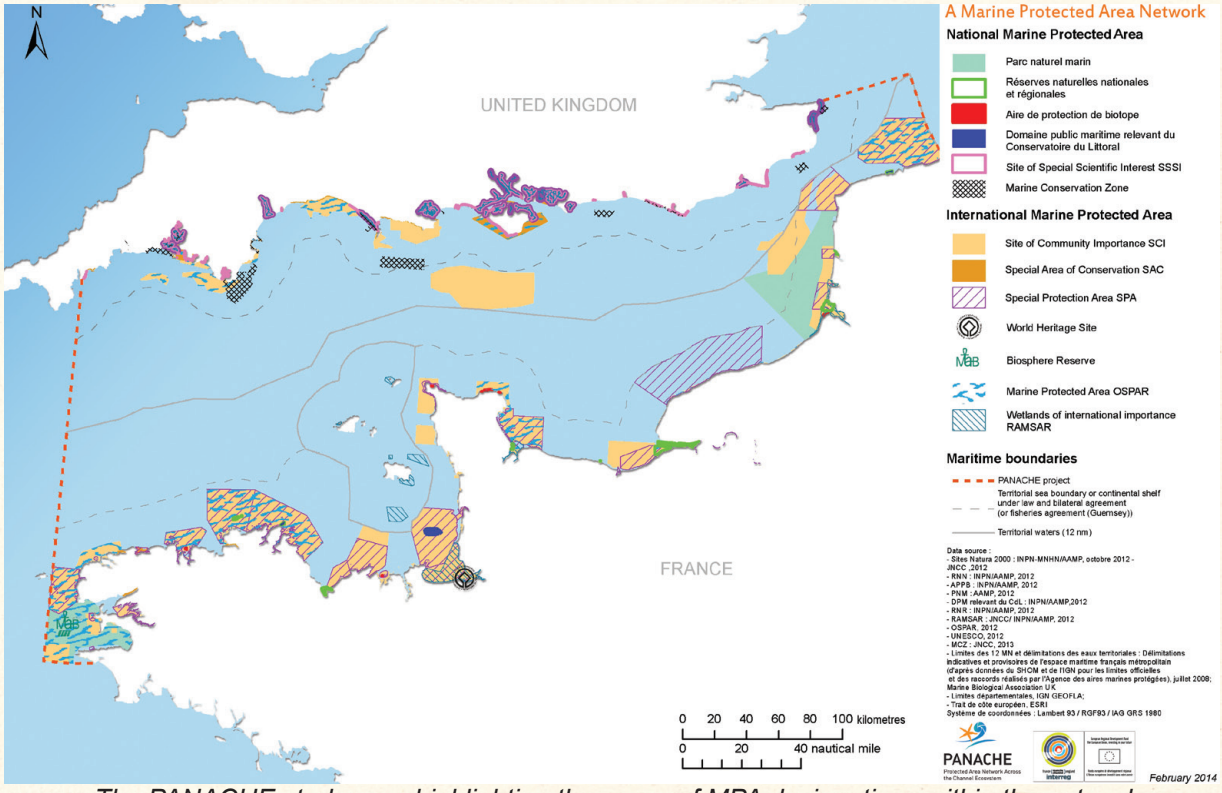
WP1 report
short version

PANACHE
Protected Area Network Across the Channel Ecosystem

Workpackage 1: Assess ecological coherence across the marine protected area network.

Axe de travail 1 : Étudier la cohérence écologique du réseau des aires marines protégées.

Marine Protected Areas (MPAs) can be designated on an individual basis or sometimes through a systematic process. International conventions call for the establishment of coherent, representative and well-managed MPA networks, at national but also regional scales, beyond administrative borders. The primary question addressed here is: how does the set of individual MPAs in the Channel ecologically look like as a whole? This document summarizes work undertaken within work package 1 of the PANACHE project: assessing the ecological coherence of the Channel MPA network (Foster et al. 2014).



The PANACHE study area highlighting the range of MPA designations within the network

Summary

Ecological coherence is considered as a pre-requisite for an effective MPA network but it is not sufficient, as adequate management must also be in place. The assessment presented here demonstrates that the Channel MPA network has made significant developments in recent years and has reached a certain level of coherence. However several gaps remain and this report calls for further MPA designations, especially in offshore waters to ensure conservation of the associated ecosystems.

Further to designating additional MPAs, this report emphasizes the need for more coherent and effective management of current MPAs. A more unified monitoring system within and across the United Kingdom and France, and a common data repository share-point are required to support the assessment of the effectiveness of MPAs at local and cross-border levels, which is a key driver for dynamic management by setting up actions plans at those different scales.

Channel MPA network fact sheet

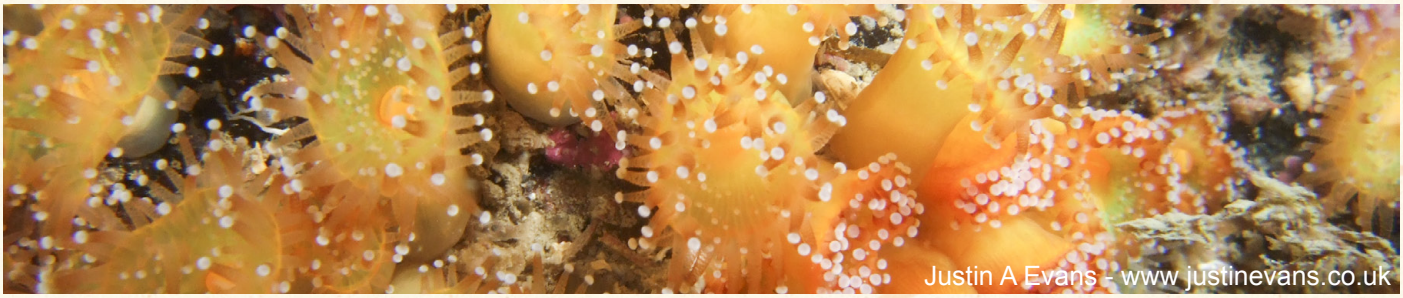
With overlaps among different MPA designations taken into account, the MPA network covers 10% of English waters, 3% of the Channel Islands waters, 31% of the French waters and 20% of the PANACHE study area. The Channel MPA network includes a variety of designations, among them are those established under specific national legislation (e.g. Marine Conservation Zone in the United Kingdom, Marine Natural Parks in France), and others established under international conventions or legislation (e.g. Natura 2000 sites for European Members States, Ramsar sites for Contracting Parties to the Ramsar Convention). The various types of MPAs do not necessarily aims at protecting the same features, and it is very important to consider those specific objectives when assessing the ecological coherence of the MPA network.

Country	MPA Category	Number of MPAs	Percentage of national waters
England	Natura 2000 – Birds Directive	10	0.5%
	Natura 2000 – Habitat Directive	15	8.4%
	OSPAR	13	3.1%
	RAMSAR	10	0.5%
	Marine Conservation Zones	12	2%
	Site of Special Scientific Interest	39	0.5%
Channel Islands	RAMSAR	7	3.4%
France	Natura 2000 – Birds Directive	28	20%
	Natura 2000 – Habitat Directive	49	20.1%
	OSPAR	18	14%
	RAMSAR	3	1.2%
	Prefectural Order for the Protection of Biotopes	4	0.004%
	Public Coastal Domain Site entrusted to Coastline Conservation	3	0.1%
	Marine Natural Park	2	9.1%
	National Natural Reserve	9	0.3%

A set of principles for the assessment

Based on a number of studies, particularly by the OSPAR Commission and developments that have accompanied the implementation of Marine Conservation Zones in the United Kingdom, a number of criteria and methodologies were used in this project to assess the ecological coherence of the MPA network. In summary, coherence would imply:

Criteria	A network of MPAs that...
Representativeness	... contains representative samples of the features at risk...
Replication	... in duplicate or more (illustrated by the adage “do not put all your eggs in one basket”)...
Adequation	... in sufficient amount...
Viability	... which are viable individually...
Connectivity	... and that are connected among them (partly illustrated by the adage: “friends of friends are also friends”).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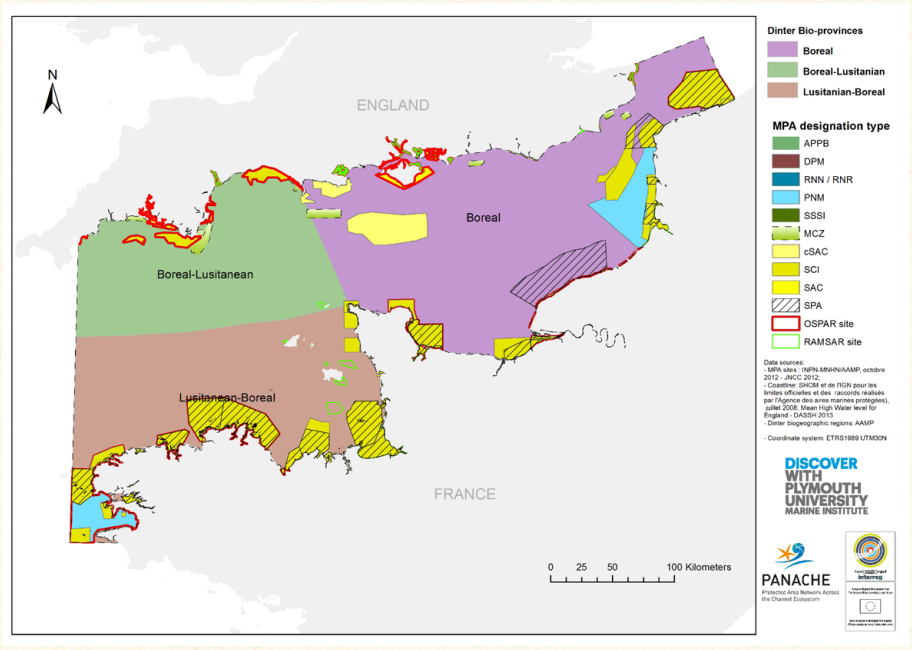
Broadscale analyses

Biogeographic regions

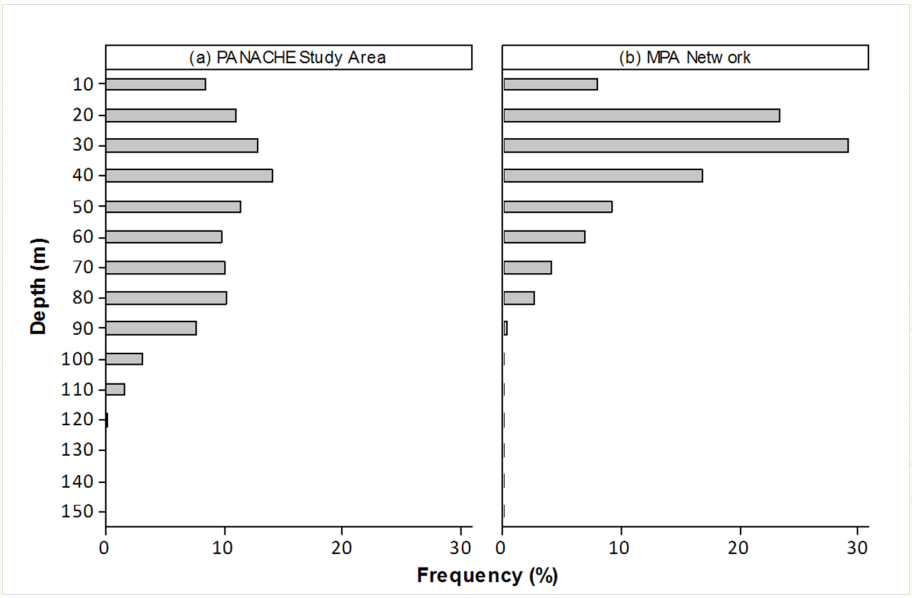
From an ecological perspective, those principles must be assessed at the relevant ecological scale, which does not fit the administrative borders in general; and ideally the criteria shall be met for every ecological unit. For instance, the Dinter's biogeographic classification divides the Channel into two or three regions: western (with possible distinction between north and south), and eastern Channel. When possible, principles have been assessed in different subunits. Overall, the MPAs network covers 5%, 24% and 26% of the north-western, south-western and eastern regions, respectively.



MPA network and continental shelf biogeographic provinces (defined by Dinter) in the Channel.

Bathymetry

In spite of accurate ecological data, bathymetry is often used as a surrogate. Not only because of the comprehensiveness and good resolution of the data, but also since ecological information can be inferred from different bathymetric ranges. The analysis highlighted that the MPA network is significantly biased towards shallow waters (see chart), therefore indicating that ecosystems associated with deeper waters are less represented and potentially less protected by the network.

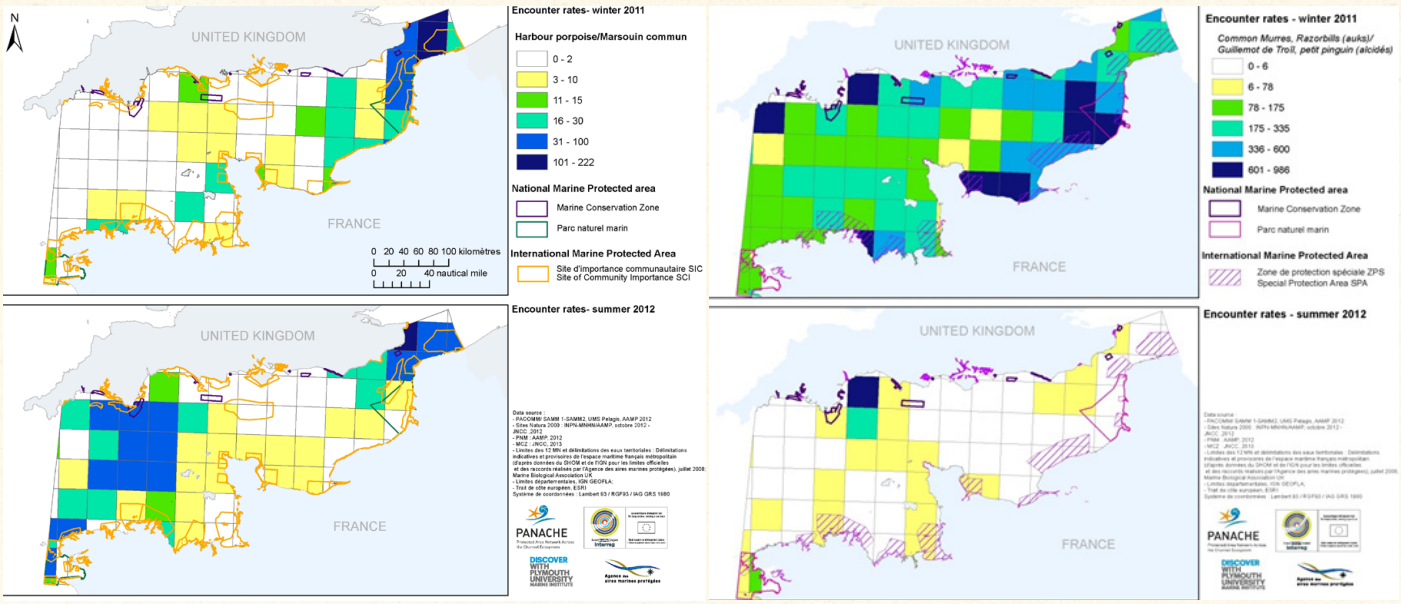


Bathymetric ranges within (a) the Channel waters and (b) MPAs.

Predictive habitat modelling

Despite some limitations, the EUSeaMap was used as the best available data source regarding the habitats assessment, since it covers the subtidal part of the whole study area. The EUSeaMap was used to assess the MPA network against the various criteria for EUNIS Level 3 habitats. The results indicate a lower representation of the EUNIS habitat categories corresponding to deeper waters (such as sublittoral coarse sediment), but is also questions the MPA network in terms of viability (the ability to capture habitat patches of significant size) and the adequacy (the ability to capture a sufficient amount of each habitat to increase the proportion of species associated to the habitat that could benefit from protection). Assessment of connectivity among MPAs within the network was based on geographical distance among habitat patches and MPAs in order to provide preliminary information on the most- and least-connected areas of the MPA network. Results indicate that connectivity is highest among MPAs along the coasts cross-Channel connectivity among French and English MPAs is limited.

Aerial survey analyses



Encounter rates of Harbour Porpoise in winter 2011-2012 (top panel) and summer 2012 (bottom panel)

Encounter rates of Auks in winter 2011-2012 (top panel) and summer 2012 (bottom panel)

Data obtained from aerial surveys of seabirds and marine mammals were used in the study to assess their distribution against the MPA network. Despite the coarse resolution (40km) at which the data were gathered, the main advantages of this dataset are that it covers the whole area of interest, and the surveys were repeated in summer and winter thereby accounting for seasonal variation. Although a number of species occur frequently within the MPA network, the analysis highlights significant gaps for species that spend significant amounts of time away from the coast: the harbour porpoise coverage within the network is 13% in winter and regarding seabirds, the auks, the northern fulmar, the gannet and the black-legged kittiwake are only partially captured by the MPA network (see table below).

Seabirds species	% of observation indices within MPAs	
	Winter	Summer
Common Murre or Razorbill (Auks)	20%	8%
Black-headed gull or Mediterranean Gull	26%	32%
Great Skua	18%	24%
Northern Fulmar	11%	30%
European Herring Gull or Yellow-legged Gull	31%	31%
Great or Lesser Black-backed Gull	32%	23%
Black-legged Kittiwake	13%	19%
Terns	35%	41%
Northern Gannet	25%	15%

Marine mammals species	% of observation indices within MPAs	
	Winter	Summer
Harbour porpoise	32%	13%
Common bottlenose dolphin	5%	20%

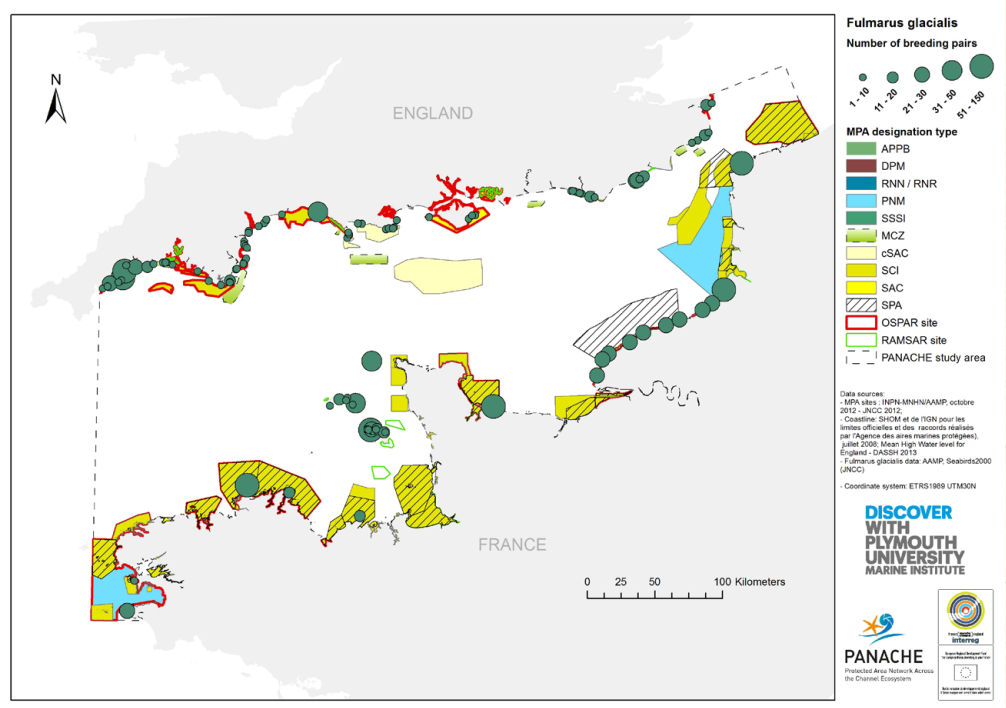
Proportion of seabirds and marine mammals observation indices (calculated from aerial surveys data) located in MPAs

Fine scale analyses

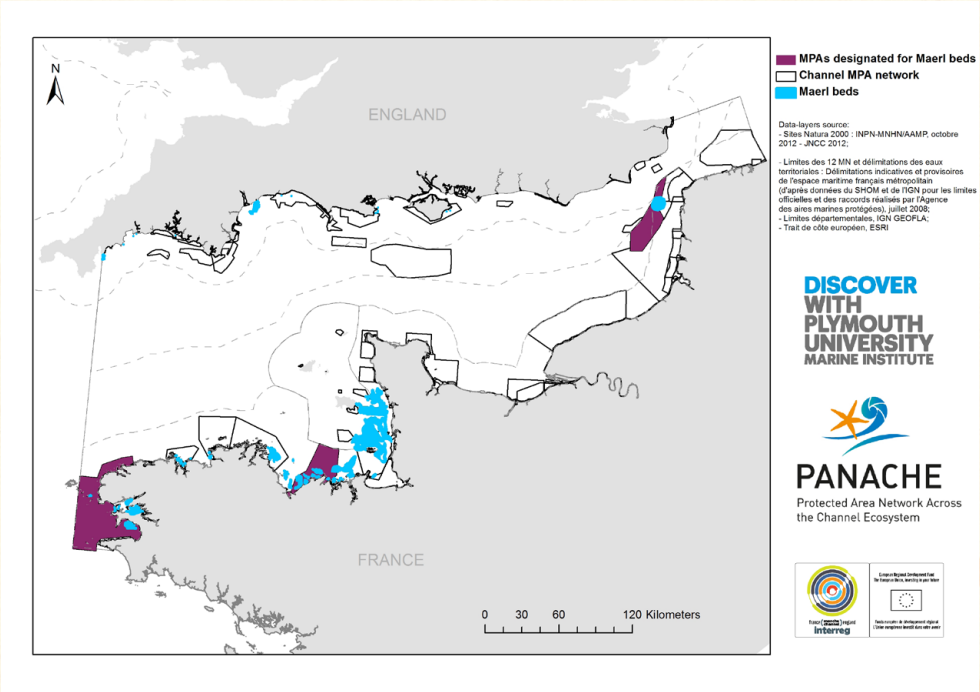
Whenever possible the analysis aimed to evaluate the integration of areas of ecological importance within the MPA network. In this study, the distribution of seabird colonies, particular habitats and spawning grounds (for the cuttlefish) were assessed.

Seabird breeding colonies

The distribution of breeding colonies of a number of species was assessed, and although information comes from different data sources, sufficient data were gathered to indicate that a substantial proportion of the breeding colonies are located within MPAs; even if some noticeable gaps were pointed out along the English coastline. Furthermore, it is necessary to make sure that the considered MPAs set up specific conservation objectives for the relevant seabirds. Last but not least, this analysis highlights the major role of the Channel Islands for a number of species (for instance the razorbill, the Atlantic puffin, the northern fulmar).



Distribution of the Northern Fulmar breeding populations in the Channel



Distribution of Maerl beds within the Channel MPA network

Declining or threatened habitats of the OSPAR Convention

The OSPAR Commission maintains a database for the habitats that are considered to be threatened and/or declining. Among these habitats, the distribution of zostera beds and maerl beds was assessed as the data available provided substantial spatial coverage. Despite the fact that the database does not hold only spatial data (sometimes occurrences), it was found that 48% and 68% of the maerl and zostera beds in the study area occur within the MPA network. However, as far as maerl is concerned, when taking into account only the MPAs that do include this habitat within their conservation objectives, the proportion decreases to 19% (see the map). One limitation is that the state of conservation of these habitats was not considered, although it is of major importance particularly, the maerl.

Achievements, challenges and recommendations

Ecological coherence achievements

Although major gaps remain within the Channel MPA network, the (fast) establishment of the present MPAs has enabled significant coverage of habitats, species and areas of ecological importance within the network. As long as adequate management is in place, it can be expected that such an MPA network can greatly improve nature conservation within the Channel. In spite of different MPA implementation and management schemes, international designations and cross-border cooperation, such as the PANACHE project, have great potential to facilitate progress towards better ecological coherence.

Ecological incoherence

The study has highlighted a number of gaps in the MPA network, in particular offshore areas remain under represented, indicating that the associated ecosystems are less protected (see below) but also that the cross-border connectivity is poorly captured by the MPA network.

Another aspect is the discrepancies in the implementation of Natura 2000 European Directives in British and French waters. Natura 2000 sites vary widely in terms of size and coverage from one side of the Channel to the other, so it is unlikely that they would provide the same results, though they protect the same features. From the Natura 2000 perspective again, the fact that the Channel Islands are not subject to this legislation increases the ecological inconsistency for the species and habitats listed under those Directives. For those reasons, cross-border cooperation is really important either to fill the gap when legislation mismatches the ecological reality or to enhance a coherent implementation when different countries are subject to the same obligations.

Channel Islands

The Channel Islands waters are of course part of the Channel ecosystem, and due to their central position and various characteristics (currents), they are of major importance for a number of species. As was highlighted in the report, numerous seabirds and marine mammals are using this area and very often for important stages of their lifecycles.

"Offshore species" - out of sight, out of mind (or MPAs)

Several sections of this study have revealed the lack of MPAs in offshore waters and their associated ecosystems: habitats of sublittoral zones, several marine mammals and numerous seabird species, whether they spend all or part of their lifecycles in these waters. Some of these are highly mobile species and there is debate whether MPAs can provide effective protection for them or not. It is important to keep these issues in mind and to develop the means to assess this in the future. Both in British and French waters, designation of offshore MPAs is in progress, and this report could provide useful information to support the process.

Assessment challenges: foster data sharing and gathering

Despite the fact that the Channel is a relatively well-known region, several knowledge gaps have hampered a comprehensive ecological assessment of the MPA network. For most species and habitats which have significant datasets, the data are scattered and generally not harmonised. Broadscale datasets, such as bathymetry or predictive habitat maps, can be used as surrogates, but with some limitations or biases. Aerial surveys have enabled assessments of homogenous data across the entire study area, but with limited accuracy in the data resolution (40km) and only for seabirds and marine mammals.

MPA networks assessments, going beyond science

The assessment of ecological coherence relies to a large extent on a holistic and theoretical approach. Certainly, this assessment pointed out features or even ecological compartments that are under-protected, but it is important to keep in mind that little attention is dedicated to practical considerations and the question: how do we manage that in the field?

Indeed, MPAs are not no-take marine reserves and a number of human activities typically occur within their boundaries. In this context, their effectiveness may be less obvious and it is therefore crucial to establish the means to facilitate their effectiveness and to assess whether they have an effect or not, at both individual and network levels. The final question being: how is the Channel?

This aspect raises other issues, such as the social acceptability of MPAs, but also their integration in marine public policies in general or their role in sustaining ecosystem services.

Key figures from the assessment

Assessment Type & Criteria	Feature	Results
Spatial – representativity	Geographical	• 20% of PANACHE study area within MPA network • 10% of English waters within MPA network • 30% of French waters within MPA network • 3% of Channel Island waters within MPA network • 218 MPAs within 12 nm of shore (inshore) • 4 MPAs beyond 12 nm of shore (offshore) • 16% of western Channel within MPA network • 26% of eastern Channel within MPA network
	Biogeographical	• 24% of Lusitanian-Boreal province within MPA network • 26% of Boreal province within MPA network • 5% of Boreal-Lusitanian province within network • 19% of cool-temperate province within network • 24% of warm-temperate province within network
	Bathymetric	• Only 14% of network occurs in water deeper than 60 m (despite 42% of study area having water deeper than 60 m)
	Marine Mammals and Seabirds	• Gaps in the network were noticeable for offshore or partially offshore species (cetaceans and seabirds with pelagic behaviour)
	Cuttlefish spawning grounds	• Spawning grounds for the cuttlefish well-represented within MPA network along the western Channel and along French coast • Spawning grounds for the cuttlefish poorly-represented within MPAs along the English coastline in the eastern Channel
	Breeding areas for seabirds	• Breeding populations of key bird species adequately represented in French MPAs (with bird specific objectives) • Breeding populations along English coastline occur predominantly outside MPAs or within the boundaries of SACs (no bird specific objectives)
Spatial - replication	EUNIS Level 3 habitats Habitats and species of conservation importance	• Habitats and species occur in 4 to 52 MPAs
Spatial - viability	MPA size Compactness Edge-to-area ratio	• Only 33% of MPAs in the optimal size range of 10-100 km^2 • 40% of MPAs are smaller than 10 km^2 • Only 8 MPAs exceed 1000 km^2 • Network unlikely to support highly mobile or migratory species • Majority of MPAs not circular and have small edge-to-area ratios – less export of individuals
	Size of EUNIS Level 3 habitats	• 79% of habitat patches within the network are 0-10 km^2 in size – only likely to support low mobility species • Just 21% of habitat patches in study area are greater than 10 km^2 – but good proportions of these within network • 67% of 10-100 km^2 patches are within the network and 59% of patches >100km^2 are within the network
Spatial - adequacy	Area of EUNIS Level 3 habitats Area of habitats of conservation importance	• Four habitats have <30% of their area within the MPA network • Six habitats have >30% of their area within the MPA network • 65% of *Zostera* beds occur within the MPA network • 48% of Maerl beds occur within the MPA network
Spatial - connectivity	Connectivity among MPAs Habitat connections Within versus among MPAs Habitats buffers	• MPAs containing the same habitat typically connected to just 2 or 3 other MPAs • Connectivity of habitat patches was found to be greater among MPAs than within MPAs, highlighting potential for replenishment of habitats and species from within the MPA network • Good connectivity among habitats within MPAs along the French and English coasts, respectively • Cross Channel connectivity virtually non-existent
Matrix Approach - representativity	Qualifying species, EUNIS Level 3 habitats OSPAR habitats Annex I habitats	• Good representativity of qualifying species, EUNIS Level 3 habitats, OSPAR habitats and Annex I habitats
Matrix Approach - replication	EUNIS Level 3 habitats OSPAR habitats Annex I habitats	• EUNIS Level 3 and Annex 1 habitats listed in 5 or more MPAs within the Channel network • Maerl beds, intertidal mudflats, littoral chalk communities and *Zostera* beds listed in 3 or more MPAs • *Sabellaria* reefs, and sea-pen and burrowing megafauna communities listed in 2 or fewer MPAs
	Qualifying species	• 68% of species listed in 3 or more MPAs • 27% of species listed in 1 MPA • 5% of species listed in 2 MPAs
Self-assessment – management status		• Medium to high level of management status reported for 98% of MPAs assessed • 75% of the MPAs reported effective enforcement and management of some of the extractive/depositional and damaging/disturbing activities • Answers varied depending on respondent – more positive responses from MPA designating authorities than MPA management authorities

PANACHE

Protected Area Network Across the Channel Ecosystem

PANACHE is a Franco-British project funded by European programme INTERREG IV. The project aims for better protection of the Channel marine environment by establishing a network among existing marine protected areas.

There are five main project goals:

- Assess ecological coherence across the marine protected area network;
- Pool and share experience in monitoring these areas;
- Strengthen coherence and foster interaction for improved marine protected area management;
- Heighten awareness of marine protected areas: create a sense of ownership and shared expectations through citizen science programmes;
- Establish 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.

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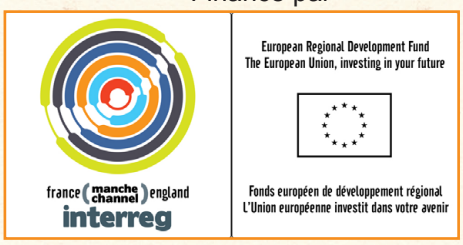

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