64: Distribution of 50 km squares containing maërl beds in the OSPAR maritime area. Source: OSPAR Background Document for maerl beds.

A number of studies indicate that maërl beds have declined in both extent and quality in the OSPAR Area. This habitat is sensitive: the three commonest species of maërl are very sensitive to substrata loss, smothering, increase in suspended sediment, abrasion and physical disturbance which can prevent light reaching the living maërl and therefore halt photosynthesis. Maërl beds are of ecological significance: they are an important habitat for a wide variety of marine animals and plants which live amongst or are attached to the nodules, or which burrow in the coarse gravel or fossil maërl beneath the top living layer. Maërl beds may also be important nursery areas for commercially valuable molluscs and crustaceans. In Europe, maërl has been dredged from both living beds and fossilised deposits for use as an agricultural soil conditioner as well as use in animal food additives and water filtration systems. Due to the very slow rate of growth, maërl is considered to be a non-renewable resource and, even if the proportion of living maërl in commercially collected material is low, extraction has major effects on the wide range of species present in both live and dead maërl deposits. There are other direct and indirect impacts from muddy plumes and excessive sediment load, heavy demersal fishing gear, mariculture, etc.

Threats to Maerl beds come from extraction of sand, stone and gravel, construction, land-based activities, mariculture, traffic infrastructure (dredging), placement and operation of cables and pipelines, fishing, hunting, harvesting, tourism and recreational activities.

11.2.6 Modiolus modiolus beds

The horse mussel *Modiolus modiolus* forms dense beds, at depths up to 70 m (but may extend onto the lower shore), mostly in fully saline conditions and often in tide-swept areas. Although *M.modiolus* is a widespread and common species, horse mussel beds (with typically 30% cover or more) are more limited in their distribution. *M.modiolus* beds are found on a range of substrata, from cobbles through to muddy gravels and sands, where they tend to have a stabilising effect, due to the production of byssal threads. Communities associated with *M.modiolus* beds are diverse, with a wide range of epibiota and infauna being recorded, including hydroids, red seaweeds, solitary ascidians and bivalves such as *Aequipecten opercularis* and *Chlamys varia*.

Location. As M.modiolus is an Arctic-Boreal species, its distribution ranges from the seas around Scandinavia (including Skagerrak & Kattegat) and Iceland south to the Bay of Biscay. The southern end of the biogeographic range of M.modiolus extends at least to the Bay of Biscay (Poppe et Goto 2000) but it is not known to form beds beyond the North Sea and the southern Irish Sea.

Threats to this habitat are: destruction or degradation through physical damage, pollution, removal of species (mussels), non-native species.

11.2.7 Ostrea edulis Beds

Beds of the oyster *Ostrea edulis* occurring at densities of 5 or more per m^2 on shallow mostly sheltered sediments (typically 0 – 10 m depth, but occasionally down to 30 m. There may be considerable quantities of dead oyster shell making up a substantial portion of the substratum. The clumps of dead shells and oysters can support large numbers of the ascidians *Ascidiella aspersa* and *A.scabra*. Several conspicuously large polychaetes, such as *Chaetopterus variopedatus* and terebellids, may be present as well as additional suspension-feeding polychaetes such as *Myxicola infundibulum*, *Sabella pavonina* and *Lanice conchilega*. A turf of seaweeds such as *Plocamium cartilagineum*, *Nitophyllum punctatum* and *Spyridia filamentosa* may also be present (Connor et al. 2003).

The population in the OSPAR Maritime Area is considered to be of global importance: *O.edulis* only occurs locally outside the OSPAR area in the Mediterranean and the northern shores of the Black Sea. Natural stocks of O. edulis have declined in OSPAR region II. This habitat is of ecological significance and O.edulis is considered a keystone species. For example, it provides a solid surface for settlement by other species. Natural beds of O. edulis have become rare in the North Sea and in the Wadden Sea. Finally, this habitat is highly sensitive to substrate loss, smothering, synthetic compound contamination, introduction of microbial pathogens/parasites, introduction of non-native species and direct extraction.

The main threat to O.edulis and O.edulis beds in OSPAR Region II has been overexploitation. There is a long history of collection and cultivation of O.edulis in northern Europe. The dramatic declines seen in stock abundance in the middle of the 19th century are attributed mainly to over-exploitation but there has also been damage by beam trawlers targeting other species. The cultivation and spread into the wild of the Pacific oyster *Crassostrea gigas* is another threat as there is a possibility that it may take over the niche of the native oyster and therefore limit the opportunities for recolonisation by *O.edulis*.

11.2.8 Sabellaria spinulosa Reefs

S. spinulosa is a small, tube-building polychaete worm found in the subtidal and lower intertidal/sublittoral fringe. In most parts of its geographic range it does not form reefs but is solitary or found in small groups, encrusting pebbles, shell, kelp holdfasts and bedrock. When conditions are

favourable, dense aggregations may be found, forming reefs up to about 60 cm high and extending over several hectares; these are often raised above the surrounding seabed. Reefs may persist in an area for many years although individual clumps may regularly form and disintegrate. (OSPAR Background Document for Sabellaria spinulosa reefs)

Subtidal S.spinulosa reefs are reported to have been lost in at least five areas of the North East Atlantic. True stable reefs, as opposed to crusts of S.spinulosa, are believed to be rare of have very restricted distribution. The highest sensitivity is to substratum loss and displacement as the worms are fixed to the substratum and cannot reattach once dislodged, or rebuild their tubes if removed from them. This habitat is ecologically significant, as it provides a biogenic habitat that allows many other associated species to become more established and acts to stabilize cobble, pebble and gravel habitats. The greatest impact on this biogenic habitat is considered to be physical disturbance.

11.2.9 Seamounts

Seamounts are widespread features in the whole OSPAR area. There are presently 104 seamounts in the official OSPAR database, as compiled in 22/09/2008, but many more will be mapped in the future.

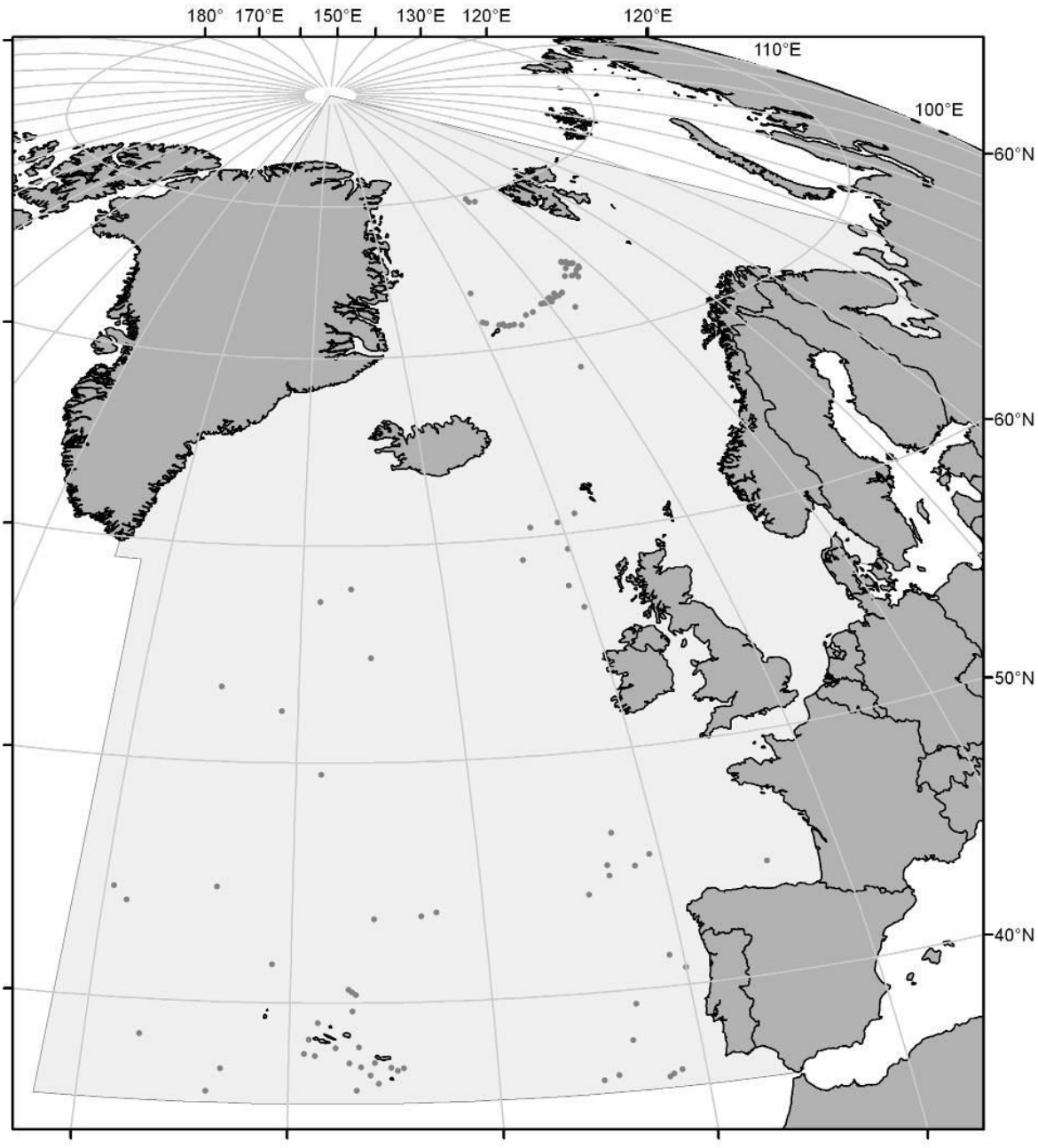

Figure 65 : Location of the 104 seamounts included in the OSPAR dataset as compiled by 22/09/2008

From the 104 seamounts, 74 are located within national EEZ with only 30 located in the High Seas. The majority lay along the Mid-Atlantic Ridge (MAR) between Iceland and the Azores. However, over the next 10 years the numbers of known seamounts will dramatically increase due to the continuous acquisition of new bathymetry data and the continuous increase in mapping techniques. Little is known about natural fluctuations in physical structure of the seamount features itself. Also, there is a limited knowledge on what species inhabit seamounts in the OSPAR area. Human activities taking place onOSPAR seamounts are also largely unknown and unregulated. All these aspects strongly limit theassessment of seamount habitats.The evaluation of threats and impacts is most relevant to the biological communities associated with seamounts rather than the physical structure of the feature itself. Threats arise mainly from thephysical impact of fishing gears on benthic habitats and communities, and from the removal of pelagic species through overfishing and by-catch. There is also the possibility that some areas may be targeted by deep-sea mining companies that are already

looking at the possibility of extracting ferromanganese crusts and polymetallic sulphides from seamounts, and where the potential physical damage could also be considerable.

Legal and administrative competencies are generally simpler in waters under national jurisdiction than in international waters. Even so, only four MPAs have been declared for the protection of seamounts in OSPAR waters under national jurisdiction to date – the Formigas Islets & Dollabarat Bank Nature Reserve (Azores), D. João de Castro Seamount (Azores), Sedlo Seamount (Azores), and El Cachucho (Spain). To date, there are no OSPAR High Seas MPAs. Few management measures have been taken specifically for the protection of seamounts in the OSPAR Maritime Area. None have been taken outside MPAs (existing or proposed). Portugal (Azores) and Spain are the only OSPAR Contracting Parties thought to have in place management measures for seamounts. No measures have been taken to date to protect seamounts in international waters.

11.2.10 **Cymodocea Meadows**

The distribution of Cymodocea Meadows in the OSPAR IV region is limited to Portugal and Spain, in the following biogeographic zones: South European Atlantic shelf or 'IXa ICES Area'; Benthic and neritic of the sheld and upper continental shelf.

Figure 66: Global distribution of Cymodocea nodosa (in Espino et al., 2008)

This habitat has a high regional importance, because the distribution range of the Atlantic population falls entirely on region IV, limited to Portugal and Spain. Those habitats are rare, as they are only limited number of locations where it occurs. It is sensitive, mayor disturbances such as dredging or water pollution cause extensive damage. It has a high ecological significance, as other seagrass meadows; it plays a pivotal role in the coastal benthos. *Cymodocea meadows* have significantly declined for the past 30 years.

A number of the threats to *Cymodocea* beds are directly linked to human activities. There are extraction of sediments, dumping of solid waste and dredged spoils, constructions, land-based activities, placement of submarine cables and pipelines, anchoring and mobile fishing gears or fish cage farms.

11.2.11 **Sea-Pen & Burrowing Megafauna Communities**

There is little evidence that global warming or organic enrichment have played much of a role in benthic community structure changes. Sedimentary modifications, due to several processes including the resuspension of the fine mud particles by bottom trawling, are undoubtedly the main factor explaining the modifications observed in the macrobenthic fauna. The direct effects of the trawling activities, facilitating some species (particularly small mobile deposit feeders and carnivores) but destroying some others (particularly epibenthic non-mobile fauna) also played a role in microbenthic

community changes (Hily et al. 2008). At a regional scale these processes have led to the dominance of a few species, including burrowing megafauna (*Nephrops*), that are tolerant to the physical constraints of trawling, modifications of the suspended matter levels in the bottom waters, and the changes in the granulometry of the sediments. The consequences are a homogenisation and standardisation of the sediments and associated communities, accompanied by a decrease in biodiversity. In all, studies reveal that the fauna associated with this habitat are, in areas where N*ephrops* stocks are fully exploited, undergoing a community shift. However knowledge on this habitat's distribution, composition and uses is poor. Important variations, in terms of community composition, biodiversity, or fisheries impacts may exist, in particular in south-western waters.

Fisheries research was traditionally driven by the requirement to manage single stocks of exploited species. However in the last 2 decades, however, research efforts have increasingly been focused on the wider environmental global effects of fishing on non-target fauna and marine habitats (Hiddink, Jennings, et Kaiser 2006); this focus is consistent with political commitments to take account of the environmental impacts of fishing in management plans. The need to adopt and operationalize the EAF (Hall et Mainprize 2004) has prompted a wider review of the range and suitability of management indicators that might describe the state of ecosystem components or attributes and provide guidance for management decision making. To date no existing management measures have taken into account habitat quality, but rather the protection of (*Nephrops*) resources (D.Atkinson, pers.comm.).

The necessity to move from a traditional fishery management to an ecosystem approach is now acknowledged. The management of marine resources, including Nephrops stocks, in an ecosystem context, and the achievement of Good Environmental Status (GES) are commitments that have been made at both national and European levels (Food and Agriculture Organization of the United Nations 2003). There is consequently a need to balance the sustainable use of the Nephrops stocks with the setting of targets to improve the quality of this habitat in a range of areas where it occurs. In this context, discussions are needed around whether setting aside some of the habitat from fishing effort could also contribute to sustaining/improving the Nephrops stocks.

11.2.12 **Zostera beds**

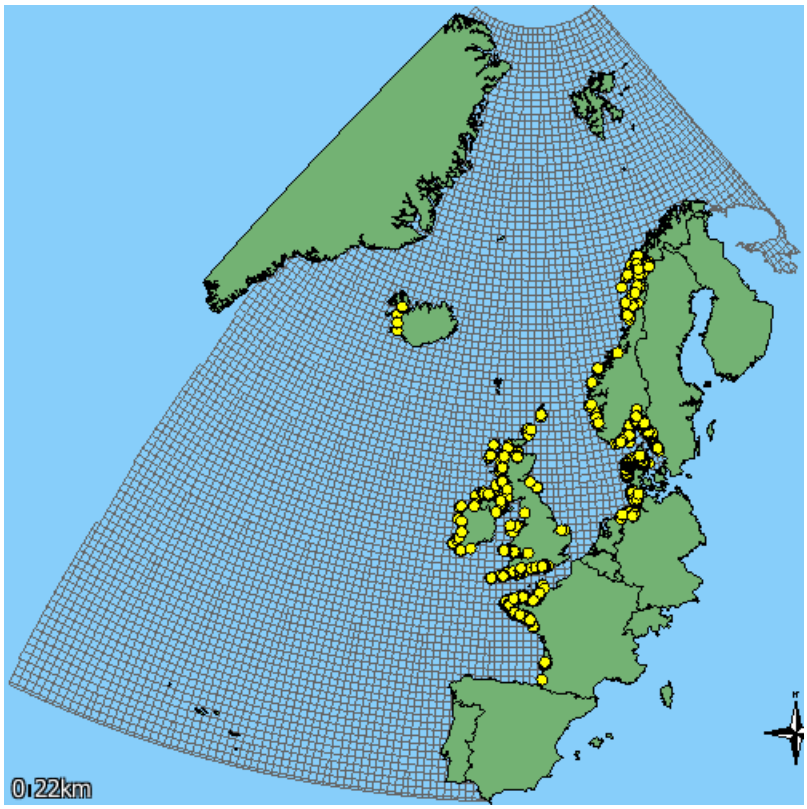

Figure 67 : Records (yellow dots) for Zostera beds in the OSPAR Maritime Area (Contracting Parties shown in

Decline: The decline in *Zostera* beds may have come to a halt in 1990/2000, but it has not re-established its former distribution area prior to the outbreak of wasting disease.

France: *Zostera marina* has not recovered fully in the Glenan Archipelago following the wasting disease. Eelgrass covered 10 km_2 of the area in 1930 but only 4 km_2. in 2000 (Krause-Jensen, Pedersen, et Jensen 2003). Fishing and anchoring activity most likely contribute to limit the present distribution area. Arcachon Bay, still has extensive beds of *Zostera noltii*, but as a consequence of eutrophication, massive blooms of green macroalgae have occurred since the late 1980s and constitute a potential threat to the seagrasses. Since 2000 the spatial extent of seagrass beds has decreased. Since 2000 some many undisturbed beds have extended their distribution landwards, resulting in a moderate increase of the total area.

Sensitivity: MarLin (*The Marine Life Information Network for Britain and Ireland*) has *Zostera marina* as very highly sensitive to substrate loss, smothering, change in turbidity, change in wave exposure, changes in nutrient levels and introduction of microbial pathogens/parasites (wasting desease). *Z. marina* is also highly sensitive to disturbance (caused by trampling, anchoring, dredging and other activities that disturb the sediment) and introduction of non-native species (eg. *Spartina anglica, Sargassum muticum*)(Tyler-Walters 2007). *Zostera noltii* is highly sensitive to substrate loss, smothering, change in wave exposure, introduction of nonnative species and extraction of other species, such as cockles (Tyler-Walters 2005).

11.3 Annex III. Description of habitats listed in Annex I to Habitat Directive

Further description of each habitat type is available in the European Commission Interpretation Manual[24] published in 2013.

11.3.1 Sandbanks which are slightly covered by sea water all the time (1110)

"Sandbanks are elevated, elongated, rounded or irregular topographic features, permanently submerged and predominantly surrounded by deeper water. They consist mainly of sandy sediments, but larger grain sizes, including boulders and cobbles, or smaller grain sizes including mud may also be present on a sandbank. Banks where sandy sediments occur in a layer over hard substrata are classed as sandbanks if the associated biota are dependent on the sand rather than on the underlying hard substrata.

"Slightly covered by sea water all the time" means that above a sandbank the water depth is seldom more than 20 m below chart datum. Sandbanks can, however, extend beneath 20 m below chart datum. It can, therefore, be appropriate to include in designations such areas where they are part of the feature and host its biological assemblages."

11.3.2 Estuaries (1130)

"Downstream part of a river valley, subject to the tide and extending from the limit of brackish waters.

River estuaries are coastal inlets where, unlike 'large shallow inlets and bays' there is generally a substantial freshwater influence. The mixing of freshwater and sea water and the reduced current flows in the shelter of the estuary lead to deposition of fine sediments, often forming extensive intertidal sand and mud flats. Where the tidal currents are faster than flood tides, most sediments deposit to form a delta at the mouth of the estuary.

Baltic river mouths, considered as an estuary subtype, have brackish water and no tide, with large wetland vegetation (helophytic) and luxurious aquatic vegetation in shallow water areas."

11.3.3 Mudflats and sandflats not covered by seawater at low tide (1140)

"Sands and muds of the coasts of the oceans, their connected seas and associated lagoons, not covered by sea water at low tide, devoid of vascular plants, usually coated by blue algae and diatoms. They are of particular importance as feeding grounds for wildfowl and waders. The diverse intertidal communities of invertebrates and algae that occupy them can be used to define subdivisions of 11.27, eelgrass communities that may be exposed for a few hours in the course of every tide have been listed under 11.3, brackish water vegetation of permanent pools by use of those of 11.4.

Note: Eelgrass communities (11.3) are included in this habitat type."

11.3.4 Coastal lagoons (1150)

"Lagoons are expanses of shallow coastal salt water, of varying salinity and water volume, wholly or partially separated from the sea by sand banks or shingle, or, less frequently, by rocks. Salinity may vary from brackish water to hypersalinity depending on rainfall, evaporation and through the addition of fresh seawater from storms, temporary flooding of the sea in winter or tidal exchange.

[24] European Commission, 2013. Interpretation manual of European Union habitats. EUR 28. European Commission, DG Environment, 144 p. https://inpn.mnhn.fr/docs/natura2000/Manuel_d_interpretation_EUR_28.pdf

With or without vegetation like *Ruppietea maritimae, Potametea, Zosteretea* or *Charetea* (CORINE 91: 23.21 or 23.22).

→ Flads and gloes, considered a Baltic variety of lagoons, are small, usually shallow, more or less delimited water bodies still connected to the sea or have been cut off from the sea very recently by land upheaval. Characterised by well-developed reedbeds and luxuriant submerged vegetation and having several morphological and botanical development stages in the process whereby sea becomes land.
→ Salt basins and salt ponds may also be considered as lagoons, providing they had their origin on a transformed natural old lagoon or on a saltmarsh, and are characterised by a minor impact from exploitation."

11.3.5 Large shallow inlets and bays (1160)

"Large indentations of the coast, in contrast to estuaries, the influence of freshwater is generally limited. These shallow 13 indentations are generally sheltered from wave action and contain a great diversity of sediments and substrates with a well developed zonation of benthic communities. These communities have generally a high biodiversity. The limit of shallow water is sometimes defined by the distribution of the *Zosteretea* and *Potametea* associations.

Several physiographic types may be included under this category providing the water is shallow over a major part of the area: embayments, fjards, rias and voes."

11.3.6 Reefs (1170)

"Reefs can be either biogenic concretions or of geogenic origin. They are hard compact substrata on solid and soft bottoms, which arise from the sea floor in the sublittoral and littoral zone. Reefs may support a zonation of benthic communities of algae and animal species as well as concretions and corallogenic concretions.

Clarifications:

→ *"Hard compact substrata"* are: rocks (including soft rock, e.g. chalk), boulders and cobbles (generally >64 mm in diameter).
→ *"Biogenic concretions"* are defined as: concretions, encrustations, corallogenic concretions and bivalve mussel beds originating from dead or living animals, i.e. biogenic hard bottoms which supply habitats for epibiotic species.
→ *"Geogenic origin"* means: reefs formed by non biogenic substrata.
→ *"Arise from the sea floor*" means: the reef is topographically distinct from the surrounding seafloor.
→ *"Sublittoral and littoral zone"* means: the reefs may extend from the sublittoral uninterrupted into the intertidal (littoral) zone or may only occur in the sublittoral zone, including deep water areas such as the bathyal.
→ Such hard substrata that are covered by a thin and mobile veneer of sediment are classed as reefs if the associated biota is dependent on the hard substratum rather than the overlying sediment.
→ Where an uninterrupted zonation of sublittoral and littoral communities exists, the integrity of the ecological unit should be respected in the selection of sites.
→ A variety of subtidal topographic features are included in this habitat complex such as:

Hydrothermal vent habitats, sea mounts, vertical rock walls, horizontal ledges, overhangs, pinnacles, gullies, ridges, sloping or flat bed rock, broken rock and boulder and cobble fields."

11.3.7 Submarine structures made by leaking gasses (1180)

"Submarine structures consist of sandstone slabs, pavements, and pillars up to 4 m high, formed by aggregation of carbonate cement resulting from microbial oxidation of gas emissions, mainly methane. The formations are interspersed with gas vents that intermittently release gas. The methane most likely originates from the microbial decomposition of fossil plant materials.

The first type of submarine structures is known as "bubbling reefs". These formations support a zonation of diverse benthic communities consisting of algae and/or invertebrate specialists of hard marine substrates different to that of the surrounding habitat. Animals seeking shelter in the numerous caves further enhance the biodiversity. A variety of sublittoral topographic features are included in this habitat such as: overhangs, vertical pillars and stratified leaf-like structures with numerous caves.

The second type is carbonate structures within "pockmarks". "Pockmarks" are depressions in soft sediment seabed areas, up to 45 m deep and a few hundred meters wide. Not all pockmarks are formed by leaking gases and of those formed by leaking gases; many do not contain substantial carbonate structures and are therefore not included in this habitat. Benthic communities consist of invertebrate specialists of hard marine substrata and are different from the surrounding (usually) muddy habitat. The diversity of the infauna community in the muddy slope surrounding the "pockmark" may also be high."

11.3.8 Submerged or partially submerged sea caves (8330)

"Caves situated under the sea or opened to it, at least at high tide, including partially submerged sea caves. Their bottom and sides harbour communities of marine invertebrates and algae."

11.4 Annex IV. Reporting under Habitats Directive and Birds Directive

11.4.1 Birds and Habitats Directive Reporting

Reporting concerns only species and habitat listed in annexes to these directives. These annexes do not focus only on marine ecosystems, but also on continental ecosystems. Therefore, the scope of Habitats and Birds Directives reporting concerning marine ecosystems is less than the scope of MSFD. The "Conservation Status" approach used in both Habitats and Birds Directives is different than the reporting required with MSFD or OSPAR frameworks. It is therefore interesting to compare the three, to know what kind of information is made available where.

11.4.1.1 *Habitats Directive (Habitats and species)*

Article 11 of the Habitats Directive requires Member States to monitor the habitats and species listed in the annexes (habitats in the Annex I and species in the Annexes II, IV and V), and Article 17 requires a report to be sent to the European Commission every 6 years following an agreed format. The core of the 'Article 17' report is assessment of conservation status of the habitats and species targeted by the directive. The assessment is made based on information on status and trends of species populations or habitats and on information on main pressures and threats. The report for the period 2007-2012 contained also information related to the impact of the Natura 2000 network and conservation measures. An important component of the Article 17 report is a map of habitat or species distribution mapped in 10x10 km grid.

(Source: https://bd.eionet.europa.eu/activities/Reporting/Article_17)

Under Habitats Directive, the categories for conservation status and their trends are the following:

→ Conservation Status Class : Favourable / Unfavourable – inadequate / Unfavourable – bad / Unkown
→ Conservation Status Trend (period 2007-2012) : Improving / Stable / Deteriorating / Unknown

Habitats and species are assessed by country and by biogeographical and marine regions. OSPAR IV region is part of the "Marine Atlantic" (MATL) region.

Assessments of habitats and species at EU 27 level or Member State level can be found on the 'Article 17 web tool on biogeographical assessments of conservation status of species and habitats under Article 17 of the Habitats Directive' (https://bd.eionet.europa.eu/article17/reports2012/)

11.4.1.2 *Birds Directive*

Population assessed at the EU level. Status classes used for birds are based on the scientific criteria developed to determine risks of extinction used to establish Species Red Lists by the International Union for the Conservation of Nature (IUCN).

→ EU Population Status Class: Secure/Near threatened, declining or depleted/ Threatened (i.e. vulnerable, endangered, critically endangered, regionally extinct)/ Unknown or not evaluated
→ Population Trend: Increasing/Stable/Fluctuating/Declining/Unknown

Latest available assessments on conservation status :

→ **Second Assessment of Conservation Status** based on established monitoring system. Reporting period 2007-2012, national reports 2013, EU synthesis 2015

→ **Third Assessment of Conservation Status**. Reporting period 2013-2018, national reports 2019, EU synthesis 2020.

11.5 Annex V. Conservation Status of marine habitats in Annex I to Habitats Directive (2007-2012, 'Marine Atlantic bioregion' in France, Spain and Portugal)

Information provided: Range, area, structure and functions, future prospect, and overall assessment (current status, precedent status)

Remark: The reporting under Habitats Directive is divided into bioregions. The 'Marine Atlantic bioregion' contains OSPAR Region IV, but also includes northern waters of France and Azores and Madeira for Portugal, which are all outside OSPAR IV. Therefore, this assessment does not exactly depict the situation for habitats in OSPAR IV Region.

11.5.1 FRANCE (Marine Atlantic bioregion)

The Marine Atlantic bioregion in France includes areas outside OSPAR IV Region.

Current selection: 2007-2012, Rocky habitats, France, Marine Atlantic.

Treated data from Member States reports

Habitat	Range (km²)				Area				Struct & func.	Future prosp.	Overall asses.				Areas from gridded maps(km²)			
	Surface	% MS	Trend	Ref.	Surface	% MS	Trend	Ref.			Curr. CS	Qualifier	Prev. CS	Nat. of ch.	Range	% MS	Distrib.	% MS
8330 - Submerged or partially sub…	1200	1.8	x	≈1200	3	0.1	x	≈3	XX	XX	XX		U1	c1	1200	6.1	1200	2.4

Legend: FV Favourable XX Unknown U1 Unfavourable-Inadequate U2 Unfavourable-Bad

Current selection: 2007-2012, Coastal habitats, France, Marine Atlantic.

Treated data from Member States reports

Habitat	Range (km²)				Area				Struct & func.	Future prosp.	Overall asses.				Areas from gridded maps(km²)			
	Surface	% MS	Trend	Ref.	Surface	% MS	Trend	Ref.			Curr. CS	Qualifier	Prev. CS	Nat. of ch.	Range	% MS	Distrib.	% MS
1110 - Sandbanks which are slight…	22400	10.2	0	x	10000	17.7	0	x	U2	U2	U2	-	U2	nc	22300	6.5	22300	15.1
1130 - Estuaries	6200	10.5	0	≈6200	6200	51.5	0	>6200	U2	U1	U2	=	U2	nc	4500	6.3	4500	7
1140 - Mudflats and sandflats not …	22500	22.2	0	≈22500	1705	15.3	0	≈1705	U1	U1	U1	=	U1	nc	22300	11.9	22300	12.9
1160 - Large shallow inlets and bays	8000	11.3	0	≈8000	4994	19.3	0	x	U2	U2	U2	x	U2	nc	8000	6.5	8000	7
1170 - Reefs	28600	7	0	≈28600	24208	12.7	x	≈24208	U1	U1	U1	x	U1	nc	27700	10.1	16900	3

Figure 68 : 2007-2012 Habitats Directive reporting for Coastal habitats (up) and Rocky habitats (down) in France (Marine Atlantic 'MATL' bioregion). No information on 1180 because it does not occur in France. (Source: EIOnet).

11.5.2 SPAIN (Marine Atlantic bioregion)

Current selection: 2007-2012, Rocky habitats, Spain, Marine Atlantic.

Treated data from Member States reports

Habitat	Range (km²)				Area				Struct & func.	Future prosp.	Overall asses.				Areas from gridded maps(km²)			
	Surface	% MS	Trend	Ref.	Surface	% MS	Trend	Ref.			Curr. CS	Qualifier	Prev. CS	Nat. of ch.	Range	% MS	Distrib.	% MS
8330 - Submerged or partially sub…	4723	7.1	0	≈4723	4723	99.9	0	≈4723	XX	XX	XX		XX		5200	26.3	5200	10.5

Legend: FV Favourable XX Unknown U1 Unfavourable-Inadequate U2 Unfavourable-Bad

Current selection: 2007-2012, Coastal habitats, Spain, Marine Atlantic.

Treated data from Member States reports

Habitat	Range (km²)				Area				Struct & func.	Future prosp.	Overall asses.				Areas from gridded maps(km²)			
	Surface	% MS	Trend	Ref.	Surface	% MS	Trend	Ref.			Curr. CS	Qualifier	Prev. CS	Nat. of ch.	Range	% MS	Distrib.	% MS
1110 - Sandbanks which are slight…	14141	6.4	0	≈14141	6110.75	10.8	0	≈6110.75	U1	FV	U1	+	XX	c1	15100	4.4	11500	7.8
1130 - Estuaries	9600	16.2	0	≈9600	201.97	1.7	x	x	U1	XX	U1	x	XX	c1	8000	11.2	8000	12.5
1140 - Mudflats and sandflats not …	9500	9.4	0	≈9500	40.35	0.4	+	>40.35	XX	U1	U1	x	XX	c1	14700	7.8	9900	5.7
1160 - Large shallow inlets and bays	7900	11.1	x	x	84	0.3	x	x	XX	XX	XX		XX		8500	7	8500	7.4
1170 - Reefs	35201	8.6	0	≈35201	12297.58	6.4	0	≈12297.58	XX	XX	XX		XX		36200	13.1	17700	3.1
1180 - Submarine structures made …	1000	4.8	0	≈1000	1000	94.3	0	≈1000	XX	XX	XX		XX		1000	2.6	1000	14.1

Figure 69 : 2007-2012 Habitats Directive reporting for Coastal habitats (up) and Rocky habitats (down) in Spain (Marine Atlantic 'MATL' bioregion). (Source: EIOnet12).

11.5.3 Portugal (Marine Atlantic bioregion)

The Marine Atlantic bioregion in France includes areas outside OSPAR IV Region.

Current selection: 2007-2012, Rocky habitats, Portugal, Marine Atlantic.

Treated data from Member States reports

Habitat	Range (km²)				Area				Struct & func.	Future prosp.	Overall asses.				Areas from gridded maps(km²)			
	Surface	% MS	Trend	Ref.	Surface	% MS	Trend	Ref.			Curr. CS	Qualifier	Prev. CS	Nat. of ch.	Range	% MS	Distrib.	% MS
8330 - Submerged or partially sub…	900	1.3	0	≈900	N/A	N/A	0	≈	XX	XX	XX		XX		900	4.5	900	1.8

Legend: FV Favourable XX Unknown U1 Unfavourable-Inadequate U2 Unfavourable-Bad

Current selection: 2007-2012, Coastal habitats, Portugal, Marine Atlantic.

Treated data from Member States reports

Habitat	Range (km²)				Area				Struct & func.	Future prosp.	Overall asses.				Areas from gridded maps(km²)			
	Surface	% MS	Trend	Ref.	Surface	% MS	Trend	Ref.			Curr. CS	Qualifier	Prev. CS	Nat. of ch.	Range	% MS	Distrib.	% MS
1110 - Sandbanks which are slight…	15500	7	0	≈15500	1444	2.6	0	≈1444	U1	U1	U1	-	XX	b1	15300	4.5	11200	7.6
1130 - Estuaries	7100	12	0	≈7100	N/A	N/A	-	>	U1	XX	U1	-	N/A	c1	7000	9.8	4400	6.9
1140 - Mudflats and sandflats not …	10100	10	0	≈10100	N/A	N/A	0	≈	U2	U2	U2	=	N/A	c1	10000	5.3	6400	3.7
1160 - Large shallow inlets and bays	1800	2.5	0	≈1800	105	0.4	0	≈105	U1	U1	U1	-	XX	b1	1800	1.5	1100	1
1170 - Reefs	35400	8.7	0	≈35400	4140	2.2	0	≈4140	U1	XX	U1	x	XX	b1	35300	12.8	26400	4.7

Figure 70 : 2007-2012 Habitats Directive reporting for Coastal habitats (up) and Rocky habitats (down) in Portugal (Marine Atlantic 'MATL' bioregion). No information is provided on 1180 because it does not occur in Portugal. (Source: EIOnet12).

11.6 Annex VI. OSPAR List of threatened and/or declining species in the OSPAR IV Region (2008-6)

Fish species affected by fishing in this list are marked with an asterisk (*). These species are subject to management by an international or national fisheries authority or body. The OSPAR Commission has no competence to adopt programmes or measures on questions relating to the management of fisheries. Where the OSPAR Commission considers that action is desirable in relation to such a question, it is to draw that question to the attention of the authority or international body competent for that question. The inclusion of species affected by fishing in this list must be read in this context.

SCIENTIFIC NAME	Common name		OSPAR Regions where the species occurs	OSPAR Regions where the species is under threat and/or in decline
	English	French		
INVERTEBRATES				
Nucella lapillus	Dog whelk	*Pourpre petite pierre*	**All**	**II, III, IV**
BIRDS				
Puffinus mauretanicus	Balearic shearwater	*Puffin des Baléares*	**II, III, IV, V**	**All where it occurs**
Sterna dougallii	Roseate tern	*Sterne de dougall*	**II, III, IV, V**	**All where it occurs**
Uria aalge – Iberian population (synonyms: *Uria aalge albionis, Uria aalge ibericus*)	Iberian guillemot	*Guillemot de Troïl*	**IV**	**All where it occurs**
FISH				
**Acipenser sturio*	Sturgeon	*Esturgeon d'Europe*	**II, IV**	**All where it occurs**
**Alosa* alosa	Allis shad	*Alose vraie ou Grande Alose*	**II, III, IV**	**All where it occurs**
**Anguilla anguilla*	European eel	*Anguille européenne*	**I, II, III, IV**	**All where it occurs**
**Centroscymnus coelolepis*	Portuguese dogfish	*Pailona commun*	**All**	**All where it occurs**
**Centrophorus granulosus*	Gulper shark	*Squale-chagrin commun*	**IV, V**	**All where it occurs**
**Centrophorus squamosus*	Leafscale gulper shark	*Petit squale*	**All**	**All where it occurs**
**Cetorhinus maximus*	Basking shark	*Requin pèlerin*	**All**	**All where it occurs**
**Dipturus batis* (synonym: *Raja batis*)	Common Skate	*Pocheteau gris*	**All**	**All where it occurs**
**Raja montagui* (synonym: Dipturus montagui)	Spotted Ray	*Raie douce*	**II, III, IV, V**	**All where it occurs**
Hippocampus guttulatus (synonym: *Hippocampus ramulosus*)	Long-snouted seahorse	*Cheval de mer(hippocampe) à long bec*	**II, III, IV, V**	**All where it occurs**
Hippocampus hippocampus	Short-snouted seahorse	*Cheval de mer (hippocampe) à museau court*	**II, III, IV, V**	**All where it occurs**
**Lamna nasus*	Porbeagle	Requin taupe	**All**	**All where it occurs**
Petromyzon marinus	Sea lamprey	*Lamproie marine*	**I, II, III, IV**	**All where it occurs**
Raja clavata	Thornback ray			
**Rostroraja alba*	White skate	*Raie à bec pointu*	**II, III, IV**	**All where it occurs**
**Salmo salar*	Salmon	*Saumon de l'Atlantique*	**I, II, III, IV**	**All where it occurs**
**Squalus acanthias*	[Northeast Atlantic] spurdog	*Aiguillat commun*	**All**	**All where it occurs**
**Squatina squatina*	Angel shark	*Ange de mer*	**II, III, IV**	**All where it occurs**

SCIENTIFIC NAME	Common name		OSPAR	OSPAR Regions
MAMMALS				
Balaenoptera musculus	Blue whale	*Baleine bleue*	**All**	**All where it occurs**
Eubalaena glacialis	Northern right whale	*Baleine franche noire*	**All**	**All where it occurs**
Phocoena phocoena	Harbour porpoise	*Marsouin commun*	**All**	**II, III AND IV**
REPTILES				
Caretta caretta	Loggerhead turtle	*Tortue caouanne*	**IV, V**	**All where it occurs**
Dermochelys coriacea	Leatherback turtle	*Tortue luth*	**All**	**All where it occurs**

* Fish species affected by fishing in this list are marked with an asterisk (*). These species are subject to management by an international or national fisheries authority or body. The OSPAR Commission has no competence to adopt programmes or measures on questions relating to the management of fisheries. Where the OSPAR Commission considers that action is desirable in relation to such a question, it is to draw that question to the attention of the authority or international body competent for that question. The inclusion of species affected by fishing in this list must be read in this context.

11.7 Annex VII. IUCN Conservation Status criteria

The International Union for the Conservation of Nature (IUCN) provides a IUCN Red List of Threatened Species, with information of the status, trends and threats to species. The Red List is recognized as the most comprehensice tool for assessing risk of species extinction. It provides assessment at different scope: global, regional and national.

→ Global Red List: http://www.iucnredlist.org/

→ Regional Red List (Europe) : http://www.iucnredlist.org/initiatives/europe Compiled information on European mammals is found in (Temple et Terry 2007)

→ National and Subnational Red Lists:

→ **France**. National and Subnational Red Lists. (http://uicn.fr/liste-rouge-france/)

→ **Spain**. National and Subnational Red Lists. *Libro rojo de los Vertebrados de Espana*

→ **Portugal**. National Red Lists. (M. J. Cabral et al. 2005)

11.7.1 IUCN Conservation Categories (Version 3.1 Second edition)

11.7.1.1 *EXTINCT (EX)*

A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

11.7.1.2 *EXTINCT IN THE WILD (EW)*

A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

11.7.1.3 *CRITICALLY ENDANGERED (CR)*

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V), and it is therefore considered to be facing an extremely high risk of extinction in the wild.

11.7.1.4 *ENDANGERED (EN)*

A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V), and it is therefore considered to be facing a very high risk of extinction in the wild.

11.7.1.5 *VULNERABLE (VU)*

A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V), and it is therefore considered to be facing a high risk of extinction in the wild.

11.7.1.6 *NEAR THREATENED (NT)*

A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

11.7.1.7 *LEAST CONCERN (LC)*

A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

11.7.1.8 *DATA DEFICIENT (DD)*

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

11.7.1.9 *NOT EVALUATED (NE) :*

A taxon is Not Evaluated when it is has not yet been evaluated against the criteria

11.8 Annex VIII. Marine mammal species in OSPAR Region IV

	Family	Scientific name	Common name (English, French, Spanish, Portuguese)	Regulatory status						Conservation status IUCN					Presence status	
				Berne	Bonn	CITES	Habitats Directive	OSPAR threatened	Other (national?)	Global scope	Europe scope	France (métropole)	Spain	Portugal (mainland)	Bay of Biscay	Iberian coasts (Portugal)
Pinnipeds	Odobénidés	*Odobenus rosmarus*	Walrus Morse Morsa	II	no			no		VU	N.A.			/	H	
	Phocidae	*Erignathus barbatus*	Bearded Seal Phoque barbu Foca Barbuda	III	no		V	no		LC	N.A.			N.A.	O	
	Phocidae	*Cystophora cristata*	Hooded Seal Phoque à capuchin	III	no		V	no		VU	N.A.			N.A.	O	
	Phocidae	*Halichoerus grypus*	Grey seal, Phoque gris, Foca gris Foca cinzenta	III	II		II, V	no	Protected in France		LC	VU		N.A.	R (permanent colonies north of the Bay)	
	Phocidae	*Pagophilus groenlandicus*	Harp Seal Phoque du Groenland Foca pia Foca da Gronelandia	III	no			no		LC	N.A.			/	O	
	Phocidae	*Phoca vitulina*	Harbor seal, Phoque commun ou veau-marin, Foca moteada	III	No*	II, V		no	Protected in Portugal		LC			N.A.	R (no permanent colonies in the Bay of Biscay)	
	Phocidae	*Pusa hispida*	Ringed Seal Phoque annelé	III	no			no			LC			N.A.	O	
Cetaceans mysticeti	Balenidae	*Eubalaena glacialis*	Northern Right Whale, Baleine franche de l'Atlantique nord, Ballena Franca del Norte Baleia-basca	II	I	I	IV	yes*		EN	CR	RE		N.A.	Disappeared from Northeast Atlantic	
	Balenopteridae	*Balaenoptera acutorostrata*	Minke whale, Petit roqual, Ballena minle común Baleia-anã	III	no	I	IV	no	Protected in France	LC	LC	LC		VU		Resident
	Balenopteridae	*Balaenoptera borealis*	Rorqual boreal Baleia-sardinheira	III	I&II	I	IV	no		EN	EN	DD		N.A.	P	Occasional
	Balenopteridae	*Balaenoptera musculus*	Blue whale Baleine bleue Baleia-azul	II	I	I	IV	yes*			EN			N.A.	O	Occasional
	Balenopteridae	*Balaenoptera physalus*	Fin whale Rorqual commun Baleia-comum	II	I&II	I	IV	no		EN	NT	NT		EN	R	Visitor

	Family	Scientific name	Common name (English, French, Spanish, Portuguese)	Regulatory status						Conservation status IUCN					Presence status	
				Berne	Bonn	CITES	Habitats Directive	OSPAR threatened	Other (national?)	Global scope	Europe scope	France (métropole)	Spain	Portugal (mainland)	Bay of Biscay	Iberian coasts (Portugal)
	Balenopteridae	*Megaptera novaeangliae*	Humpback whale Baleine à bosse Baleia-de-bossa	II	I	I	IV	no			LC			N.A.	P	Occasional
Cetaceans odontoceti	Physeteridae	*Physeter macrocephalus*	Sperm whale, Cachalot, Ballena Esperma/Cachalote Cachalote	III	I&II	I	IV	no		VU	VU	VU		N.A.	P	Occasional
	Kogiidae	*Kogia breviceps*	Pigmy sperm whale, Cachalot pygmée, Cachalote Cabeza Chica Cachalote-pigmeu	II	no	II	IV	no	Protected in France	DD	N.A	DD		DD	P	
	Kogiidae	*Kogia sima*	Dwarf sperm whale Cachalot nain Cachalote Enano	III	no		IV	no		DD	Not N.A.			/	O	
	Ziphiidae	*Ziphius cavirostris*	Cuvier's beaked whale Baleine à bec de Cuvier Zífio	II	No*	II	IV	no		LC	DD	DD		DD	R	
	Ziphiidae	*Hyperoodon ampullatus syn. H. rostratus*	Hypérodon boréal	II	II	I	IV	no		DD	DD	DD	-	/	O	-
	Ziphiidae	*Mesoplodon mirus*	Mésoplodon de True	II	no			no			DD			/	H	
	Ziphiidae	*Mesoplodon bidens*	Sowerby's beaked whale Baleia-de-bico Mésoplodon de Sowerby	II	no	II	IV	no		DD	DD	DD		/	P	
	Ziphiidae	*Mesoplodon densirostris*	Mésoplodon de Blainville	III	no	II	IV	no			DD			/	O	
	Ziphiidae	*Mesoplodon europaeus*	Mésoplodon de Gervais	III	no	II	IV	no			DD			/	H	
	Delphinidae	*Lagenorhynchus albirostris*	White-beaked dolphin Lagénorhynque à bec blanc	II	No*		IV	no		LC	LC	DD		/	R	
	Delphinidae	*Lagenorhynchus acutus*	Atlantic white-sided dolphin Lagénorhynque à flancs blancs de l'Atlantique Delfín de flancos blancos / Delfín del Atlantico	II	No*		IV	no		LC	LC	DD		/	O	
	Delphinidae	*Orcinus orca*	Killer whale Orque	II	II	II	IV	no			DD			DD	P	
	Delphinidae	*Delphinus delphis*	Common dolphin, Dauphin commun, Delfín común Golfinho-comum	II	No*	II	IV	no		LC	DD	LC		LC	R	

	Family	Scientific name	Common name (English, French, Spanish, Portuguese)	Regulatory status						Conservation status IUCN					Presence status	
				Berne	Bonn	CITES	Habitats Directive	OSPAR threatened	Other (national?)	Global scope	Europe scope	France (métropole)	Spain	Portugal (mainland)	Bay of Biscay	Iberian coasts (Portugal)
	Delphinidae	*Lagenodelphis hosei*	Fraser's dolphin Dauphin de Fraser	III	No*			no		LC	DD			/	H	
	Delphinidae	*Stenella coeruleoalba*	Striped dolphin Dauphin bleu et blanc Delfín Blanco y Azul/ Delfín Listado Golfinho-riscado	II	No*	II	IV	no	Protected in France	LC	DD	LC		LC	R	Resident
	Delphinidae	*Stenella frontalis*	Dauphin tacheté de l'Atlantique	III	no	II	IV	no			DD			/	O	Resident Banco gorringe (Portugal)
	Delphinidae	*Steno bredanensis*	Rough-toothed dolphin Sténo Delfín de Pico Largo	II	no	II	IV	no		LC	N.A.			-	H	-
	Delphinidae	*Tursiops truncatus*	Bottlenose dolphin Grand dauphin Delfin mular Roaz	II	No*	II	II, IV	no		LC	DD	LC		LC	R	
	Delphinidae	*Globicephala melas*	Long-finned pilot whale, Globicéphale noir/ Dauphin pilote, Calderón Negro /Ballena piloto Baleia-piloto,	II	No*	II	IV	no		DD	DD	LC		DD	R	
	Delphinidae	*Globicephala macrorhynchus*	Short-finned Pilot Whale, Globicéphale tropical, Calderón tropical	II	no	II	IV	no	Protected in France	DD				/	O	
	Delphinidae	*Feresa attenuata*	Pigmy Killer Whale, Orque pygmée, Orca Pigmeo	III	no		IV	no		DD					H	
	Delphinidae	*Grampus griseus*	Risso's dolphin, Dauphin de Risso, Calderón gris/Delfín de Risso, Grampo	II	No*	II	IV	no	Protected in France	LC		DD		DD	R	Resident
	Delphinidae	*Peponocephala electra*	Péponocéphale	III	no			no		LC	N.A.			/	O	
	Delphinidae	*Pseudorca crassidens*	Pseudorque Falsa-orca	II	no	II	IV	no		DD	N.A			N.A.	O	Occasional
	Phocoenides	*Phocoena phocoena*	Harbour Porpoise Marsouin commun Marsopa Común Boto	II	No*	II	IV	yes*	Protected in Portugal	LC	VU	NT		VU	R	Resident

Occurrence status for Bay of Biscay extracted from (Savouré-Soubelet et al. 2016):

→ P: presence with undetermined regularity,
→ R: presence with regularity,
→ O: occasional or erratic presence,
→ H: observation previous to 2000,
→ B: presence according to bibliography but no occurrence data.

Occurrence status for Iberian coasts extracted from Portugal national Red List (mainland) and completed with MSFD information

→ Yes*: the species is listed in OSPAR List of Threatened and/or declining species and is in addition mentioned as 'under threat or decline' in OSPAR Region IV.
→ No* : the species is listed in one of Bonn Appendix but only for one or several sub-populations, that are not within OSPAR Region IV

IUCN:

→ (-): mentioned as such in national red list
→ /: species not present in national red list

11.9 Annex IX. Main regulatory instruments concerning marine mammals

11.9.1 International (non- EU) conventions and agreements

Regulatory instruments for marine mammals in OSPAR Region IV include international (non-EU) conventions such as:

- → Convention on Biological Diversity (CBD, 1992)
- → Convention on the Conservation of Migratory Species of Wild Animals (CMS, referred to as Bonn Convention, 1979) (*)
- → Bern Convention on the Conservation of European Wildlife and Natural Habitats (referred to as Bern Convention, 1979) (**)
- → OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic (1992) (***)
- → Washington Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973) (***)

(*) One legally binding Agreement under Bonn Convention concerns OSPAR Region IV: Agreement on the Conservation of Small Cetaceans in the Baltic, North East Atlantic, Irish and North Seas (ASCOBANS, 1992). A Conservation and Management Plan is forming an Annex of this Agreement.

(**) As a signatory, the European Union meets its obligation under Bern Convention by means of the Directive 2009/147/EC on the conservation of wild birds (the Birds Directive, not concerning marine mammal species) and the Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive).

(***) The OSPAR Biological Diversity and Ecosystems Strategy sets out that the OSPAR Commission will assess which species and habitats need to be protected. The OSPAR List of Threatened and/or Declining Species and Habitats has been developed to fulfil this commitment.

(****) Species covered under CITES are listed in three Appendices according to the level of protection or regulation of trade they need. Each Party designates Management Authority which issues import and export permits for CITES-listed species.

11.9.2 European Union legislation

Marine mammal species are concerned by the following instruments:

- → Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive).
- → Directive 2008/56/EC on establishing a framework for community action in the field of marine environmental policy - known as the Marine Strategy Framework Directive (MSFD)
- → Regulation CE n°812-2004 of the Council 26 April 2004 laying down measures concerning incidental catches of cetaceans in fisheries and amending Regulation No 88/98. (*)
- → Regulation 2015/1775 of European Parliament and Council of October, 6th 2015 on trade of seal products

(*) Measures include compulsory onboard observers for given fisheries, and mandatory use of acoustic deterrent devices (‘pingers’) in certain fisheries

11.9.3 National regulation

11.9.3.1 *France*

- → **Arrêté du 27 juillet 1995** modifié fixant la liste des mammifères marins protégés sur le territoire national (JO, 1er oct.). Application in mainland and overseas territories.
- → **Reglementations implemented by MPA’s**
  - **Noise limitation ex : the Iroise parc forbidded** jets ski

- **Awareness actions for general public**

→ **Label " High Quality Whale Watching"**:Identified the operators implicated in an enviromnental process (in Pelagos and ACCOBAMS). Manage by the association "Souffleurs d'écume".

→ **Charter on good behaviours in zodiacs**

11.9.3.2 *Spain*

→ **Ley de Protección del Patrimonio Natural y la Biodiversidad (42/2007)**

→ **Ley 41/2010, de 29 de diciembre, de protección del medio marino**

11.10 Annex X. Marine bird species in OSPAR Region IV

Name	French Name	CCA	CDO1	IBE1	IOS5	IAAP	IBO1	IBA2
Number of species		*11*	*89*	*172*	*7*	*1*	*134*	*12*
Gavia adamsii	Plongeon E bec blanc			1			1	
Gavia arctica	Plongeon arctique		1	1			1	
Gavia immer	Plongeon imbrin		1	1			1	
Podiceps cristatus	Grèbe huppé			1			1	
Podiceps grisegena	Grèbe jougris			1			1	
Podiceps auritus	Grèbe esclavon		1	1			1	
Podiceps nigricollis	Grèbe E cou noir			1			1	
Tachybaptus ruficollis	Grèbe castagneux			1			1	
Diomedea exulans	Albatros hurleur, Grand albatros			1		1	1	
Fulmarus glacialis	Pétrel fulmar, Fulmar boréal			1				
Bulweria bulwerii	Pétrel de Bulwer		1	1				
Calonectris diomedea	Puffin cendré, Puffin de Scopoli		1	1				1
Puffinus assimilis	Petit puffin, Puffin semblable		1	1				
Puffinus griseus	Puffin fuligineux			1				
Puffinus puffinus	Puffin des Anglais			1				
Puffinus yelkouan	Puffin yelkouan		1	1				1
Anas bahamensis	Canard des Bahamas, Pilet des Bahamas						1	
Mareca penelope	Canard siffleur	1	1	1			1	
Anas crecca	Sarcelle d'hiver	1	1	1			1	
Anas platyrhynchos	Canard colvert		1	1			1	
Spatula clypeata	Canard souchet	1	1	1			1	
Anas acuta	Canard pilet	1	1	1			1	
Netta rufina	Nette rousse		1	1			1	
Aythya ferina	Fuligule milouin		1	1			1	
Aythya nyroca	Fuligule nyroca	1	1	1			1	
Aythya fuligula	Fuligule morillon		1	1			1	
Aythya marila	Fuligule milouinan		1	1			1	
Somateria mollissima	Eider E duvet		1	1			1	
Gavia stellata	Plongeon catmarin		1	1			1	
Hydrobates pelagicus	Pétrel tempEte, Océanite tempEte		1	1				1
Morus bassanus	Fou de Bassan			1				
Phalacrocorax carbo	Grand Cormoran			1			1	
Phalacrocorax aristotelis	Cormoran huppé			1				1
Phalacrocorax pygmaeus	Cormoran pygmée		1	1			1	1
Pelecanus onocrotalus	Pélican blanc		1	1			1	1
Pelecanus crispus	Pélican frisé	1	1	1			1	1
Fregata magnificens	Frégate superbe			1				
Egretta garzetta	Aigrette garzette	1	1	1			1	
Ardea alba	Grande Aigrette	1	1	1			1	
Platalea leucorodia	Spatule blanche	1	1	1			1	
Limnodromus griseus	Limnodrome E bec court, Bécassin roux			1			1	
Limosa limosa	Barge E queue noire		1	1			1	
Limosa lapponica	Barge rousse		1	1			1	
Numenius phaeopus	Courlis corlieu		1	1			1	
Numenius tenuirostris	Courlis E bec grEle	1	1	1			1	1
Numenius arquata	Courlis cendré		1	1			1	
Tringa erythropus	Chevalier arlequin		1	1			1	

Tringa totanus	Chevalier gambette		1	1			1	
Tringa stagnatilis	Chevalier stagnatile			1			1	
Tringa nebularia	Chevalier aboyeur		1	1			1	
Tringa melanoleuca	Grand Chevalier E pattes jaunes, Chevalier criard			1			1	
Tringa flavipes	Petit Chevalier E pattes jaunes, Chevalier E pattes jaunes			1			1	
Tringa ochropus	Chevalier culblanc			1			1	
Tringa solitaria	Chevalier solitaire			1			1	
Tringa glareola	Chevalier sylvain		1	1			1	
Xenus cinereus	Bargette du Térek, Chevalier bargette		1	1			1	
Actitis hypoleucos	Chevalier guignette			1			1	
Cygnus olor	Cygne tuberculé		1	1			1	
Cygnus columbianus	Cygne de Bewick			1			1	
Cygnus cygnus	Cygne chanteur		1	1			1	
Anser fabalis	Oie des moissons		1	1			1	
Anser brachyrhynchus	Oie E bec court		1	1			1	
Anser albifrons	Oie rieuse		1	1			1	
Anser anser	Oie cendrée		1	1			1	
Branta canadensis	Bernache du Canada		1	1			1	
Branta leucopsis	Bernache nonnette		1	1			1	
Branta bernicla	Bernache cravant		1	1			1	
Tadorna tadorna	Tadorne de Belon			1			1	
Somateria spectabilis	Eider E tEte grise			1			1	
Clangula hyemalis	Harelde de Miquelon, Harelde boréale		1	1			1	
Melanitta nigra	Macreuse noire		1	1			1	
Melanitta perspicillata	Macreuse E front blanc			1			1	
Melanitta fusca	Macreuse brune		1	1			1	
Mergus serrator	Harle huppé		1	1			1	
Mergus merganser	Harle bièvre		1	1			1	
Calidris ferruginea	Bécasseau cocorli			1			1	
Calidris maritima	Bécasseau violet			1			1	
Calidris alpina	Bécasseau variable			1			1	
Calidris subruficollis	Bécasseau rousset, Bécasseau roussEtre			1			1	
Haematopus ostralegus	HuEtrier pie		1	1			1	
Himantopus himantopus	Echasse blanche		1	1			1	
Recurvirostra avosetta	Avocette élégante		1	1			1	
Charadrius hiaticula	Grand Gravelot			1			1	
Charadrius alexandrinus	Gravelot E collier interrompu, Gravelot de Kent		1	1			1	
Charadrius vociferus	Gravelot kildir, Pluvier kildir			1			1	
Pluvialis dominica	Pluvier bronzé			1			1	
Pluvialis apricaria	Pluvier doré		1	1			1	
Pluvialis squatarola	Pluvier argenté		1	1			1	
Pluvialis fulva	Pluvier fauve			1			1	
Vanellus vanellus	Vanneau huppé		1	1			1	
Calidris canutus	Bécasseau maubèche		1	1			1	
Calidris alba	Bécasseau sanderling			1			1	
Calidris pusilla	Bécasseau semipalmé			1			1	
Calidris mauri	Bécasseau d'Alaska			1			1	
Calidris minuta	Bécasseau minute			1			1	
Calidris temminckii	Bécasseau de Temminck			1			1	
Calidris minutilla	Bécasseau minuscule			1			1	
Calidris fuscicollis	Bécasseau de Bonaparte, Bécasseau E croupion blanc			1			1	
Calidris bairdii	Bécasseau de Baird			1			1	

Calidris melanotos	Bécasseau tacheté, Bécasseau E poitrine cendrée			1			1	
Calidris acuminata	Bécasseau E queue pointue			1			1	
Arenaria interpres	Tournepierre E collier			1			1	
Phalaropus lobatus	Phalarope E bec étroit		1	1			1	
Steganopus tricolor	Phalarope de Wilson			1			1	
Phalaropus fulicarius	Phalarope E bec large			1			1	
Stercorarius pomarinus	Labbe pomarin			1				
Stercorarius parasiticus	Labbe parasite			1				
Stercorarius longicaudus	Labbe E longue queue			1				
Stercorarius skua	Grand Labbe			1				
Larus delawarensis	Goéland E bec cerclé			1				
Larus cachinnans	Goéland pontique		1	1			1	
Larus canus	Goéland cendré		1	1			1	
Larus fuscus	Goéland brun		1				1	
Larus argentatus	Goéland argenté		1				1	
Larus glaucoides	Goéland E ailes blanches, Goéland arctique			1			1	
Larus hyperboreus	Goéland bourgmestre			1			1	
Larus marinus	Goéland marin		1				1	
Rhodostethia rosea	Mouette de Ross			1				
Rissa tridactyla	Mouette tridactyle			1	1			
Pagophila eburnea	Mouette ivoire, Goéland sénateur, Mouette blanche			1	1			
Gelochelidon nilotica	Sterne hansel		1	1			1	
Hydroprogne caspia	Sterne caspienne		1	1			1	
Sterna hirundo	Sterne pierregarin		1	1			1	
Sterna paradisaea	Sterne arctique		1	1			1	
Sternula albifrons	Sterne naine		1	1			1	1
Thalasseus elegans	Sterne élégante			1				
Thalasseus bengalensis	Sterne voyageuse			1			1	1
Thalasseus sandvicensis	Sterne caugek		1	1			1	1
Sterna dougallii	Sterne de Dougall		1	1	1		1	
Chlidonias niger	Guifette noire		1	1			1	
Chlidonias leucopterus	Guifette leucoptère			1			1	
Uria aalge	Guillemot de Troïl		1	1	1			
Uria lomvia	Guillemot de BrEnnich			1	1			
Alca torda	Petit pingouin, Pingouin torda			1				
Cepphus grylle	Guillemot E miroir			1				
Alle alle	Mergule nain			1				
Fratercula arctica	Macareux moine			1				
Polysticta stelleri	Eider de Steller		1	1	1		1	
Melanitta americana	Macreuse E bec jaune			1			1	
Melanitta deglandi	Macreuse E ailes blanches			1			1	
Mergellus albellus	Harle piette		1	1			1	
Pterodroma madeira	Pétrel de Madère		1	1				
Puffinus mauretanicus	Puffin des Baléares		1	1	1		1	
Phalacrocorax auritus	Cormoran E aigrettes			1				
Calidris ruficollis	Bécasseau E cou roux			1			1	
Charadrius pecuarius	Gravelot pEtre			1			1	
Larus michahellis	Goéland leucophée			1				
Sterna forsteri	Sterne de Forster			1				
Xema sabini	Mouette de Sabine			1			1	
Puffinus lherminieri	Puffin d'Audubon			1				
Pseudobulweria aterrima	Pétrel noir de Bourbon							
Thalassarche melanophris	Albatros E sourcils noirs			1			1	

Calidris himantopus	Bécasseau E échasses, Bécasseau échasse			1			1	
Chlidonias hybrida	Guifette moustac		1	1			1	
Onychoprion fuscatus	Sterne fuligineuse			1				
Thalasseus maximus	Sterne royale			1			1	
Chroicocephalus ridibundus	Mouette rieuse		1	1			1	
Onychoprion anaethetus	Sterne bridée			1				
Chroicocephalus genei	Goéland railleur		1	1			1	
Chroicocephalus philadelphia	Mouette de Bonaparte			1				
Hydrocoloeus minutus	Mouette pygmée		1	1			1	
Larus smithsonianus	Goéland hudsonien, Goéland d'Amérique			1				
Pterodroma feae	Pétrel gongon		1	1				
Tringa semipalmata	Chevalier semipalmé			1			1	
Leucophaeus atricilla	Mouette atricille			1				
Leucophaeus pipixcan	Mouette de Franklin			1				
Ichthyaetus ichthyaetus	Goéland ichthyaète			1			1	
Ichthyaetus audouinii	Goéland d'Audouin		1	1			1	1
Ichthyaetus melanocephalus	Mouette mélanocéphale		1	1			1	
Hydrobates castro	Pétrel de Castro, Océanite de Castro		1	1				
Hydrobates leucorhous	Pétrel cul-blanc, Océanite cul-blanc		1	1				
Ardenna gravis	Puffin majeur			1				
Calidris pugnax	Chevalier combattant, Combattant varié		1	1			1	
Hydrobates monorhis	Pétrel de Swinhoe, Océanite de Swinhoe			1				
Calidris falcinellus	Bécasseau falcinelle			1			1	
Mareca strepera	Canard chipeau		1	1			1	
Spatula querquedula	Sarcelle d'été	1	1	1			1	

Code	Legislation	URL	Year
CCA	Convention on International Trade in Endangered Species of Wild Fauna and Flora, also known as the Washington Convention	http://eur-lex.europa.eu/legal-content/FR/TXT/?qid=1413449131738&uri=CELEX:01997R0338-20130810	1997
CDO1	Directive 79/409/CEE (Bird Directive)	http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal	1979
IBE1	Berne Convention on the Conservation of European Wildlife and Natural Habitats	http://conventions.coe.int/Treaty/fr/Treaties/Html/104.htm	1979
IOS5	Convention for the Protection of the Marine Environment of the North-East Atlantic or OSPAR Convention	http://www.ospar.org/convention	1992
IAAP	Agreement on the Conservation of Albatrosses and Petrels	http://legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000811052	2001
IBA2	Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean	http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000416310&dateTexte=&categorieLien=id	1995
IBO1	Convention on the Conservation of Migratory Species of Wild Animals -- more commonly abbreviated to just the Convention on Migratory Species (CMS) or the Bonn Convention	http://www.cms.int/documents/convtxt/cms_convtxt_french.pdf	1979

Table 41: List of Protected Marine Birds at an international level and the implicated legislation.

Scientific name	Common name	Conservation status (IUCN)	
		World	Europe
Alca torda	Razorbill	NT	NT
Anas clypeata (Spatula clypeata)	Northern shoveler		LC
Anas Penelope (Mareca penelope)	Eurasian wigeon		LC

Anas plathyrhynchos			LC
Anser albifrons albifrons			
Anser albifrons flavirostris	Greenland white-fronted goose		
Ardea purpurea			LC
Aythya marila	Greater Scaup	LC	
Branta leucopsis	Barnacle Goose		LC
Branta ruficollis	Red-breated Goose		NT
Bucephala clangula	Common Goldeneye	LC	
Bulweria bulwerii	Bulwer's Petrel	LC	LC
Burhinus oedicnemus			LC
Calidris alpina schinzii	Dunlin		LC
Calidris canutus	Red Knot		LC
Calonectris diomedea	Scopoli's shearwater	LC	LC
Calonectris borealis	Cory's Shearwater	LC	LC
Catharacta skua	Great Skua	LC	LC
Charadrius alexandrinus	Kentish Plover		LC
Charadrius dubius	Little Ringed Plover		LC
Chlidonias hybrida	Whiskered Tern		LC
Chlidonias niger	Black Tern	LC	LC
Ciconia ciconia	White Stork		LC
Circaetus gallicus	Short-toed Snake-eagle		LC
Circus aeruginosus	Western Marsh-harrier		LC
Clangula hyemalis	Long-tailed Duck	VU	VU
Columba livia	Rock dove		LC
Cygnus cygnus	Whooper Swan		LC
Egretta garzetta	Little Egret		LC
Falco eleonorae	Eleonora's Falcon		LC
Falco peregrinus	Peregrine Falcon		LC
Fratercula arctica	Atlantic Puffin	VU	EN
Fulmarus glacialis	Northern Fulmar	LC	EN
Gavia arctica	Black-throated diver		LC
Gavia immer	Great Northern diver	LC	VU
Gavia stellata	Red-throated diver	LC	LC
Haematopus ostralegus			VU
Haliaeetus albicilla	White-tailed eagle		LC
Hieraaetus fasciatus (Hieraaetus pennatus, Aquila fasciata)			NT
Himantopus himantopus	Black-winged Stilt		LC
Hydrobates castro (Oceanodroma castro)	Band-rumped Storm-petrel		LC
Hydrobates leucorhous (Oceanodroma leucorhoa)	Leach's Storm-petrel	VU	LC
Hydrobates pelagicus	European Storm-petrel	LC	LC
Ixobrychus minutus	Common Little Bittern		LC
Larus argentatus	European Herring Gull	LC	NT
Larus audouinii	Audouin's Gull	LC	LC
Larus cachinnans	Caspian Gull		LC
Larus canus	Mew Gull	LC	
Larus fuscus fuscus	Lesser Balck-backed Gull		LC
Larus marinus	Great Black-backed gull	LC	LC
Larus melanocephalus	Mediterranean Gull	LC	LC
Larus michaellis	Yellow-legged Gull	LC	LC
Larus minutus (Hydrocoloeus minutus)	Little Gull	LC	NT
Larus ridibundus	Black-headed Gull	LC	LC
Larus sabinii (Xena sabini)	Sabine's Gull	LC	LC
Limosa lapponica	Bar-tailed Godwit		LC
Melanitta fusca	Velvet Scoter		VU
Melanitta nigra	Common Scoter	LC	LC
Mergus albellus (Mergellus albellus)	Smew		LC
Morus bassanus	Northern Gannet	LC	LC
Netta rufina	Red-crested Pochard		LC
Oceanites oceanicus	Wilson's Storm-petrel	LC	LC
Oceanites sp			
Pandion haliaetus	Osprey		LC
Pelagodroma marina	White-faced Storm-petrel	LC	EN
Phalacrocorax aristotelis	European Shag	LC	LC
Phalacrocorax carbo	Great Cormorant	LC	LC
Phalaropus lobatus	Red-necked Phalarope		LC
Philomachus pugnax (Calidris pugnax)	Ruff		LC
Platalea leucorodia	European Spoonbill		LC
Pluvialis apricaria	Eurasia Golden Plover		LC

Pluvialis squatarola	Grey Plover		LC
Podiceps auritus	Horned Grebe		NT
Podiceps cristatus	Great Crested Grebe	LC	
Podiceps nigricollis	Black-necked Grebe	LC	
Porphyrio porphyrio	Purple Swamphen		LC
Pterodroma deserta	Desertas Petrel	VU	VU
Pterodroma madeira	Zino's Petrel	EN	
Puffinus gravis (syn. Ardenna gravis)	Great Shearwater	LC	LC
Puffinus griseus (Ardenna grisea)	Sooty Shearwater	NT	NT
Puffinus assimilis baroli	Little shearwater		Not assessed
Puffinus mauretanicus	Balearic Shearwater	CR	CR
Puffinus puffinus	Manx Shearwater	LC	LC
Puffinus yelkouan	Yelkouan Shearwater		LC
Pyrrhocorax pyrrhocorax	Red-billed Chough		LC
Recurvirostra avosetta	Pied avocet		LC
Rissa tridactyla	Black-legged Kittiwake	LC	LC
Somateria mollissima	Common Eider		NT
Stercorarius parasiticus	Arctic skua or Arctic Jaeger	LC	LC
Stercorarius pomarinus	Pomarine skua or Pomarinus Jaeger	LC	LC
Stercorarius skua (syn. Catharacta skua)	Great Skua		LC
Sterna albifrons	Little Tern	LC	LC
Sterna caspia (hydroprogne caspia)	Caspian Tern		LC
Sterna dougallii	Roseate Tern	LC	LC
Sterna hirundo	Common Tern	LC	LC
Sterna nilotica (Gelochelidon nilotica)	Gull-billed Tern		LC
Sterna paradisaea	Arctic Tern	LC	LC
Sterna sandvicensis (syn. Thalasseus sandvicensis)	Sandwich Tern	LC	LC
Streptopelia decaocto	Eurasian Collared-dove		LC
Tetrax tetrax	Little Bustard		NT
Tringa glareola	Wood Sandpiper		LC
Uria aalge	Common Murre	LC	LC
Vanellus vanellus	Northern Lapwing		NT
Xenus cinereus (Tringa cinerea)	Terek Sandpiper		LC

Table 42 : Table of UICN World and European classification of marine birds

11.11 Annex XI. Ranking of conservation challenge for elasmobranch species in French Altantic waters

Rank	Scientific name (ICES area)	French common name	*ICES type of stock*	*ICES score*	*IUCN score*	Conservation Status indicator	Biological vulnerability indicator	Marine subregion responsibility indicator	Global score
1	*Rostroraja alba*	Raie blanche	*6*	*6*	*6*	**6**	**8**	**11**	**220**
2	*Squatina squatina*	Ange de mer commun	*6*	*6*	*6*	**6**	**9**	**9**	**189**
3	*Dipturus batis cf. intermedia (VII)*	"grand Pocheteau gris "	*6*	*6*	*6*	**6**	**8**	**9**	**180**
3	*Dipturus batis cf. intermedia (VIII)*	"grand Pocheteau gris "	*6*	*6*	*6*	**6**	**8**	**9**	**180**
4	*Dipturus batis cf. flossada (VII)*	"petit Pocheteau gris"	*6*	*6*	*6*	**6**	**7**	**9**	**171**
4	*Dipturus batis cf. flossada (VIII)*	"petit Pocheteau gris"	*6*	*6*	*6*	**6**	**7**	**9**	**171**
5	*Dipturus nidarosiensis (VII)*	Pocheteau de Norvège	*6*	*6*	*3*	**6**	**7**	**7**	**133**
5	*Dipturus oxyrinchus (VII)*	Pocheteau noir	*6*	*6*	*2*	**6**	**7**	**7**	**133**
6	*Echinorhinus brucus*	Squale bouclé			*3*	**3**	**10**	**7**	**112**
7	*Cetorhinus maximus*	Requin-pèlerin	*6*	*5*	*4*	**5**	**12**	**5**	**110**
8	*Myliobatis aquila*	Aigle de mer commun			*3*	**3**	**11**	**6**	**102**
8	*Torpedo nobiliana*	Torpille noire			*3*	**3**	**11**	**6**	**102**
9	*Alopias vulpinus*	Requin-renard commun	*6*	*4*	*3*	**4**	**12**	**5**	**100**
9	*Lamna nasus*	Requin-taupe commun	*6*	*4*	*5*	**4**	**12**	**5**	**100**
9	*Prionace glauca*	Requin peau bleue	*4*	*4*	*2*	**4**	**12**	**5**	**100**
10	*Leucoraja circularis (VII)*	Raie circulaire	*5*	*4*	*3*	**4**	**6**	**7**	**98**
10	*Leucoraja circularis (VIII)*	Raie circulaire	*5*	*4*	*3*	**4**	**6**	**7**	**98**
10	*Leucoraja fullonica (VII)*	Raie chardon	*5*	*4*	*3*	**4**	**6**	**7**	**98**
10	*Leucoraja fullonica (VIII)*	Raie chardon	*5*	*4*	*3*	**4**	**6**	**7**	**98**
10	*Mustelus asterias*	Émissole tachetée	*3*	*2*	*3*	**2**	**10**	**7**	**98**
10	*Oxynotus paradoxus*	Humantin			*3*	**3**	**8**	**7**	**98**
10	*Raja brachyura (VII)*	Raie lisse	*5*	*4*	*3*	**4**	**6**	**7**	**98**
10	*Raja brachyura (VIII)*	Raie lisse	*5*	*4*	*3*	**4**	**6**	**7**	**98**
10	*Raja clavata (VII)*	Raie bouclée	*5*	*4*	*4*	**4**	**6**	**7**	**98**
10	*Raja undulata (VII)*	Raie brunette	*5*	*4*	*3*	**4**	**6**	**7**	**98**
11	*Bathyraja pallida*	Raie pâle			*3*	**3**	**7**	**7**	**91**
11	*Dipturus nidarosiensis (VIII)*	Pocheteau de Norvège			*3*	**3**	**7**	**7**	**91**
11	*Etmopterus spinax*	Sagre commun			*3*	**3**	**7**	**7**	**91**
11	*Leucoraja naevus (VII et VIII)*	Raie fleurie	*3*	*4*	*4*	**4**	**5**	**7**	**91**
11	*Raja microocellata (VII)*	Raie mêlée	*5*	*4*	*3*	**4**	**5**	**7**	**91**
11	*Raja microocellata (VIII)*	Raie mêlée	*5*	*4*	*3*	**4**	**5**	**7**	**91**
12	*Centrophorus granulosus*	Requin-chagrin			*5*	**5**	**8**	**5**	**90**
12	*Mitsukurina owstoni*	Requin-lutin			*3*	**3**	**12**	**5**	**90**
12	*Oxynotus centrina*	Centrine commune			*3*	**3**	**9**	**6**	**90**

12	*Pseudotriakis microdon*	Requin à longue dorsale			*3*	**3**	**12**	**5**	**90**
13	*Mobula mobular*	Mante de Méditerranée			*5*	**5**	**12**	**4**	**88**
14	*Centrophorus squamosus*	Squale-chagrin de l'Atlantique	*6*	*4*	*5*	**4**	**9**	**5**	**85**
14	*Dalatias licha*	Squale-liche	*6*	*4*	*3*	**4**	**9**	**5**	**85**
14	*Galeorhinus galeus*	Requin hâ	*5*	*4*	*3*	**4**	**9**	**5**	**85**
15	*Raja undulata (VIII)*	Raie brunette	*6*	*3*	*3*	**3**	**6**	**7**	**84**
16	*Centroscymnus coelolepis*	Pailona commun	*6*	*4*	*3*	**4**	**8**	**5**	**80**
16	*Hexanchus griseus*	Griset			*3*	**3**	**10**	**5**	**80**
16	*Squalus acanthias*	Aiguillat commun	*1*	*4*	*5*	**4**	**8**	**5**	**80**
17	*Etmopterus princeps*	Sagre rude			*3*	**3**	**7**	**6**	**78**
18	*Apristurus aphyodes*	Holbiche pâle			*3*	**3**	**5**	**7**	**77**
18	*Dasyatis pastinaca*	Raie pastenague commune			*1*	**1**	**9**	**7**	**77**
18	*Dasyatis tortonesei*	Raie pastenague de Tortonese			*1*	**1**	**9**	**7**	**77**
18	*Dipturus oxyrinchus (VIII)*	Pocheteau noir			*2*	**2**	**7**	**7**	**77**
18	*Galeus melastomus (VII)*	Chien espagnol	*3*	*3*	*1*	**3**	**5**	**7**	**77**
18	*Galeus murinus*	Chien nordique			*3*	**3**	**5**	**7**	**77**
18	*Rajella kukujevi*	Raie la palote			*3*	**3**	**5**	**7**	**77**
18	*Scyliorhinus stellaris (VII)*	Grande roussette	*3*	*2*	*1*	**2**	**7**	**7**	**77**
19	*Chlamydoselachus anguineus*	Requin-lézard			*3*	**3**	**9**	**5**	**75**
19	*Mustelus mustelus*	Émissole lisse	*3*	*2*	*3*	**2**	**11**	**5**	**75**
20	*Centroscyllium fabricii*	Aiguillat noir			*2*	**2**	**8**	**6**	**72**
21	*Centroscelachus crepidater*	Pailona à long nez			*3*	**3**	**8**	**5**	**70**
21	*Deania calcea (et D. profundorum)*	Squale-savate (squale savate lutin)			*3*	**3**	**8**	**5**	**70**
21	*Heptranchias perlo*	Perlon			*3*	**3**	**8**	**5**	**70**
21	*Neoraja caerulea*	Raie bleue			*3*	**3**	**4**	**7**	**70**
21	*Raja clavata (VIII)*	Raie bouclée	*3*	*2*	*4*	**2**	**6**	**7**	**70**
21	*Scymnodon ringens*	Squale-grogneur commun			*3*	**3**	**8**	**5**	**70**
22	*Apristurus laurussonii*	Holbiche grise			*3*	**3**	**5**	**6**	**66**
22	*Rajella bigelowi*	Raie de Bigelow			*3*	**3**	**5**	**6**	**66**
22	*Rajella fyllae*	Raie ronde			*3*	**3**	**5**	**6**	**66**
22	*Torpedo marmorata*	Torpille marbrée			*1*	**1**	**9**	**6**	**66**
23	*Bathyraja richardsoni*	Raie de Richardson			*3*	**3**	**7**	**5**	**65**
24	*Raja montagui (VII)*	Raie douce	*3*	*2*	*3*	**2**	**5**	**7**	**63**
24	*Raja montagui (VIII)*	Raie douce	*3*	*2*	*3*	**2**	**5**	**7**	**63**
24	*Scyliorhinus canicula (VIII)*	Petite roussette	*3*	*2*	*1*	**2**	**5**	**7**	**63**
25	*Apristurus melanoasper*	Holbiche noire			*3*	**3**	**5**	**5**	**55**
26	*Isurus oxyrinchus*	Requin-taupe bleu (mako)	*4*	*3*	*3*	**3**	**12**	**3**	**54**
26	*Sphyrna zygaena*	Requin-marteau commun			*3*	**3**	**12**	**3**	**54**
27	*Galeus melastomus (VIII)*	Chien espagnol	*3*	*1*	*1*	**1**	**5**	**7**	**49**
27	*Scyliorhinus canicula (VII)*	Petite roussette	*3*	*1*	*1*	**1**	**5**	**7**	**49**
28	*Somniosus microcephalus*	Laimargue du Groenland			*3*	**3**	**10**	**3**	**48**
29	*Somniosus rostratus*	Laimargue de Méditerranée			*3*	**3**	**8**	**3**	**42**
30	*Alopias superciliosus*	Renard à gros yeux	*6*	*4*	*3*	**4**	**12**	**2**	**40**
31	*Carcharhinus obscurus*	Requin de sable			*3*	**3**	**12**	**2**	**36**
31	*Carcharodon carcharias*	Grand requin blanc			*3*	**3**	**12**	**2**	**36**

31	*Odontaspis ferox*	Requin-féroce			*3*	**3**	**12**	**2**	**36**
31	*Sphyrna lewini*	Requin-marteau halicorne			*3*	**3**	**12**	**2**	**36**
31	*Sphyrna mokarran*	Grand requin-marteau			*3*	**3**	**12**	**2**	**36**
31	*Squaliolus laticaudus*	Squale nain			*3*	**3**	**6**	**3**	**36**
32	*Pteroplatytrygon violacea*	Pastenague violette			*1*	**1**	**9**	**3**	**33**
33	*Galeocerdo cuvier*	Requin tigre			*3*	**3**	**10**	**2**	**32**

Table 43: Ranking of conservation challenge for elasmobranch species in French Atlantic sector (subregion Bay of Biscay and Celtic seas)(Stéphan et al. 2016). ICES data is from 2015 or 2014, ICCAT data from 2015 for Prionace glauca, or from 2012 for Isurus oxyrinchus. IUCN data: National Red List of France, 2013. OSPAR Region IV corresponds to ICES divisions VIII and IX.

11.12 Annex XIII. Maximum Sustainable Yield (MSY) and Precautionary Approach (PA)

The Common Fishing Policy sets the goal of reaching **Maximum Sustainable Yield (MSY).** According to OSPAR, MSY is the "largest yield (or catch) that can be taken from a fish stock over an indefinite period. Management policies should ideally aim at maintaining fish stocks, for a long term, at levels capable to produce MSY, although other environmental, economic and social objectives may also play an important factor". To reach MSY, indicators F (Fishing mortality rate) and B (or 'SSB', Spawning Stock Biomass) have to be equal to reference values Fmsy and Btrigger. In addition to this "MSY approach" that compares F and B to MSY values, a **precautionary approach (PA**) can be adopted. A precautionary approach is descried in the UN Fish Stocks Agreement (UN, 1995[25]) as follows: '*States shall be more cautious when information is uncertain, unreliable, or inadequate. The absence of adequate scientific information shall not e used as a reason for postponing or failing to take conservation and management measures*'. Precautionary reference values Fpa and Bpa are less constraining than MSY values (Fpa> Fmsy and Bpa <Bmsy). However, sometimes these reference values are not available.

Table 1.2.1 Symbols and text for MSY status.

MSY reference points	Explanation	Sign	Text
Fishing mortality (F_{MSY})	$F < F_{MSY}$ and	✓	Appropriate
	$F <<< F_{MSY}$ (~ 0)	✓	Below
	$F > F_{MSY}$	✗	Above
	No reference point defined	?	Undefined
	Stock status unknown (even if reference point is defined)	?	Unknown
Biomass (MSY $B_{trigger}$)	SSB = MSY $B_{trigger}$ or SSB > MSY $B_{trigger}$	✓	At trigger or above trigger
	SSB ≥ MSY $B_{escapement}$	✓	At or above escapement
	SSB < MSY $B_{trigger}$	✗	Below trigger
	SSB <MSY $B_{escapement}$	✗	Below escapement
	No reference point	?	Undefined
	Stock status unknown	?	Unknown

Table 1.2.2 Symbols and text for precautionary status.

Precautionary reference points	Explanation	Sign	Text
Fishing mortality (F_{pa},F_{lim})	$F =< F_{pa}$	✓	Harvested sustainably
	$F_{lim} > F > F_{pa}$	o	Increased risk
	$F > F_{lim}$	✗	Harvested unsustainably
	No reference point	? *[or* ✓, if is "Appropriate"*]*	Undefined *[or* Below possible reference points*]*
	Stock status unknown	?	Unknown
Biomass (B_{pa},B_{lim})	SSB ≥ B_{pa}	✓	Full reproductive capacity
	$B_{lim} < B < B_{pa}$	o	Increased risk
	SSB <B_{lim}	✗	Reduced reproductive capacity
	No reference point	? *[or* ✓, if is "Above trigger"*]*	Undefined *[or* Above possible reference points*]*
	Stock status unknown	?	Unknown

Table 44: ICES symbols and text for MSY status and precautionary approach. (From ICES Advice, 2016)

Additional explanation about stock assessment is provided in the ICES Advice basis (ICES Advice, 2016[26]

[25] UN. 1995. United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks. http://www.un.org/Depts/los/convention_agreements/convention_overview_fish_stocks.htm

[26] ICES Advice, 2016. Book I. ICES Avice basis. http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2016/2016/Introduction_to_advice_2016.pdf

11.13 Annex XIV. Internationally protected fish species

Names	French name	CCA	CDH2	IBE1	IOS5	IBO1	IBA2
Number of species		7	15	30	21	8	24
Petromyzon marinus	Lamproie marine		1	1	1		1
Lampetra fluviatilis	Lamproie de rivière, Lamproie fluviatile		1	1			1
Carcharodon carcharias	Grand-requin blanc			1		1	1
Isurus oxyrinchus	Requin-taupe bleu			1		1	1
Lamna nasus	Requin-taupe commun			1	1	1	1
Cetorhinus maximus	Requin pèlerin	1		1	1	1	1
Prionace glauca	Peau bleu, Requin bleu			1			1
Centrophorus granulosus	Squale-chagrin commun				1		
Centrophorus squamosus	Squale-chagrin de l'Atlantique				1		
Centroscymnus coelolepis	Pailona commun				1		
Squalus acanthias	Aiguillat commun				1	1	
Squatina squatina	Ange de mer commun			1	1		1
Dipturus batis	Pocheteau gris				1		
Raja clavata	Raie bouclée				1		
Raja montagui	Raie douce				1		
Rostroraja alba	Raie blanche			1	1		1
Mobula mobular	Diable de mer méditerranéen, Mante						1
Acipenser sturio	Esturgeon européen, Esturgeon de l'Europe Occidentale	1	1	1	1	1	1
Acipenser naccarii	Esturgeon de l'Adriatique					1	
Acipenser ruthenus	Esturgeon du Danube, Sterlet	1	1	1		1	
Anguilla anguilla	Anguille européenne				1		1
Alosa alosa	Alose vraie, Grande Alose		1	1	1		1
Alosa fallax	Alose feinte		1	1			1
Aspius aspius	Aspe		1	1			
Salmo salar	Saumon atlantique		1	1	1		
Coregonus albula	Coregone blanc		1	1			
Coregonus lavaretus	Lavaret, Corégone		1	1			
Gadus morhua	Morue				1		
Aphanius fasciatus	Aphanius de Corse		1	1			1
Aphanius iberus	Aphanius d'Espagne, Cyprinodonte d'Espagne		1	1			1
Valencia hispanica	Cyprinodonte de Valence		1	1			1
Hoplostethus atlanticus	Hoplostète rouge				1		
Syngnathus abaster	Syngnathe de rivière			1			
Hippocampus hippocampus	Hippocampe E museau court	1		1	1		1
Hippocampus guttulatus	Hippocampe moucheté	1		1	1		1
Cottus gobio	Chabot, Chabot commun		1				
Sciaena umbra	Corb noir, Corb			1			1
Umbrina cirrosa	Ombrine commune, Ombrine cEtière			1			1
Salaria fluviatilis	Blennie fluviatile			1			
Pomatoschistus microps	Gobie tacheté			1			
Pomatoschistus minutus	Bourgette, Gobie buhotte			1			
Thunnus thynnus	Thon rouge				1		1
Xiphias gladius	Espadon						1
Epinephelus marginatus	Mérou noir			1			1
Zosterisessor ophiocephalus	Gobie lote			1			
Acipenser spp	Esturgeons (tous)	1	1				
Hippocampus denise		1					

Code	Legislation	URL	Year

CCA	Convention on International Trade in Endangered Species of Wild Fauna and Flora, also known as the Washington Convention	http://eur-lex.europa.eu/legal-content/FR/TXT/?qid=1413449131738&uri=CELEX:01997R0338-20130810	1997
CDH2	Habitats Directive (more formally known as Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora)	http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal	1992
IBE1	Berne Convention on the Conservation of European Wildlife and Natural Habitats	http://conventions.coe.int/Treaty/fr/Treaties/Html/104.htm	1979
IOS5	Convention for the Protection of the Marine Environment of the North-East Atlantic or OSPAR Convention	http://www.ospar.org/convention	1992
IBA2	Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean	http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000416310&dateTexte=&categorieLien=id	1995
IBO1	Convention on the Conservation of Migratory Species of Wild Animals -- more commonly abbreviated to just the Convention on Migratory Species (CMS) or the Bonn Convention	http://www.cms.int/documents/convtxt/cms_convtxt_french.pdf	1979

Table 45 : List of Protected Fish at an international level and the implicated legislation.

11.14 Annex XV. Stock assessment

Stocks Assessed by ICES :

- → Anchovy (Engraulis encrasicolus) in Division 9.a (Atlantic Iberian waters)
- → Anchovy (Engraulis encrasicolus) in Subarea 8 (Bay of Biscay)
- → Anchovy (Engraulis encrasicolus) in Subarea VIII (Bay of Biscay)
- → Bay of Biscay and the Iberian Coast Ecoregion – Ecosystem overview
- → Black-bellied anglerfish (Lophius budegassa) in divisions 7.b–k, 8.a–b, and 8.d (west and southwest of Ireland, Bay of Biscay)
- → Black-bellied anglerfish (Lophius budegassa) in divisions 8.c and 9.a (Cantabrian Sea and Atlantic Iberian waters)
- → Black-bellied anglerfish (Lophius budegassa) in Divisions VIIIc and IXa (Cantabrian Sea, Atlantic Iberian waters)
- → Blonde ray (Raja brachyura) in Division 9.a (Atlantic Iberian waters)
- → Blue ling (Molva dypterygia) in Subareas I, II, VIII, IX, and XII, and Divisions IIIa and IVa (other areas)
- → Blue whiting (Micromesistius poutassou) in subareas 1–9, 12, and 14 (Northeast Atlantic)
- → Blue whiting (Micromesistius poutassou) in Subareas I–IX, XII, and XIV (Northeast Atlantic)
- → Boarfish (Capros aper) in subareas 6–8 (Celtic Seas, English Channel, and Bay of Biscay)
- → Boarfish (Capros aper) in subareas 6–8 (Celtic Seas, English Channel, and Bay of Biscay)
- → Boarfish (Capros aper) in Subareas VI–VIII (Celtic Seas and the English Channel, Bay of Biscay)
- → Common skate (Dipturus batis-complex) in Subarea 8 and Division 9.a (Bay of Biscay and Atlantic Iberian waters)
- → Cuckoo ray (Leucoraja naevus) in Division 8.c (Cantabrian Sea)
- → Cuckoo ray (Leucoraja naevus) in Division 9.a (Atlantic Iberian waters)
- → EU request for ICES to evaluate the management strategy for boarfish (Capros aper) in Subareas VI–VIII (Celtic Seas and the English Channel, Bay of Biscay)
- → EU request to ICES on in-year advice for anchovy (Engraulis encrasicolus) in Division 9.a (Atlantic Iberian waters), December 2017
- → Four-spot megrim (Lepidorhombus boscii) in divisions 8.c and 9.a (Cantabrian Sea and Atlantic Iberian waters)
- → Greater silver smelt (Argentina silus) in Subareas VII-X, XII, and Division VIb (other areas)
- → Hake (Merluccius merluccius) in divisions 8.c and 9.a, Southern stock (Cantabrian Sea and Atlantic Iberian waters)
- → Hake (Merluccius merluccius) in subareas 4, 6, and 7 and divisions 3.a, 8.a–b, and 8.d, Northern stock (Greater North Sea, Celtic Seas, and the northern Bay of Biscay)
- → Horse mackerel (Trachurus trachurus) in Division 9.a (Atlantic Iberian waters)
- → Mackerel (Scomber scombrus) in subareas 1–8 and 14, and in Division 9.a (the Northeast Atlantic and adjacent waters)
- → Mackerel (Scomber scombrus) in Subareas I–VII and XIV and Divisions VIIIa–e and IXa (Northeast Atlantic)
- → Megrim (Lepidorhombus whiffiagonis) in divisions 8.c and 9.a (Cantabrian Sea and Atlantic Iberian waters)
- → Mixed-fisheries advice for the Bay of Biscay and Atlantic Iberian waters
- → Norway lobster (Nephrops norvegicus) in Division 8.c, Functional Unit 25 (southern Bay of Biscay and northern Galicia)
- → Norway lobster (Nephrops norvegicus) in Division 8.c, Functional Unit 31 (southern Bay of Biscay and Cantabrian Sea)
- → Norway lobster (Nephrops norvegicus) in Division 9.a, functional units 26–27 (Atlantic Iberian waters East, western Galicia, and northern Portugal)
- → Norway lobster (Nephrops norvegicus) in Division 9.a, functional units 28–29 (Atlantic Iberian waters East and southwestern and southern Portugal)
- → Norway lobster (Nephrops norvegicus) in Division 9.a, Functional Unit 30 (Atlantic Iberian waters East and Gulf of Cadiz)

- → Other skates and rays in Subarea 8 and Division 9.a (Bay of Biscay and Atlantic Iberian waters)
- → Plaice (Pleuronectes platessa) in Subarea VIII and Division IXa (Bay of Biscay, Atlantic Iberian Waters)
- → Pollack (Pollachius pollachius) in Subarea 8 and Division 9.a (Bay of Biscay and Atlantic Iberian waters)
- → Pollack (Pollachius pollachius) in Subarea VIII and Division IXa (Bay of Biscay, Atlantic Iberian Waters)
- → Red gurnard (Chelidonichthys cuculus) in Subareas III, IV, V, VI, VII, and VIII (Northeast Atlantic)
- → Sardine (Sardina pilchardus) in divisions 8.c and 9.a (Cantabrian Sea and Atlantic Iberian waters)
- → Sardine (Sardina pilchardus) in divisions 8.c and 9.a (Cantabrian Sea and Atlantic Iberian waters)
- → Sardine (Sardina pilchardus) in Divisions VIIIa,b,d and Subarea VII (Bay of Biscay, Southern Celtic Seas and English Channel)
- → Sardine (Sardina pilchardus) in Divisions VIIIc and IXa (Cantabrian Sea, Atlantic Iberian Waters)
- → Seabass (Dicentrarchus labrax) in divisions 8.a–b (northern and central Bay of Biscay)
- → Sole (Solea solea) in divisions 8.a–b (northern and central Bay of Biscay)
- → Sole (Solea solea) in Divisions VIIIa, b (Bay of Biscay North and Central)
- → Sole (Solea solea, S. senegalensis, and Pegusa lascaris) in ICES areas Divisions VIIIc and IXa (Cantabrian Sea, Atlantic Iberian Waters)
- → Sole in Divisions VIIIa,b (Bay of Biscay)
- → Spotted ray (Raja montagui) in Division 9.a (Atlantic Iberian waters)
- → Spotted ray (Raja montagui) in Subarea 8 (Bay of Biscay)
- → Spurdog (Squalus acanthias) in the Northeast Atlantic
- → Striped red mullet (Mullus surmuletus) in subareas 6 and 8, and in divisions 7.a–c, 7.e–k, and 9.a (North Sea, Bay of Biscay, southern Celtic Seas, and Atlantic Iberian waters)
- → Striped red mullet (Mullus surmuletus) in Subareas VI and VIII and Divisions VIIa–c, e–k and IXa (West of Scotland, Bay of Biscay, Southern Celtic Seas, Atlantic Iberian Waters)
- → Thornback ray (Raja clavata) in Division 9.a (Atlantic Iberian waters)
- → Thornback ray (Raja clavata) in Subarea 8 (Bay of Biscay)
- → Undulate ray (Raja undulata) in Division 8.c (Cantabrian Sea)
- → Undulate ray (Raja undulata) in Division 9.a (Atlantic Iberian waters)
- → Undulate ray (Raja undulata) in divisions 8.a–b (northern and central Bay of Biscay)
- → White anglerfish (Lophius piscatorius) in divisions 7.b–k, 8.a–b, and 8.d (southern Celtic Seas, Bay of Biscay)
- → White anglerfish (Lophius piscatorius) in divisions 8.c and 9.a (Cantabrian Sea and Atlantic Iberian waters)
- → White anglerfish (Lophius piscatorius) in Divisions VIIb–k and VIIIa,b,d (Southern Celtic Seas, Bay of Biscay)
- → White anglerfish (Lophius piscatorius) in Divisions VIIIc and IXa (Cantabrian Sea, Atlantic Iberian waters)
- → White skate (Rostroraja alba) in the Northeast Atlantic
- → Whiting (Merlangius merlangus) in Subarea 8 and Division 9.a (Bay of Biscay and Atlantic Iberian waters)
- → Whiting (Merlangius merlangus) in Subarea VIII and Division IXa (Bay of Biscay, Atlantic Iberian Waters)

Stocks Assessed by ICCAT :

SPECIES		Last / Next assessment	Reports
Albacore	*Thunnus alalunga*	ATL 2013 /2016	Detailed
Atl. Bluefin Tuna	*Thunnus thynnus t.*	2014 /2017	Detailed
Bigeye Tuna	*Thunnus obesus*	2015 /2018	Detailed
Blue Marlin	*Makaira nigricans*	2011 / 2018*	Detailed
Sailfish	*Istiophorus albicans*	2009 / 2016	Detailed
Skipjack Tuna	*Katsuwonus pelamis*	2014 /2019*	Detailed
Southern Bluefin	*Thunnus maccoyii*		Report
Swordfish Atl.	*Xiphias gladius*	2013 / 2017	Detailed
White Marlin	*Tetrapturus albidus*	2012 / 2019*	Detailed
Yellowfin Tuna	*Thunnus albacares*	2016 /2021	Detailed
Small Tunas			
→ Blackfin tuna	→ *Thunnus atlanticus*		
→ Bullet tuna	→ *Auxis rochei*		
→ Atlantic bonito	→ *Sarda sarda*		
→ Plain bonito	→ *Orcynopsis unicolor*		
→ Serra Spanish mackerel	→ *Scomberomorus brasiliensis*		
→ Cero	→ *Scomberomorus regalis*		
→ Frigate tuna	→ *Auxis thazard*		Detailed
→ King mackerel	→ *Scomberomorus cavalla*		
→ Scomberomorus unclassified	→ *Scomberomorus spp.*		
→ Little tunny	→ *Euthynnus alletteratus*		
→ West African Spanish mackerel	→ *Scomberomorus tritor*		
→ Atlantic Spanish mackerel	→ *Scomberomorus maculatus*		
→ Wahoo	→ *Acanthocybium solandri*		
→ Dolphinfish	→ *Coryphaena hippurus*		
Pelagic sharks			
→ Blue shark	→ *Prionace glauca*	2015 / 2021	Detailed (BSH)
→ Shortfin mako shark	→ *Isurus oxyrinchus*	2012 / 2017	Detailed (SMA)
→ Porbeagle	→ *Lamna nasus*	2009 / 2019	Detailed (POR)

11.15 Annex XVI. Criteria that can be used to assess importance of Essential Fish Habitats

Criteria that can be used to assess importance of Essential Fish Habitats (in terms of contribution to population renewing) as identified in (Delage et Le Pape 2016) are found in the Table 46 below.

Essential Fish Habitat	Importance criteria
Nursery	Nurseries are characterized by a high concentration of juveniles in a restricted area. Importance criteria for nurseries : → Hotspot EFH with a high **contribution to the recruiting per area unit** (Beck et al. 2001) → EFH **contribution to the *total* recruiting** , its surface being taken into account (Dahlgren et al. 2006) With the contribution to the recruiting depending on density of juveniles, growth and survival, migration success towards adults habitats.
Spawning area	Spawning areas have a precise location determined by physical conditions, association with high productivity areas such as estuaries or upwellings, and temperature. It is possible to use criteria to determine important spawning areas. Importance criteria for spawning areas: → Hotspot EFH with a high **contribution to population renewing per area unit** (Beck et al. 2001) → EFH **contribution to *total* population renewing**, its surface being taken into account (Dahlgren et al. 2006)
Larval drift area	Not realistic to identify important restricted larval drift areas since they are very widespread, and not strongly bound to a certain type of habitat
Feeding area for adults	Not realistic to identify important restricted feeding areas highly contributing to population renewing because they are widespread areas.
Active migration paths for migratory diadromous fish (Salmon, eel, etc.)	The whole population takes restricted migration paths. It is possible to use criteria to determine important migration paths for diadromous fish. **Cf. Importance criteria for spawning areas.**
Active migration paths for non-diadromous fish	Not realistic to identify important restricted migration paths highly contributing to population renewing because they are widespread areas

Table 46: Criteria that can be used to assess importance of Essential Fish Habitats (in terms of contribution to population renewing(Delage et Le Pape 2016)

12 Bibliography

Agence des Aires Marines Protégées, et Ifremer. 2012. « Evaluation Initiale des Eaux Marines, Sous-Région marine golfe de gascogne, Plan d'Action pour le Milieu Marin ».

Aguirre, A. Alonso, et Peter L. Lutz. 2004. « Marine Turtles as Sentinels of Ecosystem Health: Is Fibropapillomatosis an Indicator? » *EcoHealth* 1 (3):275‑83. https://doi.org/10.1007/s10393-004-0097-3.

Amara, R., P. Laffargue, J. M. Dewarumez, C. Maryniak, F. Lagardére, et C. Luzac. 2001. « Feeding Ecology and Growth of O-Group Flatfish (Sole, Dab and Plaice) on a Nursery Ground (Southern Bight of the North Sea) ». *Journal of Fish Biology* 58 (3):788‑803. https://doi.org/10.1111/j.1095-8649.2001.tb00531.x.

Baltzer, Agnes, Axel Ehrhold, Carinne Rigolet, Stanislas Dubois, et Celine Cordier. 2013. « Etude d'un champ de pockmarks associé à un peuplement de Haploops dans la Baie de Concarneau: apport de la prospection géophysique THR ». In *CARHAMB'AR-2ème colloque national de CARtographie des Habitats Marins Benthiques: de l'Acquisition à la Restitution–Brest, 26-28 mars 2013*.

Beck, Michael W., Kenneth L. Heck, Kenneth W. Able, Daniel L. Childers, David B. Eggleston, Bronwyn M. Gillanders, Benjamin Halpern, et al. 2001. « The Identification, Conservation, and Management of Estuarine and Marine Nurseries for Fish and Invertebrates ». *BioScience* 51 (8):633‑41. https://doi.org/10.1641/0006-3568(2001)051[0633:TICAMO]2.0.CO;2.

Bellier, Edwige, Benjamin Planque, et Pierre Petitgas. 2007. « Historical Fluctuations in Spawning Location of Anchovy (Engraulis Encrasicolus) and Sardine (Sardina Pilchardus) in the Bay of Biscay during 1967–73 and 2000–2004 ». *Fisheries Oceanography* 16 (1):1‑15. https://doi.org/10.1111/j.1365-2419.2006.00410.x.

Bensetti, Farid, Frédéric Bioret, Jean Roland, et Jean-Philippe Lacoste. 2004. « "Cahiers d'habitats" Natura 2000. Connaissance et gestion des habitats et des espèces d'intérêt communautaire. Tome 2 - Habitats côtiers. » MEDD/MAAPAR/MNHN. https://inpn.mnhn.fr/docs/cahab/tome2.pdf.

Berger, WH. 1989. « Global Maps of Ocean Productivity. » In *Productivity of the Ocean: Present and Past.*, par WH Berger, Victor Smetacek, et Gerold Wefer, Wiley & Sons, 429‑55. Report on the Dahlem Workshop on Productivity of the Oceans, Berlin 1988.

Bett, B. J., et A. L. Rice. 1992. « The influenceof hexactinellid sponge (Pheronema carpenteri) spicules on the patchy distribution of macrobenthos in the porcupine seabight (bathyal ne atlantic) ». *Ophelia* 36 (3):217‑26. https://doi.org/10.1080/00785326.1992.10430372.

Bjorndal, KA, et Jeremy BC Jackson. 2002. « Roles of sea turtles in marine ecosystems: Reconstructing the past. » In *The Biology of Sea Turtles, Volume II*, par Peter L. Lutz, John A Musick, et Jeanette Wyneken, 472. CRC Marine Biology Series. CRC Press.

Budria, Alexandre, Anaïs Aubert, Isabelle Rombouts, Clare Ostle, Angus Atkinson, Claire Widdicombe, Eric Goberville, et al. 2017. *WP1 Deliverable Report "Cross-linking plankton indicators to better define GES of pelagic habitats." OSPAR Commission.*

Cabral, Henrique. 2003. « Differences in growth rates of juvenile Solea solea and Solea senegalensis in the Tagus estuary, Portugal ». *Journal of the Marine Biological Association of the United Kingdom* 83 (4):861‑68. https://doi.org/10.1017/S0025315403007902h.

Cabral, Henrique, et Maria Costa. 2001. « Abundance, feeding ecology and growth of 0-group sea bass, Dicentrarchus labrax, within the nursery areas of the Tagus estuary ». *Journal of the*

Marine Biological Association of the UK 81 (août):679‑82. https://doi.org/10.1017/S0025315401004362.

Cabral, Henrique, et Maria José Costa. 1999. « Differential Use of Nursery Areas Within the Tagus Estuary by Sympatric Soles, Solea Solea and Solea Senegalensis ». *Environmental Biology of Fishes* 56 (4):389‑97. https://doi.org/10.1023/A:1007571523120.

Cabral, Henrique Nogueira. 2000. « Distribution and Abundance Patterns of Flatfishes in the Sado Estuary, Portugal ». *Estuaries* 23 (3):351‑58. https://doi.org/10.2307/1353327.

Cabral, M. J., J. Almeida, Pedro R. Almeida, T. Dellinger, N. Ferrand de Almeida, M. E. Oliveira, J. M. Palmeirim, A. I. Queirós, L. Rogado, et M. Santos-Reis. 2005. *Livro Vermelho dos Vertebrados de Portugal*. Instituto da Conservação da Natureza. https://dspace.uevora.pt/rdpc/handle/10174/6006?locale=pt.

Caminas, JA. 2004. « Estatus y conservación de las tortugas marinas en España. » In *Atlas y libro rojo de los anfibios y reptiles de España*, par Juan M. Pleguezuelos, Rafael Márquez, et Miguel Lizana, 345‑80. Madrid: Organismo Autónomo de Parques Nacionales.

Clark, Malcolm R., Ashley A. Rowden, Thomas A. Schlacher, John Guinotte, Piers K. Dunstan, Alan Williams, Timothy D. O'Hara, Les Watling, Edwin Niklitschek, et Shinji Tsuchida. 2014. « Identifying Ecologically or Biologically Significant Areas (EBSA): A Systematic Method and Its Application to Seamounts in the South Pacific Ocean ». *Ocean & Coastal Management* 91 (avril):65‑79. https://doi.org/10.1016/j.ocecoaman.2014.01.016.

Coelho, Henrique, et Santos. 2003. « Enhanced Primary Production over Seamounts: A Numerical Study ». *Thalassas*, 4th Symposium on the Iberian Atlantic Margin, 19 (juillet):144‑45.

Connor, David W., James H. Allen, Neil Golding, LOUISE M. Lieberknecht, KATE O. Northen, et JOHNNY B. Reker. 2003. « The national marine habitat classification for Britain and Ireland ». *Joint Nature Conservation Committee, Peterborough*.

Cort, José L. 2017. « REVIEW OF THE CATCH AT AGE OF THE BAY OF BISCAY BLUEFIN TUNA FISHERY (1950-2000) ». *Collect. Vol. Sci. Pap. ICCAT* 73 (7):2280–2288.

Costa, M.J., Carmen I Santos, et Henrique N. Cabral. 2001. « Comparative Analysis of a Temperate and a Tropical Seagrass Bed Fish Assemblages in Two Estuarine Systems : The Mira Estuary (Portugal) and the Mussulo Lagoon (Angola) ». *Chaier de La Biologie Marine* 43 (décembre):73‑81.

Dahlgren, Craig P., G. Todd Kellison, Aaron J. Adams, Bronwyn M. Gillanders, Matthew S. Kendall, Craig A. Layman, Janet A. Ley, Ivan Nagelkerken, et Joseph E. Serafy. 2006. « Marine nurseries and effective juvenile habitats:: concepts and applications ». *Marine Ecology Progress Series* 312:291‑95.

Delage, Nicolas, et Olivier Le Pape. 2016. « Inventaire des zones fonctionnelles pour les ressources halieutiques dans les eaux sous souveraineté française. Première partie: définitions, critères d'importance et méthode pour déterminer des zones d'importance à protéger en priorité ». Pôle halieutique AGROCAMPUS OUEST.

Dorel, Didier, Constantin Koutsikopoulos, Yves Desaunay, et Jocelyne Marchand. 1991. « Seasonal distribution of young sole (Solea solea (L.)) in the nursery ground of the bay of Vilaine (Northern bay of Biscay) ». *Netherlands Journal of Sea Research*, Proceedings of the First International Symposium on Flatfish Ecology, 27 (3):297‑306. https://doi.org/10.1016/0077-7579(91)90032-V.

European Environmental Agency. 2014. « Crosswalks between European Marine Habitat Typologi Es - A Contribution to the MAES Marine Pilot ». European Topic Centre on Biological Biodiversity.

European Parliament, et Council of European Union. s. d. *DIRECTIVE 2008/56/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 June 2008 Establishing a Framework for Community Action in the Field of Marine Environmental Policy (Marine Strategy Framework Directive)*. *2008/56/EC*. Consulté le 21 novembre 2017. http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0056&from=EN.

Food and Agriculture Organization of the United Nations, éd. 2003. *Fisheries management. 2: The ecosystem approach to fisheries*. FAO technical guidelines for responsible fisheries 4, suppl. 2. Rome: Food and Agriculture Organization of the United Nations.

Frid, Chris, Cornelius Hammer, Robin Law, Harald Loeng, Janet F. Pawlak, Philip C. Reid, Mark Tasker, Stig Carlberg, Tore Jakobsen Jakobsen, et Jake Rice Rice. 2003. « Environmental Status of the European Seas ». *ICES*.

Gailhard-Rocher, Isabelle, Martin Huret, Pascal Lazure, Frederic Vandermeirsch, Julie Gatti, Pierre Garreau, et Francis Gohin. 2012. « Identification de «paysages hydrologiques» dans les eaux marines sous juridiction française (France métropolitaine) ».

GD Environnment. 2013. *Interpretation Manual of European Union Habitats*. http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/Int_Manual_EU28.pdf.

Global Ocean Associates. 2004. « An Atlas of Internal Solitary-like Waves and Their Properties ». Global Ocean Associates. http://www.internalwaveatlas.com/Atlas2_index.html.

Guerin, Laurent, E Feunteun, Antoine Grémare, Sophie Beauvais, Isabelle Gailhard-Rocher, Jacques Grall, Céline Labrune, et al. 2013. *Définition du programme de surveillance et plan d'acquisition de connaissances pour la DCSMM: propositions scientifiques et techniques (chantier 2). Thématique 1: Biodiversité*. https://doi.org/10.13140/RG.2.1.3666.0321.

Hall, Stephen J, et B Mainprize. 2004. « Towards Ecosystem-Based Fisheries Management ». *Fish and Fisheries* 5 (1):1‑20. https://doi.org/10.1111/j.1467-2960.2004.00133.x.

Harden Jones, F. R. 1968. *Fish Migration*. Edward Arnold.

Hiddink, J. G., S. Jennings, et M. J. Kaiser. 2006. « Indicators of the Ecological Impact of Bottom-Trawl Disturbance on Seabed Communities ». *Ecosystems* 9 (7):1190‑99. https://doi.org/10.1007/s10021-005-0164-9.

Hily, C., F. Le Loc'h, J. Grall, et M. Glémarec. 2008. « Soft bottom macrobenthic communities of North Biscay revisited: Long-term evolution under fisheries-climate forcing ». *Estuarine, Coastal and Shelf Science* 78 (2):413‑25. https://doi.org/10.1016/j.ecss.2008.01.004.

ICES. 2005. « Report of the Study Group on the Status of Diadromous Fish Species (SGSDFS) ». International Council for the Exploration of the Sea Conseil International pour l'Exploration de la Mer. https://brage.bibsys.no/xmlui/bitstream/handle/11250/102743/SGSDFS05.pdf?sequence=1.

———. 2007. « Report of the ICES Advisory Committee - Bay of Biscay and Atlantic Iberian Wates ». ICES Advice 2007 Book 7. http://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Advice/2013/Book%207%20-%20Bay%20of%20Biscay%20and%20Atlantic%20Iberian%20Waters.pdf.

———. 2008. « Report of the ICES Advisory Committee - Bay of Biscay and Atlantic Iberian Wates ». ICES Advice 2008 Book 7. http://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Advice/2013/Book%207%20-%20Bay%20of%20Biscay%20and%20Atlantic%20Iberian%20Waters.pdf.

———. 2016a. « Report of the Working Group on Marine Mammal Ecology (WGMME) ». ICES Advisory Commitee 2016. ICES CIEM. http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2016/WGMME/wgmme_2016.pdf.

———. 2016b. « Ecosystem Overviews - Bay of Biscay and the Iberian Coast Ecoregion ». ICES Advice 2016, Book 7. ICES CIEM. https://www.ices.dk/sites/pub/Publication%20Reports/Advice/2016/2016/Bay_of_Biscay_and_the%20Iberian%20Coast%20Ecoregion%20-Ecosystem%20overview.pdf.

Instituto Espanol de Oceanografia, et Asistencia Tecnica TRAGSATEC SA. 2012. « Estrategia Marina. Demarcacion Marina Noratlantica. Parte IV. Descriptores des Buen Estado Ambiental. Descriptor 1: Biodiversidad. » Madrid: Ministerio de Agricultura, Alimentacion y medio ambiente. http://www.mapama.gob.es/es/costas/temas/proteccion-medio-marino/IV_D1_Noratlantica_tcm7-207268.pdf.

Jardim, Ernesto, Finlay Scott, Iago Mosqueira, Chato Osio, Paris Vasilakopoulos, Alessandro Mannini, et John Casey. 2017. « Monitoring the Performance of the Common Fisheries Policy (STECF-17-04) ». Scientific, Technical and Economic Committee for Fisheries (STECF). https://stecf.jrc.ec.europa.eu/documents/43805/55543/2015-03_STECF+15-04+-+Monitoring+the+CFP_JRCxxx.pdf.

Jorge, Isabel, Carlos Costa Monteiro, et Gerard Lasserre. 2002. « Fish community of Mondego estuary: space-temporal organisation ». In *Aquatic ecology of the Mondego River basin global importance of local experience*, par Manuel Augusto Graça, Miguel Ângelo Pardal, et João Carlos Marques, 199‑218. Imprensa da Universidade de Coimbra. https://doi.org/10.14195/978-989-26-0336-0_12.

Kelley, D. F. 1988. « The Importance of Estuaries for Sea-Bass, Dicentrarchus Labrax (L.) ». *Journal of Fish Biology* 33 (décembre):25‑33. https://doi.org/10.1111/j.1095-8649.1988.tb05555.x.

Krause-Jensen, Dorte, Morten Foldager Pedersen, et Claus Jensen. 2003. « Regulation of Eelgrass (Zostera Marina) Cover along Depth Gradients in Danish Coastal Waters ». *Estuaries* 26 (4):866‑77. https://doi.org/10.1007/BF02803345.

Lee Van Dover, Cindy. 2000. *The Ecology of Deep-Sea Hydrothermal Vents*. Princeton University Press. https://press.princeton.edu/titles/6880.html.

Louis, M., M. C. Fontaine, J. Spitz, E. Schlund, W. Dabin, R. Deaville, F. Caurant, Y. Cherel, C. Guinet, et B. Simon-Bouhet. 2014. « Ecological Opportunities and Specializations Shaped Genetic Divergence in a Highly Mobile Marine Top Predator ». *Proceedings of the Royal Society B: Biological Sciences* 281 (1795):20141558‑20141558. https://doi.org/10.1098/rspb.2014.1558.

Loureiro, João José. 2017. « National Report of Parties on the Implementation of the Convention on the Conservation of Migratory Species of Wild Animals ». Convention on the Conservation of Migratory Species of Wild Animals. Lisboa, Portugal: Instituto da Conservação da Natureza e das Floresta. http://www.cms.int/sites/default/files/document/14-05-30_Portugal_UNEP-CMS-COP11-Inf.20.3.PT_.pdf.

Loureiro, João José, A Ferrand de Almeida, N Carretero, et M.A. Paulo. 2008. *Atlas dos Anfíbios e Répteis*. O.S.

Ministère de l'Environnement, de l'Energie et de la Mer, et Agence Française Biodiversité. 2017. « Document de travail. 2ème cycle de la DCSMM - Horizon 2018. Identification et priorisation des enjeux ecologiques à l'échelle de chaque sous-région marine. Partie 1- Résultats. »

Ministério da Agricultura, do Mar, do Ambiente e do Ordenamento do Território. 2012. « Estratégia Marinha para a subdivisão do Continente ». Governo de Portugal. https://ciencias.ulisboa.pt/sites/default/files/fcul/investigacao/DQEM_Continente.pdf.

National Oceanic and Atmospheric Administration. 2007. « Magnuson-Stevens Fishery Conservation and Management Act ». U.S. DEPARTMENT OF COMMERCE.

Núñez, Estanislao Fernández de la Cigoña. 1988. *Islas Cíes (historia, etnografía, geografía, flora y fauna) y otros trabajos*. Vigo: Asociación Gallega para la Cultura y la Ecología.

Oceana. 2014. « The seamounts of the Gorringe Bbank ». Stiftung Drittes Millenium. http://oceana.org/sites/default/files/reports/oceana_the_seamounts_of_the_gorringe_bank_2014.pdf.

OSPAR Commission. 2010. « The Quality Status Report ». OSPAR Commission. https://qsr2010.ospar.org/en/index.html.

———. 2017. « Intermediate Assessment ». OSPAR Commission. https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/.

OSPAR Intersessional Correspondence Group on the Coordination of Biodiversity Assessment and Monitoring. 2012. « OSPAR's MSFD Advice Manual on Biodiversity ». https://circabc.europa.eu/sd/a/68c36348-42b8-4181-98c4-1cb4fc67e0a4/OSPAR2001_Advice%20D1_D2_D4_D6.pdf.

Pennino, MG, R Vilela, JM Bellido, et F Velasco. 2018. « Identifying Nurseries without Dismiss Fisheries: The European Hake (Merluccius Merluccius) Case Study. (Submitted) », Fisheries Oceanography, .

Perez, C, P Valdès, et J.A. Pis-Millan. 2001. *Tortugas marinas en la costa asturiana (N de España).* XIV Reunión Bienal de la Real Sociedad Española de Historia Natural. Murcia.

Persohn, Cecile. 2009. « Sensibilité des populations de poissons aux changements globaux en fonction de leurs traits d'histoire de vie étudiée par une approche empririque ». Université de Bretagne Occidentale.

Petitgas, Pierre. 1997. « Sole egg distributions in space and time characterised by a geostatistical model and its estimation variance ». *Ices Journal of Marine Science - ICES J MAR SCI* 54 (avril):213‑25. https://doi.org/10.1006/jmsc.1996.0184.

Pettex, Emeline, Charlotte Lambert, Sophie Laran, Amandine Ricart, Auriane Virgili, et Hélène Falchetto. 2014. « Suivi Aérien de la Mégafaune Marine en France ». Agence des Aires marines Protégées.

Pilar-Fonseca, Tereza, Aida Campos, João Pereira, Ana Moreno, Silvia Lourenço, et Manuel Afonso-Dias. 2014. « Integration of fishery-dependent data sources in support of octopus spatial management ». *Marine Policy* 45 (mars):69‑75. https://doi.org/10.1016/j.marpol.2013.11.016.

Poppe, G. T., et Y. Goto. 2000. *European seashells: 2. (Scaphopoda, Bivalva, Cephalopoda)*. ConchBooks. http://www.vliz.be/en/imis?module=ref&refid=21430.

Punzon, A., A. Serrano, F. Sanchez, F. Velasco, I. Preciado, J. M. Gonzalez-Irusta, et L. Lopez-Lopez. 2016. « Response of a Temperate Demersal Fish Community to Global Warming ». *Journal of Marine Systems* 161 (septembre):1‑10. https://doi.org/10.1016/j.jmarsys.2016.05.001.

Raybaud, Virginie, Débora Heroin, Thomas Raud, Jean-Michel Brylinski, Lars Stemmann, Delphine Thibault-Botha, et Benoît Sautour. 2012. « Census and Analysis of Zooplankton Metadata of the French Coasts since 1955 ». *Journal of Oceanography, Research and Data* 4 (1). http://www.jord.obs-vlfr.fr/index.php/JORD/article/view/77.

Regimbart, Amélie, Jerome Guitton, et Olivier Le Pape. 2017. « Inventaire des zones fonctionnelles pour les ressources halieutiques dans les eaux sous souveraineté française. » 46. Les publications du Pôle halieutique AGROCAMPUS OUEST. Agrocampus Ouest. http://halieutique.agrocampus-ouest.fr/pdf/5864.pdf.

Reveillaud, Julie, Andre Freiwald, David Van Rooij, Erwan Le Guilloux, Alvaro Altuna, Anneleen Foubert, Ann Vanreusel, Karine Olu-Le Roy, et Jean-Pierre Henriet. 2008. « The Distribution of Scleractinian Corals in the Bay of Biscay, NE Atlantic ». *Facies* 54 (3):317‑31. https://doi.org/10.1007/s10347-008-0138-4.

Ruys, Thomas, et Laurent Soulier. 2013. « Atlas des Mammifères sauvages d'Aquitaine : les Mammifères marins ». C. Nature. Cistude nature et LPO Aquitaine. http://www.naturemp.org/mammif2013/wp-content/uploads/2013/03/SFEPM2013_Ruys_Poster_MamMarin.pdf.

Sánchez, Francisco, et Julio Gil. 2000. « Hydrographic Mesoscale Structures and Poleward Current as a Determinant of Hake (Merluccius Merluccius) Recruitment in Southern Bay of Biscay ». *ICES Journal of Marine Science* 57 (1):152‑70. https://doi.org/10.1006/jmsc.1999.0566.

Sanchez, Francisco, et Antonio Punzon. 2014. « Sistema de Cañones Submarinos de Avilés ». Instituto Español de Oceanografí. http://www.indemares.es/sites/default/files/sistema_de_canones_submarinos_de_aviles.pdf.

Savouré-Soubelet, Audrey, Stéphane Aulagnier, Patrick Haffnier, Francois Moutou, Olivier Van Canneyt, Jean-Benoit Charassin, et Vincent Ridoux. 2016. *Atlas des mammifères sauvages de France volume 1 - mammifères marins*. Vol. 1. Muséum national d'Histoire naturelle, Paris ; IRD, Marseille,.

Schreiber, E.A., et Joanna Burger. 2001. *Biology of Marine Birds*. CRC Press. CRC Marine Biology Series.

Serrano Gordo, L. 1989. « Age, Growth and Sexuality of Sea Bass, Dicentrarchus Labrax (Linnaeus, 1758) (Perciformes, Moronidae) from Aveiro Lagoon, Portugal ». *Scientia Marina (Spain)*. http://agris.fao.org/agris-search/search.do?recordID=ES9000582.

STECF Expert Working Group. 2016. « The 2016 Annual Economic Report on the Eu Fishing Fleet ». https://stecf.jrc.ec.europa.eu/documents/43805/1489224/2016_AER_2_STECF_EXECUTIVE+SUMMARY.pdf.

Stéphan, E, A Rohr, S Tachoires, SP Iglesias, et H Gadenne. 2016. « Proposition d'une méthode de hiérarchisation des enjeux de conservation pour les élasmobranches ». APECS Association. https://www.asso-apecs.org/IMG/pdf/elasmobranches_hierarchisation_enjeux_conservation_vf_2016.pdf.

Templado, José, Enric Ballesteros, Ibon Galparsoro, Angel Borja, A. Serrano, L. martin, et Ana C. Brito. 2012. « Inventario español de hábitats marinos. » Ministerio de Agricultura, Alimentación y Medio Ambiente.

Temple, Helen J, et Andrew Terry. 2007. *The Status and Distribution of European Mammals*. Luxembourg: Official Publications of the European Communities. http://ec.europa.eu/environment/nature/conservation/species/redlist/downloads/European_mammals.pdf.

Thiriet, Pierre, Anthony Acou, Céline Artero, et Eric Feunteun. 2017. « Evaluation DCSMM 2018 de l'état écologique des poissons et céphalopodes de France métropolitaine : Rapport scientifique du co-pilotage MNHN D1-PC ». Muséum national d'Histoire naturelle.

Trimoreau, E., B. Archambault, A. Brind'Amour, M. Lepage, J. Guitton, et O. Le Pape. 2013. « A quantitative estimate of the function of soft-bottom sheltered coastal areas as essential flatfish nursery habitat ». *Estuarine, Coastal and Shelf Science* 133 (Supplement C):193‑205. https://doi.org/10.1016/j.ecss.2013.08.027.

Tyler-Walters, Harvey. 2005. « MarLIN - The Marine Life Information Network - Dwarf eelgrass (Zostera (Zosterella) noltei) ». 2005. http://www.marlin.ac.uk/species/detail/1409.

———. 2007. « MarLIN - The Marine Life Information Network - Common eelgrass (Zostera (Zostera) marina) ». 2007. http://www.marlin.ac.uk/species/detail/1282.

Vasconcelos, R. 2001. « Composição e estrutura das comunidades ictiicas dos estuarios do Douro e Tejo ». Thesis, Lisboa, Portugal: Universidade de Lisboa.

Wallace, Bryan P., Andrew D. DiMatteo, Brendan J. Hurley, Elena M. Finkbeiner, Alan B. Bolten, Milani Y. Chaloupka, Brian J. Hutchinson, et al. 2010. « Regional Management Units for Marine Turtles: A Novel Framework for Prioritizing Conservation and Research across Multiple Scales ». *PLOS ONE* 5 (12):e15465. https://doi.org/10.1371/journal.pone.0015465.

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