Marine Protected Area monitoring in the Channel: a review

David Rodríguez-Rodríguez, Siân Rees, Gerald Mannaerts & Emma Sheehan

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Marine Protected Area monitoring in the Channel

A review

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Author(s) / Auteur(s) : David Rodríguez-Rodríguez, Siân Rees, Gerald Mannaerts, Emma Sheehan

Contact : David Rodríguez-Rodríguez

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Marine Protected Area monitoring in the Channel: a review

Suivi des aires marines protégées dans la Manche : une synthèse

ABSTRACT

This report provides an overview of marine protected area (MPA) monitoring in the English Channel (the Channel). It uses an operational definition of MPAs by the OSPAR Convention that has been used throughout the PANACHE project.

It justifies the importance of monitoring MPAs soundly, regularly and systematically for effective conservation of biodiversity and related ecosystem services provided by these areas. It also shows the international and national policy and legal frameworks for MPA monitoring applicable to the Channel as well as existing marine and coastal monitoring schemes and programmes in the UK and France.

Finally, it provides a snapshot of MPA designation, management and monitoring status in the Channel by February 2014.

KEYWORDS: English Channel, marine protected area, monitoring, policy, legal requirement, scheme.

RÉSUMÉ

Ce rapport fourni un aperçu des suivis des Aires Marines Protégées (AMP) dans la Manche. Il se base sur une définition opérationnelle des AMP développée par la Convention OSPAR et utilisée tout au long du projet PANACHE.

Il illustre l'importance de suivis judicieux, réguliers et systématiques pour une protection efficace de la biodiversité et des services écosystémiques liés fournis par les AMP. Il montre également les politiques internationales et nationales et les cadres légaux entourant les suivis des AMPs dans la Manche ainsi que les schémas et programmes de suivis en mer et sur la côte au Royaume Unis et en France.

Finalement, il fourni un instantané du statut actuel des désignations, gestions et suivis des AMPs dans la Manche en février 2014.

MOTS-CLÉS : Manche, aire marine protégée, suivis, politique, obligation juridique, schéma

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I. Introduction

1.1 Marine protected areas

1.1.1. Policy background

Marine protected areas (MPAs) are one of the main strategies to safeguard marine biodiversity as well as other important ecosystem services provided by marine and coastal areas (Roberts et al., 2003; Sobel & Dahlgren, 2004). In response to international requirements to introduce measures for marine environmental protection (EU, 2000; EU, 2008) and to develop representative systems of marine protected areas (OSPAR, 2003; CBD, 2010b), national and European administrations are tasked to substantially complete an ecologically coherent network of MPAs by 2012.

1.1.2. Definition

There is not a unified definition of an "MPA". There are several definitions worldwide (WWF-UK, 2005a). Depending on their *main aims*, we can broadly distinguish between: "formal" MPAs that are designated for the primary purpose of conserving the natural and cultural environment in the long term (Dudley, 2008); and "*de facto*" MPAs, that are designated for other reasons (e.g. transport, energy, fishing, defence…) but apply a regulatory regime that also benefits the whole environment within their boundaries. Depending on their *legislative background*, we can distinguish between: "statutory" MPAs (those legally designated); and "voluntary" MPAs (those managed and protected on voluntary agreements by stakeholders such as NGOs). For the purpose of this work, we will consider as an "MPA" only those statutory MPAs that meet the broadly-accepted definition of a "protected area" (PA) by the International Union for Conservation of Nature (IUCN): "A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values" (Dudley, 2008). A protected area can thus be any area of sea, lakes, rivers or land that has been identified as important for the conservation of nature, and managed for this purpose.

The IUCN also establishes 7 categories of PAs according to their management objectives (Dudley, 2008; Table 1) which many countries have incorporated in their national legislations. All these categories can apply to MPAs. The higher the management category, the more stringent conservation measures are and thus the more limited human uses allowed in the PA are.

IUCN Category	Name
Ia	Strict nature reserve
Ib	Wilderness area
II	National park
III	Natural monument or feature
IV	Habitat/species management area
V	Protected landscape / seascape
VI	Protected area with sustainable use of natural resources

Table 1. IUCN protected area management categories (Source: Dudley, 2008.)

In the UK, the Review of Marine Nature Conservation, working report to Government, 2004 refers to the Convention on Biological Diversity (CBD) definition for Marine and Coastal PAs as: “any defined area within or adjacent to the marine environment, together with its overlying waters and associated flora, fauna, and historical and cultural features, which has been reserved by legislation or other effective means, including custom, with the effect that its marine and/or coastal biodiversity enjoys a higher level of protection than its surroundings” (DEFRA, 2004). In France, the definition for an MPA commonly used is the one registered in the National Strategy for the Creation of MPAs: “A delimited space of the sea for which long term conservation aims have been defined and, as a result, a certain number of management measures have been implemented”. In general, the conservation goal is not exclusive in a MPA. Sustainable economic activities can also be promoted (Ministère de l’Écologie, du Développement durable, des Transports et du Logement, 2012).

For this work, we will use a policy-led definition of “MPA” by the Oslo Paris Convention (OSPAR) that applies to both partners of the PANACHE project (UK & France): "An area within the [OSPAR] maritime area for which protective, conservation, restorative or precautionary measures, consistent with international law have been instituted for the purpose of protecting and conserving species, habitats, ecosystems or ecological processes of the marine environment”. This is also the main definition of MPAs used by the statutory environmental conservation agencies in the UK that are relevant for this project: Joint Nature Conservation Committee (JNCC), Natural England (NE) & Department for Environment Food and Rural Affairs (DEFRA).

1.2 Categories of MPAs in the framework of the project

All in all, there are nine categories of MPAs currently in use in the Channel area. Figure 1 shows how these categories are distributed between both project partners: the UK (England) and France.

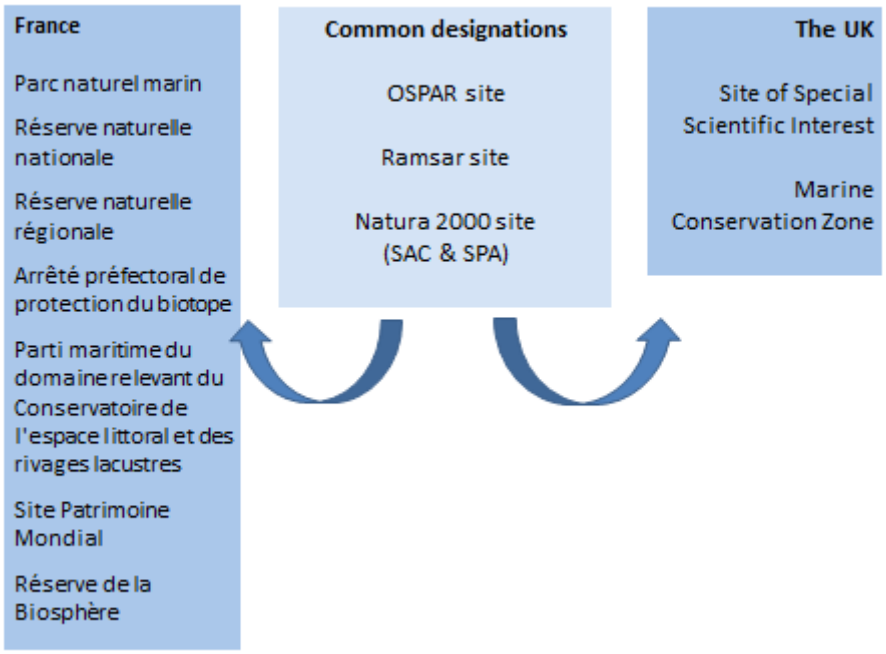

Figure 1. Comparison of marine protected area categories in use in the UK (England) and France. (*) 1st tranche to be designated in 2013

The following section describes those MPAs in more detail for each of the project partners.

1.2.1 The United Kingdom (England)

In England, there are 7 categories of MPAs currently in use (NE, 2013). Six of them currently occur in the Channel area:

1. *Special Areas of Conservation (SACs)*. This category of MPAs falls within the broader category of "European Marine Sites", and was originally set up under Article 3 of the Habitats Directive. According to it, SACs "hosting the natural habitat types listed in Annex I and habitats of the species listed in Annex II, shall enable the natural habitat types and the species' habitats concerned to be maintained or, where appropriate, restored at a favourable conservation status in their natural range" (EU, 1992).

2. *Special Protection Areas (SPAs)*. This category is also included within the broader category of "European Marine Sites", and was originally established under the Birds Directive (EU, 1979). SPAs should be made up of the most suitable territories in number and size for the

conservation of the bird species mentioned in the Annex I in the geographical sea and land area covered by the Directive in order to ensure their survival and reproduction in their area of distribution.

3. *Sites of Special Scientific Interest (SSSIs)*. SSSIs are designated for the protection of the most significant sites for the conservation of wildlife (species & habitats) and/or geology (UK Government, 1981).

4. *Ramsar sites*. These sites are designated under the Ramsar Convention (Ramsar Convention, 1971) to protect wetlands of international importance in terms of ecology, botany, zoology, limnology or hydrology. In the first instance wetlands of international importance to waterfowl at any season should be included. “Wetlands” are defined as: “areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres”.

5. *OSPAR MPAs*. A key part of OSPAR's biodiversity strategy is to establish a network of marine protected areas which is both ecologically coherent and well-managed by 2010 (OSPAR, 2003). An MPA may be considered for contribution towards the OSPAR network of MPAs if it meets one or more of the OSPAR MPA ecological criteria (OSPAR, 2006).

6. Marine Conservation Zones (MCZs). MCZs can be established for conserving: marine fauna, flora, habitats, geological or geomorphological features, according to the Marine and Coastal Access Act (2009). Eleven new MCZ have recently been designated in the Channel area[1].

Additionally, there are two further categories of MPAs in use in England:

- *Marine Nature Reserves (MNRs)*. MNRs are areas of sea and seabed (which can include intertidal areas) designated under the Wildlife and Countryside Act (UK Government, 1981)[2] for the purpose of conserving marine flora and fauna or geological or physiographic features of special interest and/or providing opportunities for study and research (UKMPA, 2012). There are no MNRs designated in the Channel. No further MNRs are likely to be designated as this legislation has now been superseded by the Marine and Coastal Access Act (2009).

[1] Within the PANACHE project area
[2] This law has been amended by the Marine and Coastal Access Act (2009)

1.2.2. France

In France, the Law N.2006/436 from 14th April 2006 establishes 6 categories of MPAs: national parks with a marine area, nature reserves with a marine area, prefectoral orders for the protection of biotopes with a marine area, marine nature parks, Natura 2000 sites with a marine area, and the marine areas of the public coastal domain. The Decree N.2006/1266 from 16th October 2006 and Order from 3rd June 2011 complete the list of areas considered as MPAs in France up to the 15 categories currently in use.

Of all of French MPA categories, 11 are in use in the Channel area (*):

1. *Parcs Naturels Marins*: This* Category of MPA was recently created in 2006[3]. Parcs Naturels Marins are MPAs designated for the integrated management of large areas. They contribute to knowledge as well as to protection and sustainable development of the marine environment. They are created following a public inquiry and managed directly by the staff of the Agence des Aires Marines Protégées.

2. *Réserves Naturelles*:* these sites are mainly terrestrial and have been designated to protect fauna, flora, soil, waters, mineral deposits and fossils or whichever important environmental feature that can be degraded by human activities. They can be created by the state (national) or proposed by local (regional) administrations. Both designations occur in the Channel area. They are considered to be MPAs if they include some marine area.

3. *Arrêtés préfectoraux de protection du biotope**: Protected area established to conserve a habitat hosting protected plant or animal species. They are considered as MPAs if they have a marine part.

4. Parties maritimes du domaine relevant du Conservatoire de l'espace littoral et des rivages lacustres*: Conservatoire du littoral is a public organisation that acquires and manages parts of the maritime public domain for conservation;

5. *Natura 2000 sites**: This category encompasses all the sites designated by the Birds Directive and Habitats Directives (EU, 1979; EU, 1992): Zones Spéciales de Conservation et Zones de Protection Spéciales. Both designations occur in the Channel area.

[3] Law N.2006/436 from 14th April 2006 related to national parks, marine natural parks and regional natural parks

6. *OSPAR sites**: Some MPAs (Parc Naturels Marins, Réserves Naturelles,...) that meet the requirements of OSPAR Commission (OSPAR, 2006) are also registered as OSPAR sites. These sites are mainly focused on marine environmental quality.

7. *Ramsar sites**: These sites are designated under the Ramsar Convention (Ramsar Convention, 1971), to protect wetlands of international importance in terms of ecology, botany, zoology, limnology or hydrology.

8. UNESCO World Heritage Sites: There is only one site in the Channel designated under the international convention concerning the Protection of the World Cultural and Natural Heritage from 1972 (Baie du Mont Saint Michel).

9. Biosphere Reserves: Following the Sevilla Strategy, one site has been designated in the Iroise Sea, at the Western limit of the Channel.

The following 6 MPA categories are also in use in France, although not in the Channel area:

- Parc Nationaux
- Réserves de chasse et de faune sauvage
- Barcelona Agreement Sites (Mediterranean);
- Nairobi Agreement Sites (East-Africa);
- Cartagena Agreement Sites (West-Indies);
- CAMLR Agreement (Antarctica);

1.3 Protected area monitoring rationale

Designating PAs is usually not enough to warrant the effective conservation of biodiversity (Liu et al., 2001; Naughton-Treves et al., 2005) and related ecosystem services. Effective management of these areas is also important, including regular monitoring and assessment activities to facilitate that the features that are formally protected are also effectively protected (Addison, 2011).

PA monitoring sets up the basis for assessing the status of protected features, detecting possible socioeconomic impacts of protection measures, and identifying and preventing existing pressures and threats (Davies et al., 2001; Pomeroy et al., 2005; Chape et al., 2008). Monitoring should therefore provide the basis for adaptive and effective management of PAs (Hockings et al., 2006). Without objective and regular monitoring, assessing the effectiveness of any PA against agreed targets is not possible (Addison, 2011). Despite its importance, the vast majority of PAs worldwide are not subject to regular monitoring and assessment activities, although the number of those PA where such activities are performed is increasing fast (Leverington et al., 2010).

There is not a unified definition of “monitoring” applied to PAs. We found the definition of “monitoring” in Lockwood (2001) to be a precise one: “The regular and systematic collection of environmental and biological data by agreed methods and to agreed standards. Monitoring provides information on current status, trends and compliance with respect to declared standards and objectives”.

II. MPA monitoring in the Channel

2.1. Policy and legislative requirements for monitoring

The following section shows policy and legislative requirements for MPA monitoring at international and national levels for the two project partner countries.

2.1.1. International level

At an international level, the CBD states in its Article 7 the need for the identification and monitoring of biological diversity at its three levels: ecosystems, species and genes, as stated in Annex I to the Convention (CBD, 1992). More specifically, the CBD Programme of Work on Protected Areas sets up different goals and targets regarding monitoring and assessment of PAs. Goals 1.5, 4.2, 4.3 & 4.4 of the CBD Programme of Work directly state the need to monitor and assess PAs to achieve a number of objectives: preventing impacts, improving the effectiveness of PA management, evaluating status and trends, and ensuring that scientific knowledge contributes to the effectiveness of PAs and PA systems (CBD, 2004).

Monitoring and assessing MPAs contributes to the successful implementation of the CBD's Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity targets included in it in the 10th CBD Conference of the Parties (CBD, 2010a) Monitoring MPAs helps achieve Aichi targets 11 and, especially, targets 12 & 13 related to preventing species and genetic diversity degradation and loss under the Strategic Goal C: "To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity" (CBD, 2010a). In its 10th Conference of the Parties meeting, the CBD required its Parties to "develop technical guidance on ecological restoration, monitoring and evaluation of the status of biodiversity in protected areas, governance of protected areas, connectivity, representativity with a regional approach, management effectiveness, conservation corridors, and adaptation to and mitigation of climate change" (CBD, 2010b).

At the European level, the OSPAR Convention (OSPAR, 1992) also contains a general obligation to its Parties to collaborate in regular monitoring and assessment of the state of the marine environment in the OSPAR maritime area. Annex IV to the Convention provides for cooperation in monitoring programmes, joint quality assurance arrangements, the development of scientific assessment tools, such as modelling, remote sensing and risk assessment strategies, and the preparation of assessments. In 2010 the Ministerial Meeting of the Commission adopted a renewed Strategy for the Joint Assessment and Monitoring Programme (JAMP) for the period 2010 to 2014. This provides a framework for work to develop OSPAR's monitoring and assessment programmes, with a particular focus on supporting the work to implement the EU Marine Strategy Framework Directive (MSFD; EU, 2008) that needs to be completed by Contracting Parties that are EU Member States over this period.

The Marine Strategy Framework Directive (EU, 2008) also includes objectives and deadlines for monitoring and assessing marine conditions:

- The initial assessment of the current environmental status of national marine waters and the environmental impact and socio-economic analysis of human activities in these waters (by 15 July 2012);
- The determination of what Good Environmental Status (GES) means for national marine waters (by 15 July 2012);
- The establishment of environmental targets and associated indicators to achieve GES by 2020 (by 15 July 2012);
- The establishment of a monitoring programme for the ongoing assessment and the regular update of targets (by 15 July 2014);
- The development of a programme of measures designed to achieve or maintain GES by 2020 (by 2015);
- The review and preparation of the second cycle (2018 – 2021).

Article 11 of the MSFD states the need for Member States to carry out coordinated monitoring programmes that are compatible within marine regions and with other relevant provisions, such as the Habitats Directive or the Birds Directive. Annex V of the Directive gives detailed guidance on the development of monitoring programmes to assess the GES of Member States' marine waters. These monitoring and assessment requirements apply to MPAs which are considered (art. 13.4) "spatial protection measures, contributing to coherent and representative networks… adequately covering the diversity of the constituent ecosystems…" (EU, 2008).

Similarly, the EU Water Framework Directive (EU, 2000) includes provisions for the establishment of monitoring programmes for the status of transitional and coastal waters additional to other necessary monitoring in coastal and estuarine PAs (art. 8).

The Habitats Directive (EU, 1992) requires the monitoring (art. 11) and periodic reporting (every six years; art. 17.1) on the conservation status of the habitats and species included in its annexes for which Natura 2000 sites (SACs & SPAs) have been designated, with particular regard to priority natural habitat types (Annex I) and priority species (Annex II). Article 1.e & 1.i detail what is meant by *conservation status* and *favourable conservation status* of habitats and species, respectively. The Directive also requires Member States to set up "a system to monitor the incidental capture and killing of the animal species listed in Annex IV (a)" (art. 12.4).

2.1.2. National level

To support the UK and French Governments in meeting international and European MPA monitoring commitments, national legislation has been developed to streamline the way the marine environment is managed at a national level.

a) The United Kingdom (England)

The only explicit MPA monitoring requirements in the national legislation of the UK arise from the Regulations transposing the Habitats Directive that apply to European Marine Sites: SACs and SPAs.
Wider MPA monitoring requirements are however inferable from the reporting requirements on the condition of conservation features in the Marine and Coastal Access Act (MCAA; UK Government, 2009), the driving legislation for MPAs in the whole UK, and in the Wildlife and Countryside Act (UK Government, 1981). The MCAA aims to achieve the Government's aim of 'clean, healthy, safe, productive and biologically diverse oceans and seas' (DEFRA, 2002) by regulating the activities in the marine and coastal environment of the UK with a view of sustainable development. Its Part 5 introduces a new category of MPA: Marine Conservation Zones (MCZs). MCZs can be established for conserving: marine fauna, flora, habitats, geological or geomorphological features. Designation orders for MCZs must state: the protected feature(s) and their conservation objectives, thus facilitating monitoring and assessment in these areas.
Similarly, the Wildlife and Countryside Act (UK Government, 1981) does not specifically requires the monitoring of SSSIs, but it states the need to manage SSSIs to ensure a "favourable condition" for these sites, which is defined as when the site is adequately conserved and is meeting its conservation objectives. For this assessment to be done, regular monitoring of protected features is again needed.

b) France

In France, the only overarching statutory monitoring requirement for MPAs comes from the Code de l' Environment (Gouvernement Français, 2013) and concerns Natura 2000 sites. Its article R414-11 requires the making of a "document of objectives" for these sites. This "document of objectives" should include monitoring methods for the planned measures in the MPA as well as surveillance methods of protected habitats and species according to their conservation status. For other MPA categories, their diversity leads to specific monitoring regulations and requirements at the management planning level. However such monitoring is more focused on the implementation of the intended actions than on the effectiveness of these actions.
To inform monitoring, the National Strategy for the Creation and Management of MPAs (Ministère de l'Écologie, du Développement durable, des Transports et du Logement, 2012) provides a framework to develop management plans using indicators. The main objective of this indicator framework is to assess the impact of activities on each MPA. Moreover, it advocates the evaluation of the network of MPAs both by type of MPAs and by (sub)region. It is proposed that both types of monitoring are included in an "MPA dashboard", whereby progress against MPA targets can be visualised (AAMP, 2012).

2.2. MPA monitoring schemes and programmes in use in the UK and France

2.2.1. The UK

a) UK Marine Monitoring and Assessment Strategy

The UK Marine Monitoring and Assessment Strategy (UKMMAS, 2007) is the reference document guiding monitoring of the sea and its resources in the UK. It includes all aspects of marine ecosystem monitoring; also human activities. The implementation of the Strategy is a cooperative enterprise undertaken by a partnership of by over 40 organisations nationwide and coordinated by DEFRA. It aims to provide a better integrated understanding of the marine environment. The ultimate aims of the UKMMAS are "to provide, and respond -within the UK capability-, within a changing climate, to the evidence required for sustainable development within a clean, healthy, safe, productive and biologically diverse marine ecosystem and within one generation to make a real difference" (UKMMAS, 2007).

The main targets and deadlines derived from those aims are: "to reach Good Environmental Status by 2021 as specified by the proposed European Marine Strategy Framework Directive; to achieve the targets set out under the 5 OSPAR Strategies, e.g. the cessation target for hazardous substances by 2020; to reach Good Ecological Status of Coastal and transitional waters by 2020 according to the Water Framework Directive; and globally to implement the open ocean observing system by 2010, as part of the Global Climate Observing System (GCOS) endorsed by the UNFCCC. Also, to demonstrate a difference from the baseline set out in 'Charting Progress' in one generation" (UKMMAS, 2007).
Annex 1 of the UKMMAS lists the main policy areas that require marine monitoring, including biodiversity conservation and MPAs, and which organisation has responsibility for its implementation. A summary of responsible Working Groups for different work areas is presented in Table 2. According to it, most monitoring activities within MPAs in the UK fall under the remit of the Healthy and Biologically Diverse Seas Group (HBDSEG).

Evidence Group	Chair	Secretariat	Drivers/Work areas
Clean and Safe Seas (CSSEG)	Centre for Environment, Fisheries and Aquaculture Science (CEFAS)	Scottish Environment Protection Agency (SEPA)	OSPAR: Hazardous Substances, Radioactive Substances; WFD : Chemical Status; Shellfish Hygiene Directive; Bathing Waters Directive
Healthy and Biologically Diverse Seas (HBDSEG)	Environment Agency (EA)	Joint Nature Conservation Committee (JNCC)	OSPAR: Biodiversity, Eutrophication; WFD: Ecological Status; Birds Directive: Habitats Directive; Conservation of Seals Act; IOC-GOOS; Climate change impacts; Fisheries: fish community data; IMO Ballast Water Strategy; UWWT Directive; Nitrates Directive
Productive Seas (PSEG)	Scottish Government	Centre for Environment, Fisheries and Aquaculture Science (CEFAS)	Socioeconomic data

Table 2. Distribution of monitoring responsibilities in marine monitoring in the UK (Source: Modified from UKMMAS, 2007.)

b) Common Standards Monitoring for designated sites in the UK

The statutory nature conservation agencies of the UK (the JNCC, Countryside Council for Wales –now Natural Resource Wales-, Natural England, Scottish Natural Heritage, and the Northern Ireland Environment Agency) produced a document for the standardised monitoring of *SSSI, SACs, SPAs and Ramsar sites*: *Common Standards Monitoring for designated sites* (Williams, 2006). It provides guidance for the assessment of the conservation status (favourable, unfavourable or destroyed) of selected features (habitats, species or earth science features) against conservation targets set up for those features. The marine features monitored according to this standard are shown in Table 3:

Category	Sub-category	Feature
Species	Mammals	Mammals
	Birds	Aggregations of breeding birds
		Assemblages of breeding birds
		Aggregations of non-breeding birds
	Fish	Fish
	Invertebrates	Other invertebrates
	Plants	Flowering plants
Habitats	Coastal	Saltmarsh
	Marine	Rocky shores, reefs and caves
		Intertidal sands and muds
		Lagoons
		Subtidal sandbanks
		Estuaries*
		Large shallow inlets and bays*

*Table 3. Marine features to be monitored according to the Common Standards Monitoring for designated sites. * No assessments of features in this category have been undertaken yet. Source: Adapted from* ***http://jncc.defra.gov.uk/page-3524***

Human activities affecting MPA sites and conservation measures taken to maintain or restore features are recorded as well. Figure 2 shows the rationale and procedure used for this monitoring.

c) Marine Monitoring Handbook

The Marine Monitoring Handbook (Davies et al., 2001) describes the principles behind and the procedures for the monitoring of condition (favourable conservation status) of some marine features in SACs in the UK, following the requirements of the Habitats Directive. “Favourable condition” is the formulated standard or target defined for each interest feature. There are two basic components of “favourable condition” of an interest feature (Davies et al., 2001) :

1) Quantity (e.g. extent of habitat, abundance of species, etc.), quality of the feature (e.g. presence of component species, productivity rate), and processes supporting the feature (e.g. water quality, sediment processes); and
2) Favourable conservation thresholds.

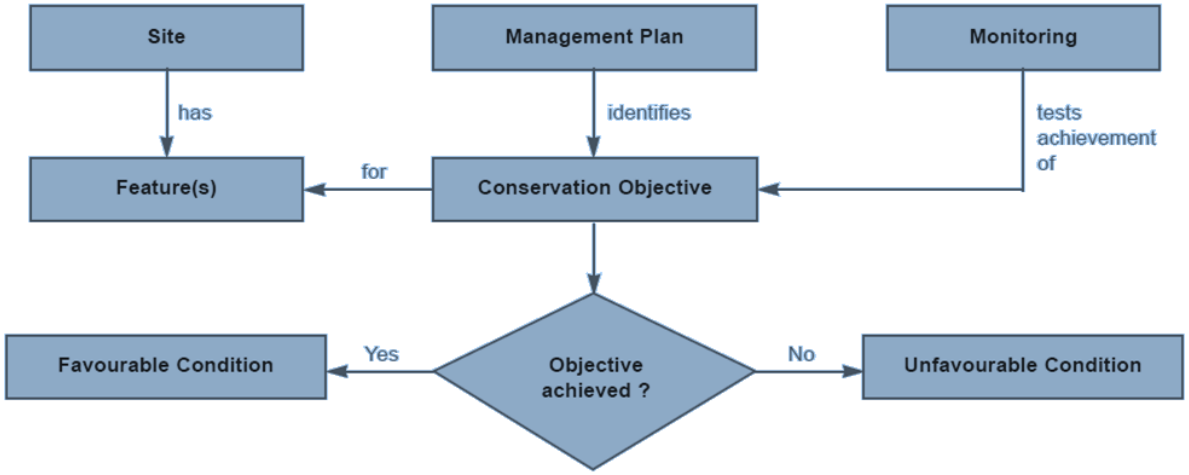

Figure 2: Rationale and procedure for the monitoring of SSSI, SACs, SPAs and Ramsar sites. Source: Common Standards Monitoring for Designated Sites: First Six Year Report: Summary.

In the Second Report by the United Kingdom under Article 17 on the implementation of the Habitats Directive from January 2001 to December 2006 on assessing conservation status of features protected under the Directive (JNCC, 2007), the UK selected some parameters to estimate "conservation status":

1) For species: range; population estimates; habitat for the species (area, trend in quantity and quality, and area of suitable habitat); & future prospect judgements on a 12-year basis. The UK has assessed the condition of the 89 plant and animal species (including 13 marine mammal species) included in the Annex II of the Habitats Directive (JNCC, 2013a).
2) For habitats: range (calculated on a feature by feature basis for marine habitats comprising coastal habitats, sublittoral habitats and sea caves); area; structures & functions (considering main pressures, current condition, and condition of typical species); & future prospects (considering conservation measures in place, future threats and analysis of the possible future habitat condition based on the same Common Standards Monitoring (Williams, 2006) data used to assess structures and functions (JNCC, 2007). The UK has assessed the condition of 77 habitats, of which 15 are marine, coastal or halophytic habitats (JNCC, 2013b).

Following the requirements by the Habitats Directive, the UK statutory agencies have developed guidance requiring the monitoring all its designated sites on a six-year basis (Williams, 2006). Within this period, each interest feature should be monitored preferably on a yearly basis or, at least, on a three-year basis. However, some features will need to be monitored more frequently than that depending, for instance, on their conservation status or threats (JNCC, 2013c). The monitoring of SACs is coordinated by statutory nature conservation agencies (JNCC & NE in England) although other relevant authorities can carry out monitoring activities. An outline of the statutory monitoring procedure is shown in Figure 3.

The JNCC currently leads the Marine Biodiversity Monitoring Research and Development (R & D) Programme on behalf of the Statutory Nature Conservation Bodies. The Marine Biodiversity Monitoring R & D Programme aims to recommend an integrated UK system of monitoring for both

MPAs and the wider environment to meet the requirements of the MSFD and other drivers such as the Habitats Directive and the Marine and Coastal Access Act.

d) MCZ Monitoring

MCZs provide for the conservation of rare, threatened and representative habitats, species, geological and geomorphological features important at a UK scale. In September 2011 a total of 127 recommended MCZ sites were submitted to Government. In December 2012, an initial tranche of 31 recommended MCZs was put forward for a further public consultation process to determine if they meet the economic, social and environmental criteria to be fully designated (DEFRA, 2013). In November 2013, 27 of the 31 proposed MCZs within the first tranche were finally designated, 11 of which occur in the PANACHE project area (PANACHE, 2014).

Although not explicitly requiring the monitoring of MCZs, the MCAA (UK Government, 2009) implies the need to carry out of monitoring activities in MCZs. It states that (art. 124.3): “the appropriate authority for any area may direct the appropriate statutory conservation body for that area to carry out such monitoring of MCZs in that area as is specified in the direction”. Furthermore, it requires a periodical report setting out (art. 124.2): “the extent to which, in the opinion of the [appropriate] authority, the conservation objectives stated for each MCZ which it has designated have been achieved”, and “any further steps which, in the opinion of the authority, are required to be taken in relation to any MCZ in order to achieve the conservation objectives stated for it”.

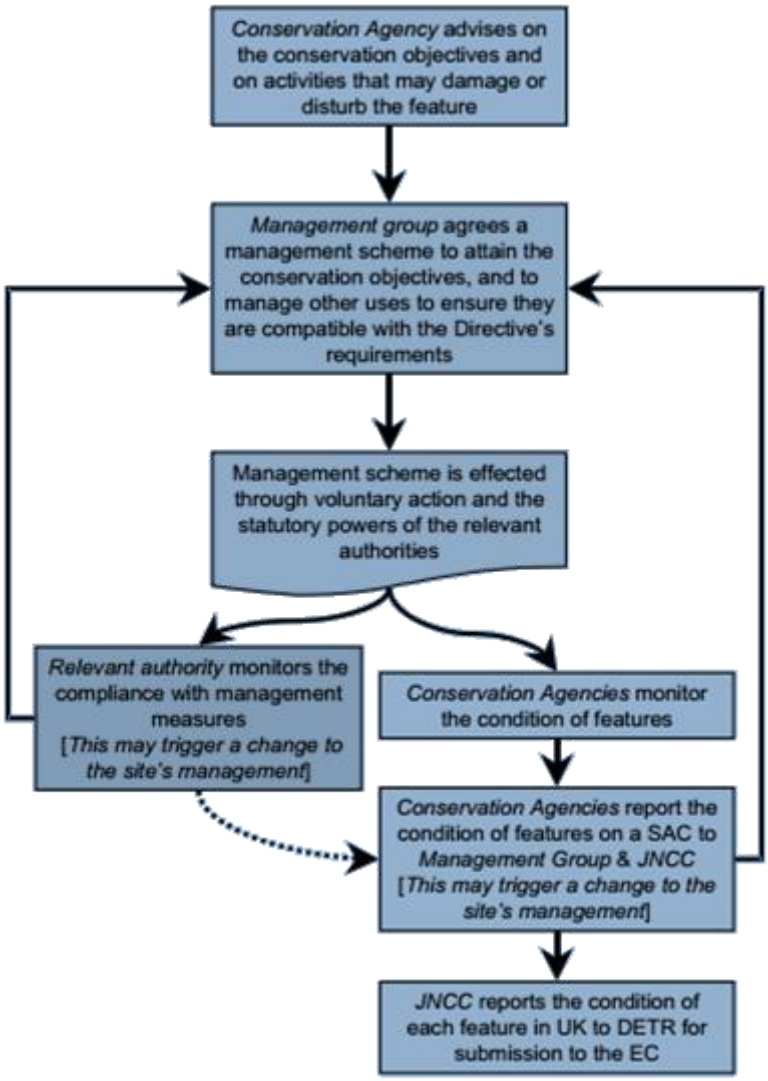

Figure 3: Outline of the process of establishing a management scheme incorporating a monitoring programme on a SAC, showing the organizations responsible for each stage.
Source: Davies et al. (2001)

2.2.2. France

a) Marine Action Plan in France

The MSFD (EU, 2008) urges member states to achieve GES for the marine environment by 2020. Following the requirements of the Code de l'Environnement (Gouvernement Français, 2013), it has been adapted in the "Plan d'action pour le milieu marin" (article L219-9). This action plan must include the following:

- An initial evaluation of the state of each marine sub-region. This consists of an assessment of the state of the environment which will inform the development of a program of measures within the action plan. The evaluation was concluded in 2012 and includes an assessment of the characteristics and the ecological status of marine waters, a study of impacts and human pressures, an economic and social survey about the uses of these waters, and the economic consequences of their eventual degradation.

- The definition of GES of each sub-region to be achieved by 2020. This describes the goals that need to be achieved by the action plan. It is based on 11 of the GES indicators listed in the Directive.
- The setting of environmental goals. These goals divide the definition of GES into operational targets. They must be measurable and quantifiable.
- The establishment of a surveillance program before July 2014. This program includes all monitoring and assessment activities that enable an evaluation of the implementation of the program of measures and the achievement of objectives.
- The development of a program of measures that should be done before 2015. It constitutes the operational part of the Plan d'action pour le milieu marin.

As defined by the Code de l'Environnement (Gouvernement Français, 2013), the monitoring resulting from this law "contributes to the creation of a coherent network of marine protected areas representative of ecosystems and marine life". This network includes the MPAs delegated to the Agence des Aires Marines Protégées and MPAs designated following regional or international agreements.

The implementation and coordination of the "Plan d'action pour le milieu marin" is delegated to both a regional and a maritime prefect, depending on the marine sub-region. For the Channel, the Channel and North Sea maritime prefect and the prefect of Upper-Normandy are responsible for its making, approval and the coordination of its implementation. The initial evaluation will lead to a monitoring program which will be updated every six years.

b) Management plans and monitoring in French MPAs

For a long time, monitoring of MPAs in France dealt only with assessing the degree of accomplishment of the planned actions. The effectiveness of these actions is a recent concern found in some guidance documents such as the "Grenelle de la mer" or the "Plan d'action pour le milieu marin". The management plans of Natura 2000 sites, Parcs Naturels Marins, Parcs Nationaux, Réserves Naturelles and other MPA categories need to be updated regularly (for example every 5 year for a Nature Reserve or every three years for Natura 2000 sites). At each revision period, the actions included in management plans are evaluated. New management plans generally focus on the mains conservation issues perceived about the site by managers and stakeholders.

c) French Marine Protected Area Dashboard

In 2006 the Agence des Aires Marines Protégées (AAMP) was created[4]. In 2012 a strategic document setting up its principles and orientations was produced. It highlights the necessity to monitor management effectiveness by the establishment of dashboards and indicators. The use of indicators had previously been tested in protected areas but it was not a legal obligation (e.g. through regional impulse, NGO recommendations....). In 2007 the IUCN pointed out the lack of indicators to assess the evolution of threats, biodiversity, etc. in France (Martinez, 2007). The "Tableau de bord des AMP" (AAMP, 2012) was initiated in 2008 and is part of a French marine sea dashboard. The aim of this dashboard is having an overall view of the MPA network. A common monitoring framework and indicators are defined:

- at a regional scale to ensure the coherence of the monitoring of the network; &
- for each MPA, to assess the effectiveness of the implemented management measures.

The AAMP provides support to each MPA manager so they can develop their own dashboard to assess the effectiveness of their management and whether the goals included in the management plan are reached. For this, a list of indicators linked to the different objectives of the MPA is established.

The different objectives of each type of MPA are listed in Table 4.

[4] LOI n° 2006-436 du 14 avril 2006 relative aux parcs nationaux, aux parcs naturels marins et aux parcs naturels régionaux

MPA Category	Protection objectives (in the designation texts)							
	F1	F2	F3	F4	F5	F6	F7	F8
Réserve naturelle ayant une partie maritime	X	X	X					X
Site Natura 2000 en mer	X							
Parc naturel marin	X	X	X	X	X	X	X	X
Parties maritimes du DPM remis en gestion au Conservatoire du littoral	X	X	X			X	X	X
Arrêté de protection de biotope ayant une partie maritime	X							
Site Ramsar	x	x	x	x			x	
Sites OSPAR	x							

Table 4. Objectives of each marine protected area category occurring in the Channel in France

F1. Good status of protected, rare or threatened species and habitats.
F2. Good status of species and habitats mentioned in the management plan of the MPA (exploited, locally abundant …);
F3. Rendering of ecological functions (reproduction, feeding, nursery, shelter…)
F4. Good status of marine waters;
F5. Sustainable use of resources;
F6. Sustainable development of uses;
F7. Maintaining of cultural maritime heritage;
F8. Services provided (social, economic, scientific, educative)

The aggregation of individual dashboards into a regional analysis allows developing inter-site surveys, relevant indicators across the entire coastline and regional and international projects. They are also intended for developing a regular assessment habit by each MPA manager. The dashboard should ultimately increase the visibility of the role played by MPAs in the GES of the marine environment in regard to the 2020 objectives by the MSFD (EU, 2008). An example of monitoring dashboard for a French MPA is shown in Annex 1.

d) National programs and research projects

There are several national or regional wide programs concerning marine monitoring, including designated MPAs and planned MPAs. Recently launched, in 2010, PACOMM and CARTHAM programs focus on marine birds and mammals and marine habitats respectively. They allow assessing the initial status of features in and outside MPAs where previous reference was non-existent.
Like in the UK, other marine monitoring schemes harmonized at the national level contribute to the objectives of MPAs although they are not aimed specifically at protected areas: monitoring of the

sanitary condition (e.g. bathing water quality) and ecological status of coastal and transitional waters following the Water Framework Directive (Table 5), or assessment of the current environmental status of national marine waters and monitoring of the achievement and maintenance of GES following the MSFD (EU, 2008).

Coastal and transitional waters		
Ecological status determined by	Biology compounds	Phytoplankton
		Macroalgae
		Angiosperms
		Benthic invertebrates
		Fish (only in transitional waters)
	Physico-chemical compounds related to biology	Temperature
		Turbidity
		Dissolved oxygen
		Nutriments
	Hydromorphology	Hydromorphology
Chemical status determined by	Chemical compounds	41 substances (8) hazardous (33) priority

Table 5. Monitored features in coastal and transitional waters in France related to the Water Framework Directive

Also similarly to the UK, a number of research projects focus on the assessment of the wider marine environment. Ifremer (French Institute for the exploitation of the sea) work on a regular basis on national projects related to fisheries resources (for example the participation in the project IBTS, International Bottom Trawl Survey, CGFS, Channel Ground Fish Survey,…), to oceanography (including the use of new technology *in situ* like the Marel stations or from far away using remote sensing) and to relationships between human activities and the environment. In addition, marine observatories (at Wimereux, Roscoff, Brest, etc.), playing the role of marine laboratories for universities or research centers, work increasingly together at a national level to carry out coherent studies, including MPAs in their surveys sometimes. The project SOMLIT for example (acquisition of hydro-climatic, chemical and biological parameters, in relation to the ecological status assessment mentioned above), or the project RESOMAR (study on benthos) are results of this cooperation.

2.3 Current status of MPA monitoring in the Channel

2.3.1. Project area

Figure 4 shows the PANACHE project area in the Channel, to which ensuing figures in this section relate.

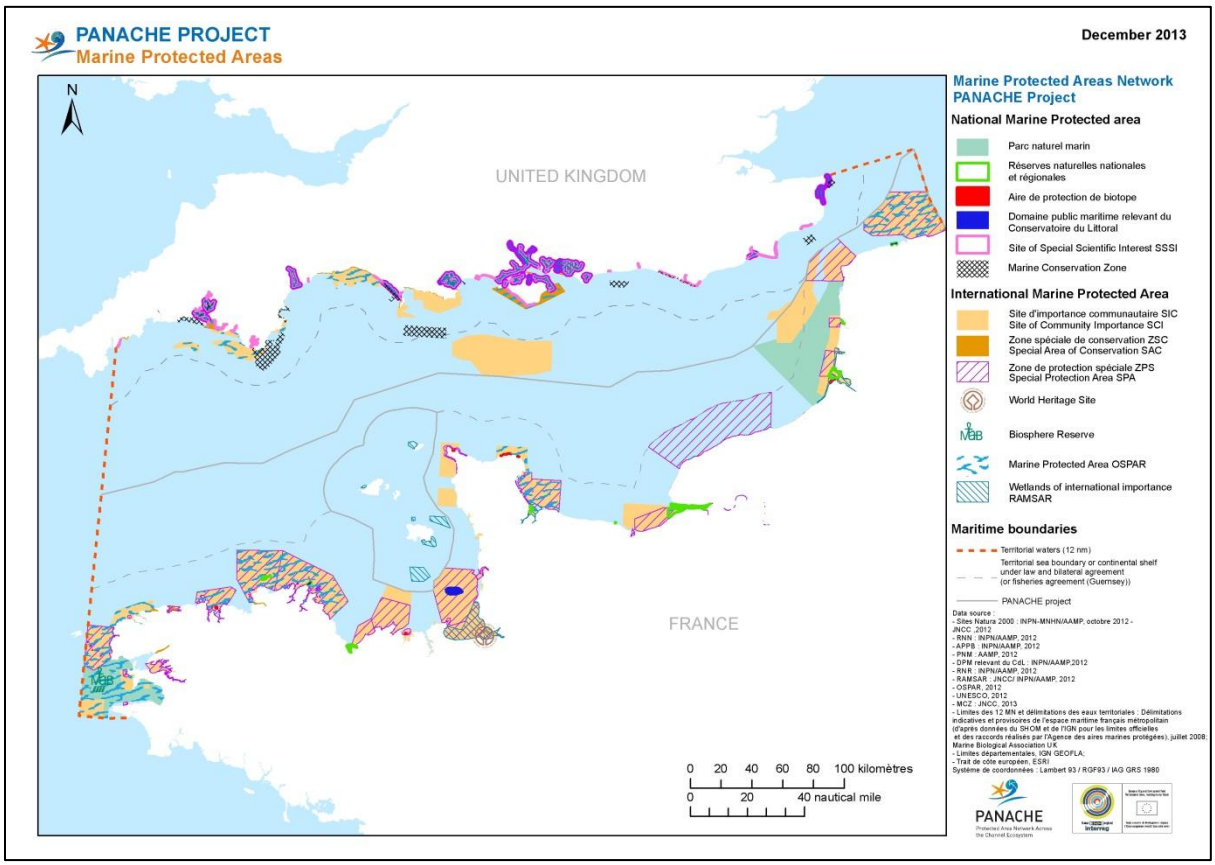

Figure 4. PANACHE project area, marine protected areas (by category) and territorial waters of the UK and France in the project area. Source: PANACHE, 2014.

2.3.2. The UK

a) Main figures on MPAs in the Channel

On the English side of the project area there are currently 98 MPAs corresponding to 6 categories. There are 15 SACs[5], 10 SPAs, 39 SSSIs, 13 OSPAR sites, 10 Ramsar sites and 11 MCZs[6]. Some of these categories overlap on the same MPA. For instance, most Ramsar sites are also SPAs and all OSPAR sites are also either SACs or SPAs.

Together, these 98 MPAs cover approximately 353,100 ha of marine and coastal (intertidal and subtidal) habitats. This amounts to approximately 4.1% of the PANACHE project area, roughly 8.2% of

[5] Including, SACs and cSACs. Both are considered as designated MPAs, according to NE's advice.
[6] Designated in November 2013.

the UK side of the project area. They provide protection for 103 different features of conservation interest[7]: 51 species, 51 habitat types and 1 other feature[8] (Annex 2).

e) State of management

The management of the English MPAs in the Channel is diverse, complex and highly site-specific. MPA management follows a sectorial approach, with different authorities in charge of different resource management responsibilities (e.g., the Inshore Fisheries and Conservation Authorities in charge of inshore fisheries, or the Crown Estate, granting leases and licenses on the use and exploitation of the seabed). As a result, there is not usually a unified management body for an MPA. Nor does every MPA have a managing authority in place.

Regarding marine Natura 2000 sites (marine SACs & SPAs) or Natura 2000 sites with marine components, the regulations that transpose the Habitats Directive (EU, 1992) specify that a single management scheme involving a large number of organizations at the national, regional and local levels (UK Government, 2010), may be established for any Natura 2000 site (JNCC, 2010), although there is no legal imperative to do so. As a result, not every European Marine Site (SAC or SPA) has a management scheme. Management schemes act as frameworks whereby to manage sites and promote cooperation among relevant authorities, especially in large and complex sites. For some of these sites, European Marine Site Management Groups (including different relevant authorities: port authorities, Natural England, the JNCC, local councils and others) have been established. They are normally coordinated by one of the competent authorities. In these sites, in addition to relevant authorities, there may also be advisory groups that allow other stakeholders (NGOs, users, etc.) to have their say in the management of the site. Coastal partnerships (Coastal Partnerships Network, 2011) are one example of such groups.

OSPAR sites and Ramsar sites are managed by the same organisations and through the same actions as the specific SACs and/or SPAs they overlap with.

The Marine and Coastal Access Act (UK Government, 2009) endows the Marine Management Organisation (MMO) with different competencies regarding the management of MCZs, although a range of other organisations can also participate in additional management actions, including monitoring.

Only SSSIs can have a single manager: landowners, who can be assisted by Natural England in some management activities, although the management of most coastal SSSIs often involves several landowners in a single site.

f) State of monitoring

[7] According to the Habitats Directive, the Birds Directive, the Marine and Coastal Access Act and the Wildlife and Countryside Act. “Marine” features included in this report have been checked against Natural England criteria and include subtidal and intertidal features.

[8] Earth heritage feature (Wildlife and Countryside Act, 1981).

In England, monitoring responsibilities for MPAs are to some extent decoupled from other management activities and are often more clearly defined. It is up to the statutory nature conservation bodies (Natural England and the JNCC) to monitor the condition of designated features within designated MPAs to inform the site's managers and the government as well as to provide managers with appropriate management advice. The Department of the Environment, Transport and the Regions provided some guidance on monitoring activities and responsibilities in European Marine Sites (DETR, 1998). Natural England reports to the JNCC on the condition of designated features under the Habitats and Birds Directives (SACs and SPAs) in MPAs located within 12 nautical miles from the coastline. It reports to the UK government of the condition of designated features within SSSIs. The JNCC reports on the condition of designated features in MPAs beyond 12 nm. It also collects all info on the condition of designated features in SACs and SPAs within and beyond 12 nm and conveys it to the government. It should be noted though that reporting does not currently take place at an MPA scale.

Natural England and the JNCC are also involved in the collection of monitoring data using their staff, partners or contractors. Raw monitoring data is often provided by different groups such as statutory bodies (e.g. the Environment Agency, the IFCAs), other public bodies (e.g. Ministry of Defence, Marine and Coastguard Agency, United Kingdom Hydrographic Office) research centres (like CEFAS or universities) or NGOs.

It is important to note that most monitoring activities carried out in MPAs to date have implied identifying the presence of features (verification, for MCZs), or establishing feature condition baselines (for recently designated SACs and SPAs), as well as *ad hoc* monitoring of some designated features within previously designated MPAs.

Marine features in English MPAs are monitored through a range of different techniques, the most usual of them being shown in Table 6. These techniques are not usually feature-specific, but are normally used to monitor a diversity of features. However, different features sharing monitoring techniques may require specific monitoring design in terms of sampling effort, size of quadrat, length of transects, etc.

Monitoring technique	Monitored feature(s)
Acoustic (multibeam)	Extent of subtidal features;
Towed/drop video	Extent and species and biotope composition of of subtidal benthic features
Intertidal biotope mapping	Extent and species and biotope composition of intertidal features
Core sampling	Species and biotope composition of intertidal sediment features; benthos and biomass analysis

Transects & quadrats	Species and biotope composition of reefs & sea caves; Littoral rock; Littoral sediment
Hand coring, hand net, & visual assessment	Species and biotope composition of coastal & Saline lagoons
Diving surveys	Species and biotope composition of benthic features (incl. sea caves)
Grab sampling	Species and biotope composition of subtidal sediment habitat
Intertidal survey	Extent, distribution and quality of intertidal features
Water sampling	Water quality; pollution; level of organic contaminants; plankton
Wetland Bird Survey[9] / Birdcounts	Bird numbers

Table 6. Main monitoring techniques in use in English marine protected areas of the Channel

Whereas some techniques such as littoral transects and quadrats are non-destructive, cost and time effective techniques, and are thus appropriate to use in MPAs, many of the subtidal benthic monitoring techniques are not. Dragging towed sledges over the seabed can impact structurally complex species, which are slow growing and long lived, such as corals, sponges and some bryozoans. The alternative use of non-destructive scuba divers or Remote Operated Vehicles techniques is inherently expensive and consequently only allows small areas to be monitored. The required area within MPAs far exceeds the area that could be sampled within environmental budgets; however, new methods of surveying benthic habitats would allow representative proportions of MPAs to be monitored. An example of these is 'The flying array', which was developed by the Marine Institute team, and comprises a floating array with mounted High Definition video camera, LED lights, CTD and laser scaling (Sheehan et al., 2010). This relatively non-destructive, time and cost-effective sampling method allows an average of 8 x 200 m video transects to be surveyed per day. These can be analysed in full to count rare and conspicuous species, or spliced into frame-grabs with a digital quadrat overlay for analysis of common or cover forming organisms.

Most designated features are currently being verified or monitored in the English MPAs of the Channel (Chris Pirie, Natural England, personal communication), although monitoring frequencies differ substantially between features, MPAs and MPA categories. Feature monitoring frequency usually follows a risk-based approach whereby endangered features or features at higher risk of degradation are more frequently monitored. Most features are monitored on a multi-annual basis, although there

[9] http://www.bto.org/volunteer-surveys/webs

are a few MPAs where annual or even monthly monitoring takes place (mainly some SPAs). The reporting frequency on the condition of features generally aligns with the 6-year reporting cycle required by the Habitats Directive (Table 7). Social and economic features are starting to be monitored in some UK MPAs as a result of a legal requirement to do so (UK Government, 2009). An extensive socioeconomic impact assessment to identify and estimate the main social and economic impacts and benefits from the establishment of a network of MCZs has recently been conducted nationwide (JNCC, 2012) through four regional projects dividing the UK's waters (JNCC, 2013d).

MPA category	Monitoring frequency (in general)	Reporting frequency
SSSI	Between 6-10 years	Every 6 years
SAC	Between 3-6 years	Every 6 years
SPA	Continuous (monthly)	Every 6 years
OSPAR site	Not specified, although actually following the frequency of the overlapping category	Not specified
Ramsar site	Not specified, although usually continuous for overlapping with SPAs	Not specified
MCZ (2013)	To be determined	Every 6 years (proposed)

Table 7. General feature monitoring and reporting frequency in English marine protected areas in the Channel

Note: The actual monitoring frequency is highly feature-specific

Figure 5 shows the investment on Channel MPA monitoring by NE in the last three years. The amount spent in monitoring MPAs in the Channel (mainly SACs & MCZs) has increased substantially in recent years. This not only reflects the increase in the number of designated or proposed sites in the Channel but it also highlights how the raised political profile of the marine environment in the recent past has enabled a greater budget to be made available for monitoring in England.

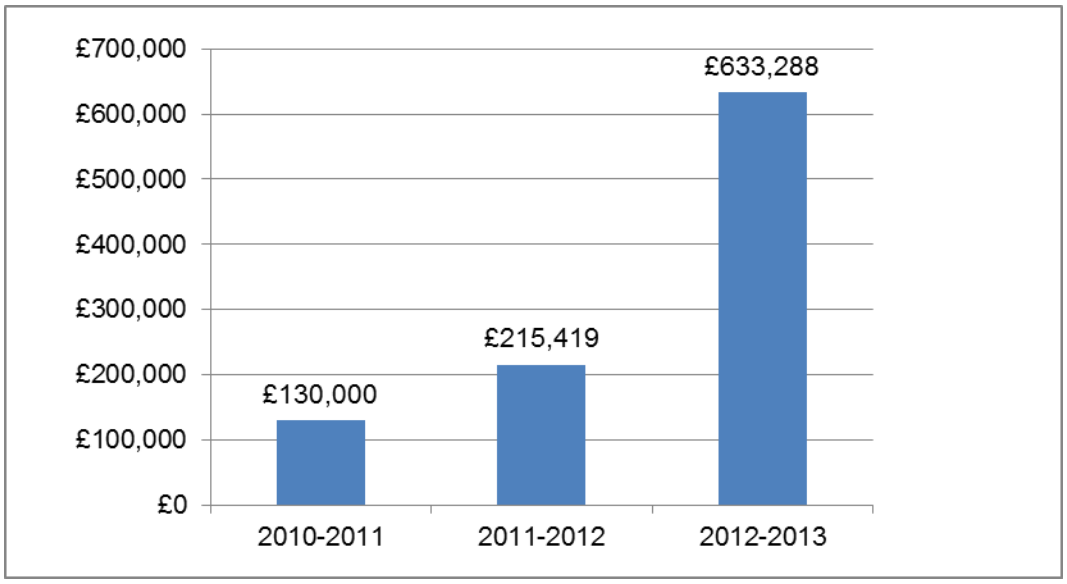

Figure 5. Marine protected area monitoring expenditure by Natural England in the Channel per year. Courtesy of Natural England

Note: Figures reflect the total available budget for marine protected area monitoring by Natural England in the Channel (excluding Natural England's staff costs). They include monitoring activities in some Special Areas of Conservation, Special Protection Areas and Marine Conservation Zones between Land's End and Thanet Coast.

2.3.3. The Channel Islands

a) Main figures on MPAs in the Channel

The 7 Ramsar sites in the Channel Islands cover 209.64 km2, which represents 0.24% of the project area, 3.28% of the Channel Islands' waters and contributes 1.2% to the MPA network in that area.

b) State of management

The Ramsar sites in the Channel Islands are managed either directly by their respective governments (Jersey, through the Ramsar Management Authority, an organization representing the government but also different stakeholders, and Guernsey, through contractors: Environment Guernsey) or by wildlife trusts (Alderney, Alderney Wildlife Trust).

c) State of monitoring

Marine monitoring in the Ramsar sites of the Channel Islands is included in the rest of management activities and performed by the management organizations.

2.3.4. France

10. Main figures on MPAs in the Channel

On the French side there are 117 MPAs distributed among 11 categories. There are 3 Ramsar sites, 17 OSPAR sites, 77 Natura 2000 sites (Zones Speciales de Conservation, Zones de Protection Speciale and Sites d'Importance Communautaire) 8 Réserves naturelles nationales, 1 Réserve naturelle régionale, 2 Parcs naturels marins, 4 Arrêtés préfectoraux de protection du biotope, 3 Parties maritimes du domaine relevant du Conservatoire de l'espace littoral et des rivages lacustres, 1 UNESCO World Heritage Site and 1 Biosphere Reserve. Similarly to the UK, some of these categories overlap. For instance, all OSPAR sites are additionally either Natura 2000 sites (13 of them), Reserves Naturelles (3 of them) or Parc Naturel Marins (1 of them).
Together, these 117 MPAs cover roughly 1,391,000 ha, approximately 16.2% of the project area and 37.9% of the French side of the project area.

g) State of management

Channel MPAs are managed by a wide diversity of actors: fisheries committees, NGOs, public conservation bodies such as l'Agence des Aires Marines Protégées, the Conservatoire du Littoral and Parcs Naturels Regionals, local authorities (communes or groups of communes) and other organisations, such as port authorities (Figure 6).

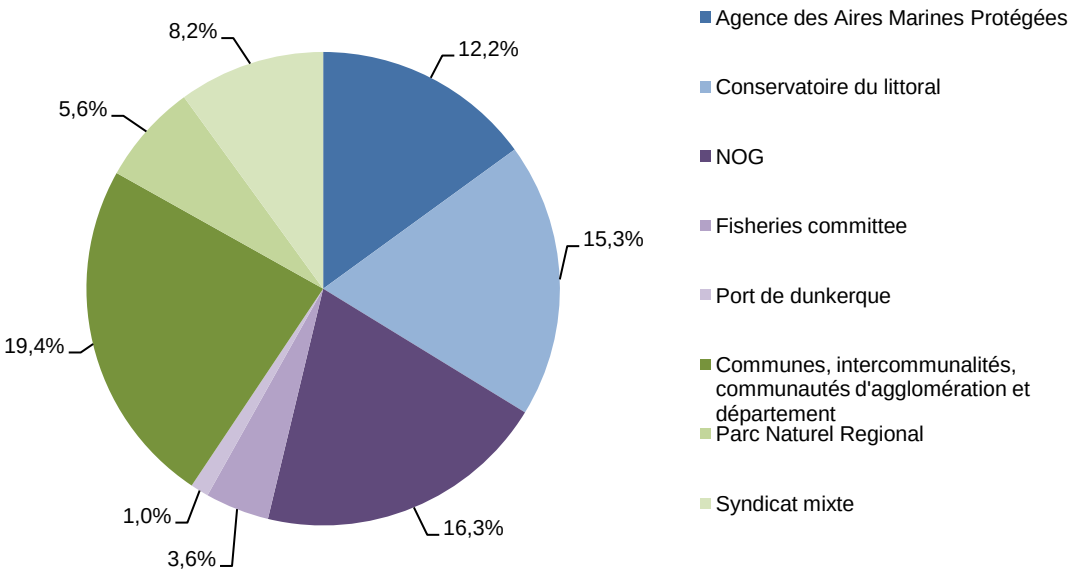

Figure 6. Distribution of management responsibilities in French marine protected areas in the Channel area

The Agence des Aires Marines Protégées is acquiring more management responsibilities and is likely to become the manager of all marine Natura 2000 sites in the forthcoming future.

h) State of monitoring

Monitoring in French MPAs is highly site-specific and many monitoring requirements come from national or regional regulations not specifically related to protected areas. In France a lot of different organizations are involved in assessing the state of MPAs such as the AAMP, Ifremer, laboratories, universities, or NGOs. Whereas some of the monitoring such as stranding survey and sea birds surveys is harmonized at the national level through national programs, most monitoring activities are not standardised. Effort is being made for the making of an inventory of monitoring protocols both on land and in the sea: SINP, '*Systeme d'Information Nature et Paysages',* launched in 2005 by the Ministry of Environment.

It is part of the MPA manager role to gather existing data and to establish any necessary action following requirements in management plans that are produced based on the best available data collected since the last management plan was produced. Unlike what frequently happens in the UK, monitoring is part of the MPA manager's duties, even if it can be completed by some specific or global monitoring carried out by other external organizations (e.g: universities working in this particular area).

Management plans are reviewed regularly according to MPA categories (Table 8). Monitoring activities take place between those periods, although not necessarily at a regular frequency.

An MPA indicator "dashboard" is currently being developed by the AAMP in partnership with MPA managers, research institutions and other stakeholders. It uses a common assessment framework based on indicators that are integrated at different scales: from individual MPA, to indicate the evolution of each indicator at each new management plan, to regional and national scales, to obtain a strategic overview of the network (AAMP 2012). Since 2010 the AAMP has assisted each manager since 2010 to develop his/her own indicators and dashboard to assess management effectiveness. The AAMP are responsible for the aggregation of the data on the regional and national scales.

Category	Frequency
Natura 2000	Every 6 years
Réserve Naturelle	Every 5 years
Parc Naturels Marins	Every 15 years
Site of the Conservatoire du Littoral	Every 5 years

Table 8. General frequency of update of management plans for different categories of marine protected areas in France.

The most common techniques for monitoring natural features in MPA in France are shown in Table 9. Socioeconomic, governance or threat monitoring are not treated in this report, even though such issues are becoming more frequently monitored by managers.

Monitoring technique		Monitored feature(s)
Core sampling and hand coring		Quality of intertidal sediment features; benthos; biomass analysis
Theodolite, GPS and topography techniques		Coast evolution
Water sampling		Water quality, pollution, level of organic contaminants; Plankton
Grab sampling		Quality of subtidal sediment habitat and chemical contamination; Benthos
Acustic (multibeam)		Extent of subtidal features
Hydrophones (CPod)		Mammals
Audio recording		Bird counts
GPS Tracking, tagging and banding		Functional areas for seals, birds and fish (sea bass)
Towed/drop video		Quality/extent of subtidal benthic features; pelagic features
Visual assessment and photographic identification	Diving survey	Quality, extent and number of subtidal features
	Intertidal survey, fix point, transects and quadrats	Extent and number of intertidal features; mapping
	Sea watching	Sea bird and marine mammal survey
	Boat survey	Number of pelagic features (fish, birds, marine mammals)
	Aerial survey	Extent of intertidal features, number of features (birds, marine mammals)
Nesting areas and colony survey (observation, study of biological parameters)		Seal and marine birds survey (number of couples, juvenile production, feeding, ...)
Stranding surveys		Causes of death, number and distribution

Nets, trawl and sampling	Identification, extent and number of features (fish, plankton, benthos,...); chemical analysis
High water mark and litter survey and faeces analysis	Feeding; pollution; species distribution

Table 9. Main monitoring techniques in use in English marine protected areas of the Channel

The complexity of actors intervening in MPA monitoring in France makes it extremely difficult to assess a total budget for MPA monitoring. While in the UK there are usually fewer actors involved in MPA monitoring, in France a lot of different organizations monitor MPAs and the broader marine environment at different levels: locally, regionally and nationally.

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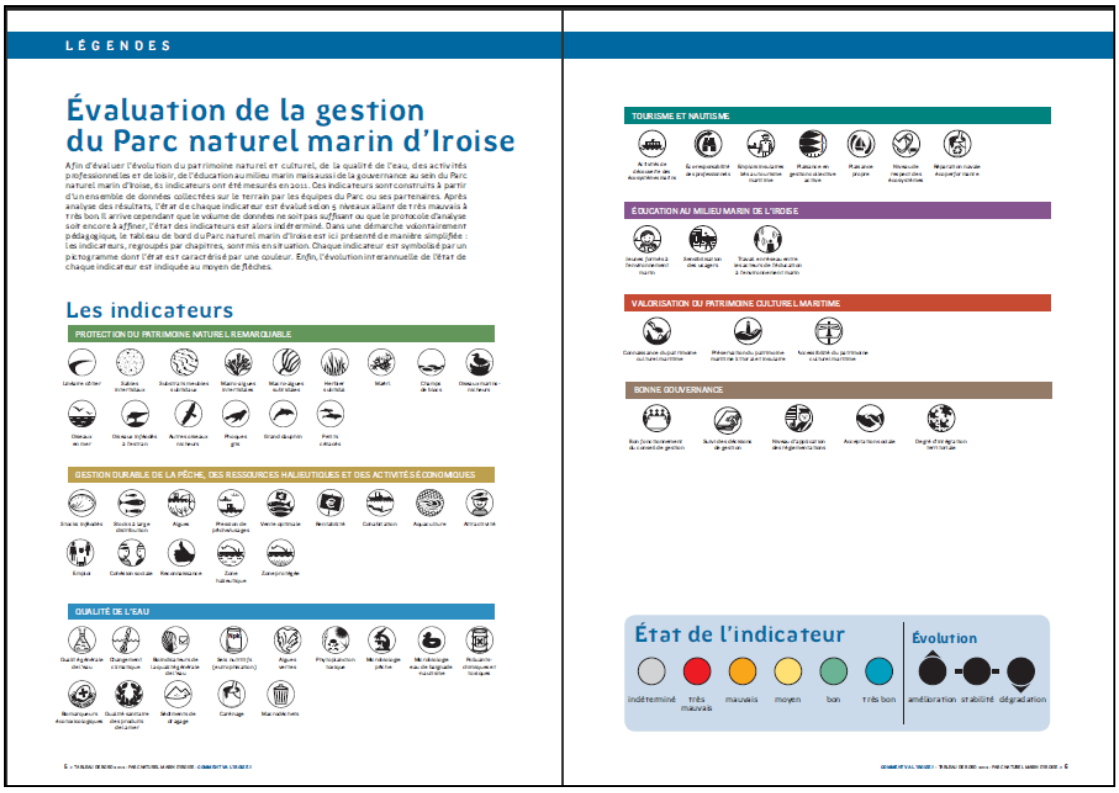
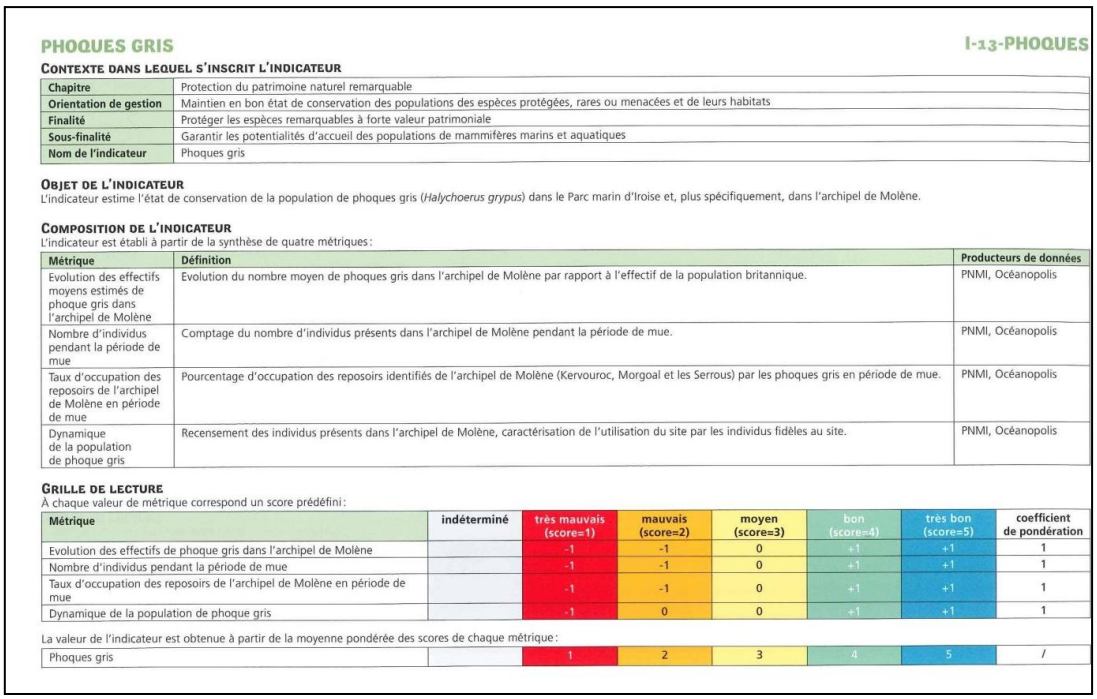
Appendix

Appendix 1. Example of Dashboard for the Iroise Marine Natural Park



List of indicators used in the dashboard for the "Parc naturel marin d'Iroise"



PHOQUES GRIS I-13-PHOQUES

CONTEXTE DANS LEQUEL S'INSCRIT L'INDICATEUR

Chapitre	Protection du patrimoine naturel remarquable
Orientation de gestion	Maintien en bon état de conservation des populations des espèces protégées, rares ou menacées et de leurs habitats
Finalité	Protéger les espèces remarquables à forte valeur patrimoniale
Sous-finalité	Garantir les potentialités d'accueil des populations de mammifères marins et aquatiques
Nom de l'indicateur	Phoques gris

OBJET DE L'INDICATEUR

L'indicateur estime l'état de conservation de la population de phoques gris (*Halychoerus grypus*) dans le Parc marin d'Iroise et, plus spécifiquement, dans l'archipel de Molène.

COMPOSITION DE L'INDICATEUR

L'indicateur est établi à partir de la synthèse de quatre métriques :

Métrique	Définition	Producteurs de données
Evolution des effectifs moyens estimés de phoque gris dans l'archipel de Molène	Evolution du nombre moyen de phoques gris dans l'archipel de Molène par rapport à l'effectif de la population britannique.	PNMI, Océanopolis
Nombre d'individus pendant la période de mue	Comptage du nombre d'individus présents dans l'archipel de Molène pendant la période de mue.	PNMI, Océanopolis
Taux d'occupation des reposoirs de l'archipel de Molène en période de mue	Pourcentage d'occupation des reposoirs identifiés de l'archipel de Molène (Kervouroc, Morgoal et les Serrous) par les phoques gris en période de mue.	PNMI, Océanopolis
Dynamique de la population de phoque gris	Recensement des individus présents dans l'archipel de Molène, caractérisation de l'utilisation du site par les individus fidèles au site.	PNMI, Océanopolis

GRILLE DE LECTURE

À chaque valeur de métrique correspond un score prédéfini :

Métrique	indéterminé	très mauvais (score=1)	mauvais (score=2)	moyen (score=3)	bon (score=4)	très bon (score=5)	coefficient de pondération
Evolution des effectifs de phoque gris dans l'archipel de Molène		-1	-1	0	+1	+1	1
Nombre d'individus pendant la période de mue		-1	-1	0	+1	+1	1
Taux d'occupation des reposoirs de l'archipel de Molène en période de mue		-1	-1	0	+1	+1	1
Dynamique de la population de phoque gris		-1	0	0	+1	+1	1

La valeur de l'indicateur est obtenue à partir de la moyenne pondérée des scores de chaque métrique :

Phoques gris		1	2	3	4	5	/

Example of indicator: a patrimonial species, the grey seal

Annex 2. List of features of conservation interest in English MPAs in the Channel[10]

Species	Habitats
Pink sea-fan (*Eunicella verrucosa*)	Reefs
Short snouted seahorse (*Hippocampus hippocampus*)	High energy intertidal rock
Spiny lobster (*Palinurus elephas*)	Moderate energy intertidal rock
Sea-fan anemone (*Amphianthus dohrnii*)	Intertidal coarse sediment
Sunset cup coral (*Leptopsammia pruvoti*)	Intertidal sand and muddy sand
Kaleidoscope jellyfish (*Haliclystus auricula*)	Intertidal mud
Allis shad (*Alosa alosa*)	Intertidal mixed sediments
Basking shark (*Cetorhinus maximus*)	High energy infralittoral rock
Harbour porpoise (*Phocoena phocoena*)	Moderate energy infralittoral rock
European eel (*Anguilla anguilla*)	Moderate energy circalittoral rock
Long snouted seahorse (*Hippocampus guttulatus*)	Subtidal coarse sediment
Native oyster (*Ostrea edulis*)	Subtidal sand
Smelt (*Osmerus eperlanus*)	Subtidal mud
Peacock's tail (*Padina pavonica*)	Subtidal mixed sediments
Sea snail (*Paludinella littorina*)	Subtidal macrophyte dominated sediment
Giant goby (*Gobius cobitis*)	Low energy intertidal rock
Defolin's lagoon snail (*Caecum armoricum*)	Coastal saltmarshes and saline reebeds
Lagoon sand shrimp (*Gammarus insensibilis*)	Sheltered muddy gravels
Black bream (*Spondyliosoma cantharus*)	Estuarine rocky habitats
Ocean quahog (*Arctica islandica*)	Infralittoral rock and thin sandy sediment
Black necked grebe (*Podiceps nigricollis*)	Intertidal biogenic reefs
Black throated diver (*Gavia arctica*)	Subtidal chalk

[10] This list of features may soon change as a result of the ongoing processes of MPA designation in the UK and France which may result in new MPAs being designated in the Channel area and, subsequently, in new features been awarded legal protection. Thus this list should be seen only as a reasonably comprehensive guidance.

Common loon (*Gavia immer*)	Infralittoral rock and thin mixed sediment
Brent goose (*Branta bernicla bernicla*)	Infralittoral muddy sand
Dunlin (*Calidris alpina alpina*)	Mud habitats in deep water
Eurasian Oystercatcher (*Haematopus ostralegus*)	Subtidal sands and gravels
Black-tailed Godwit (*Limosa limosa islandica*)	Coastal lagoons
Grey plover (*Pluvialis squatarola*)	Submerged or partially submerged sea caves
Horned Grebe (*Podiceps auritus*)	Sandbanks which are slightly covered by sea water all the time
Pied Avocet (*Recurvirostra avosetta*)	Estuaries
Mediterranean Gull (*Larus melanocephalus*)	Large shallow inlets and bays
Common tern (*Sterna hirundo*)	Mudflats and sandflats not covered by seawater at low tide
Common Shelduck (*Tadorna tadorna*)	Sandbanks
Red-breasted merganser (*Mergus serrator*)	Littoral sediment
Common Teal (*Anas crecca*)	Littoral rock
Common ringed plover (*Charadrius hiaticula*)	Supralittoral rock
Little tern (*Sterna albifrons*)	Supralittoral sediment
Roseate tern (*Sterna dougallii*)	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
Sandwich tern (*Sterna sandvicensis*)	Annual vegetation of drift lines
Ruff (*Philomachus pugnax*)	Salicornia and other annuals colonising mud and sand
Ruddy turnstone (*Arenaria interpres*)	Fragile sponge and anthozoan communities on subtidal rocky habitats
Golden plover (*Pluvialis apricaria*)	Intertidal underboulder communities
Little egret (*Egretta garzetta*)	Littoral chalk communities
Northern pintail (*Anas acuta*)	Subtidal chalk
Northern Shoveler (*Anas clypeata*)	Maerl beds

Eurasian wigeon (*Anas penelope*)	Seagrass beds
Sanderling (*Calidris alba*)	Spartina swards (Spartinion maritimae)
Bar-tailed godwit (*Limosa lapponica*)	Blue mussel (Mytilus edulis) beds
Eurasian curlew (*Numenius arquata*)	Honeycomb worm (Sabellaria alveolata) reefs
Common redshank (*Tringa totanus*)	Ross worm (Sabellaria spinulosa) reefs
Tundra swan (*Cygnus columbianus bewickii*)	Sea pen and burrowing megafauna communities

PANACHE

Protected Area Network Across the Channel Ecosystem

PANACHE is a project in collaboration between France and Britain. It aims at a **better protection** of the Channel marine environment through the **networking** of existing marine protected areas.

The project's five objectives:

- **Assess** the existing marine protected areas network for its ecological coherence.
- **Mutualise** knowledge on monitoring techniques, share positive experiences.
- **Build** greater coherence and foster dialogue for a better management of marine protected areas.
- **Increase** general awareness of marine protected areas: build common ownership and stewardship, through engagement in joint citizen science programmes.
- **Develop** a public GIS database.

France and Great Britain are facing similar challenges to protect the marine biodiversity in their shared marine territory: PANACHE aims at providing **a common, coherent and efficient reaction**.

PANACHE est un projet franco-britannique, visant à une **meilleure protection** de l'environnement marin de la Manche par la **mise en réseau** des aires marines protégées existantes.

Les cinq objectifs du projet :

- **Étudier** la cohérence écologique du réseau des aires marines protégées.
- **Mutualiser** les acquis en matière de suivi de ces espaces, partager les expériences positives.
- **Consolider** la cohérence et encourager la concertation pour une meilleure gestion des aires marines protégées.
- **Accroître** la sensibilisation générale aux aires marines protégées : instaurer un sentiment d'appartenance et des attentes communes en développant des programmes de sciences participatives.
- **Instaurer** une base de données SIG publique.

France et Royaume-Uni sont confrontés à des défis analogues pour protéger la biodiversité marine de l'espace marin qu'ils partagent : PANACHE vise à apporter **une réponse commune, cohérente et efficace**.

- www.panache.eu.com –

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