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National Action Plan 2021-2025

For the Balearic Shearwater
Puffinus mauretanicus

Acknowledgements

The Balearic Shearwater is the most threatened seabird in Europe with an estimated population of about 30 000 individuals. Breeding only in the Balearic Islands, the shearwater then migrates to the Atlantic and Channel seaboard.

In October 2017, the major responsibility of the Brittany region for the conservation of the Balearic Shearwater led the Water and Biodiversity Directorate of the Ministry for Ecological Transition to delegate the steering and coordination of a National Action Plan (NAP) for the Balearic Shearwater to DREAL Bretagne.

To this end, I would especially like to thank the project team that assisted the DREAL in this national coordination: the OFB, which is the technical coordinator, the Biotope environmental consultancy and the independent expert Nyls de Pracontal.

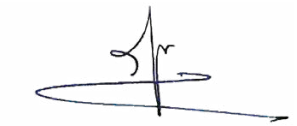
I would also like to thank all the national and international, and also local, stakeholders from Normandy to Occitanie, who have contributed to enabling this NAP to propose concrete and complete actions that should in the long run ensure that France honours its commitments to the conservation of this species.

The national steering committee validated the NAP on 22nd September 2020 after two years of work. I wish also to recognise the committed mobilisation of the steering committee members in drafting the NAP, particularly those that were involved through thematic workgroups:

- the professional organisations whose constructive contribution enabled a complete programme of actions to be established so as to achieve the conservation objectives for the species. Bycatch of Balearic Shearwater is indeed the main human pressure that could contribute to the decline of the species, and major work was done with the profession to act effectively. Being a first instance in Metropolitan France concerning the issue of seabird bycatch, the results of this NAP are much awaited to improve the conservation status of the Balearic Shearwater and also to feed future considerations with regard to other and thus respond to the objectives of European Union directives (Marine Strategic Framework Directive (MSFD), and Birds Directive).
- the marine renewable energy (MRE) operators who committed to optimising the work of characterising interactions between MREs and the Balearic Shearwater in order to successfully implement the ARC measures retired for maintaining the conservation status of the species.
- the scientific organisations, nature protection associations and experts who enabled the establishment of a complete programme of knowledge about the species and its distribution in French waters so that the actions of the NAP could be as pertinent as possible. A monitoring strategy for the species was also developed in parallel with the NAP, steered by the OFB.

Thankyou finally to the natural heritage department of DREAL Bretagne, and in particular Michel Ledard, for his commitment to carrying out this work.

The Regional Director of DREAL Bretagne
Marc NAVEZ



En 2017, the Atlantic Seaboard Delegation initiated the idea of heading a National Action Plan (NAP) for the Balearic Shearwater. This seabird species, although extremely threatened, did not benefit from a dedicated conservation programme nor from the attention it deserved regarding its situation. After consultation with the Ministry for Ecological Transition and the National Council for the Protection of Nature, it was decided that France would respond to the conservation issues of this species by implementing a NAP.

Together with the coordinating DREAL, the OFB ensured the coordination and drafting of this strategic document whose aim is to improve the conservation status of the species within 5 years. We would like to thank the Biotope environmental consultancy and Nyls de Pracontal consulting for having assisted us and accompanying us in this phase of constructing this NAP.

Several months after the start of this work, of concertation, mobilisation and forward planning at the same time, a clear and ambitious roadmap was drawn up, thanks to the involvement of all the stakeholders gathered together in the Steering Committee.

We would like to thank the commitment of all partners (socioeconomic stakeholders, NGOs, experts, decentralised State services ...) that enabled a programme to be completed that is intended to be immediately operational on the basis of 23 detailed action files.

One of the major advances of this NAP, thanks to the mobilisation of the world of professional fishing, is the implementation of an unprecedented programme to characterise interactions between the species and the various types of fishing gear. This heralds a very clear enhancement of knowledge that will enable appropriate and effective measures to be taken.

We wish every success for this NAP and count on the mobilisation of one and all for the Balearic Shearwater, whose mid-term survival is not yet ensured.

Coordinating Director for the Atlantic Seaboard
Nathalie FRANQUET

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RESUMÉ

Le Puffin des Baléares (*Puffinus mauretanicus*), espèce d'oiseau nicheuse endémique des Baléares, est considéré comme l'oiseau marin le plus menacé d'Europe. L'effectif mondial de l'espèce est restreint et en déclin. Son statut de conservation est jugé en « danger critique d'extinction » en Europe depuis 2004 et l'espèce est protégée en France. La France a une responsabilité majeure dans la conservation de cette espèce en période internuptiale (présence dans les eaux territoriales françaises atlantiques), et dans une moindre mesure en période de reproduction (présence en Mer Méditerranée).

Face aux déclins des populations, la SEO/BirdLife a coordonné le premier plan international d'actions en faveur du Puffin des Baléares en 2011 dans lequel la France était vivement invitée à s'engager dans la prise en compte de cette espèce menacée. En 2020, après plus d'un an de concertation, la France se dote d'un Plan National d'Actions en faveur de cette espèce. Ce PNA vise en premier lieu la réduction des pressions qui s'exercent sur l'espèce, telles que les interactions avec les activités de pêche et avec les activités nautiques sportives et de loisirs, ou encore les interactions potentielles avec les futurs parcs éoliens en mer, afin d'améliorer son état de conservation.

Le présent document est adossé à des annexes composées de rapports autoporteurs et détaillés sur certaines thématiques : état de l'art des connaissances publiées sur l'espèce, meta-analyse des données inédites collectées sur la ZEE française entre 2004 et 2018, état de l'art des connaissances relatives au risque de capture accidentelle de Puffin des Baléares, stratégie de suivi de l'espèce.

Le premier chapitre de ce PNA synthétise l'ensemble de ces connaissances rassemblées, avant de proposer dans un deuxième chapitre une stratégie à long terme pour la conservation de l'espèce au regard des principaux enjeux identifiés. Un troisième chapitre détaille au travers de « fiches actions » les mesures concrètes qui sont proposées dans le cadre du premier cycle de mise en œuvre de ce PNA.

SUMMARY

The Balearic Shearwater (*Puffinus mauretanicus*), a species endemic to the Balearic Islands, is considered the most endangered seabird in Europe. The global number of this species is low and declining. Its conservation status has been ranked «critically endangered» in Europe since 2004 and the species is protected in France. France has a major responsibility for the conservation of this species during the non-breeding period (presence in French Atlantic territorial waters), and to a lesser extent during the breeding period (presence in the Mediterranean Sea).

To face the population decline, SEO / BirdLife coordinated the first international action plan for the Balearic Shearwater in 2011, in which France was urged to commit to taking this endangered species into account. In 2020, after more than a year of public engagement, France approved its own National Action Plan (NAP) in support of this species. This NAP primarily aims to reduce the pressures exerted on the species, such as interactions with fisheries, nautical sports and leisure activities, or even potential interactions with future offshore wind farms, in order to improve its conservation status.

This document is backed by appendices made up of stand-alone and detailed reports on certain topics: state of the art of published literature on the species, meta-analysis of unpublished data collected within the French marine Exclusive Economic Zone between 2004 and 2018, state of the art related to Balearic Shearwater by-catch in fisheries, monitoring plan for the species.

In a first chapter, this NAP synthesizes all of this knowledge gathered in these appendices, before proposing in a second chapter a long-term strategy for the conservation of the species with regard to the main issues identified. In a third chapter, the document details the concrete measures that are proposed as part of the first 5 years NAP implementation-cycle.

INTRODUCTION

The Balearic Shearwater (Puffinus mauretanicus), a species in critical danger of extinction, is considered to be the most endangered seabird in Europe, yet no specific conservation programme has been devoted to it until now.

Alerted by the French Biodiversity Agency (OFB) and after approval by the National Council for the Protection of Nature (CNPN), the ministry responsible for ecology gave a favourable response to the proposition to launch a National Action Plan (NAP) for the species. The ministry then designated the Brittany Regional Environment, Planning and Housing Directorate (DREAL Bretagne) as the coordinating DREAL, which entrusted the OFB with steering the writing of the NAP. The drawing up of this NAP was launched in December 2018, and the OFB was supported by a group of specialised consultants, coordinated by the environmental consultancy Biotope.

This NAP is in line with public policies, in particular European Union directives such as the Birds Directive and MSFD (Marine Strategy Framework Directive) which aim to achieve good ecological status for the species and ensure its monitoring.

This NAP also responds to the need to transcribe the International Action Plan drawn up in 2011 by the Sociedad Española de Ornitología (SEO, BirdLife partner in Spain) at the French scale. It benefited from interactions and sharing of information with foreign partners in Spain and Portugal, whose help was sought throughout the time it was being written.

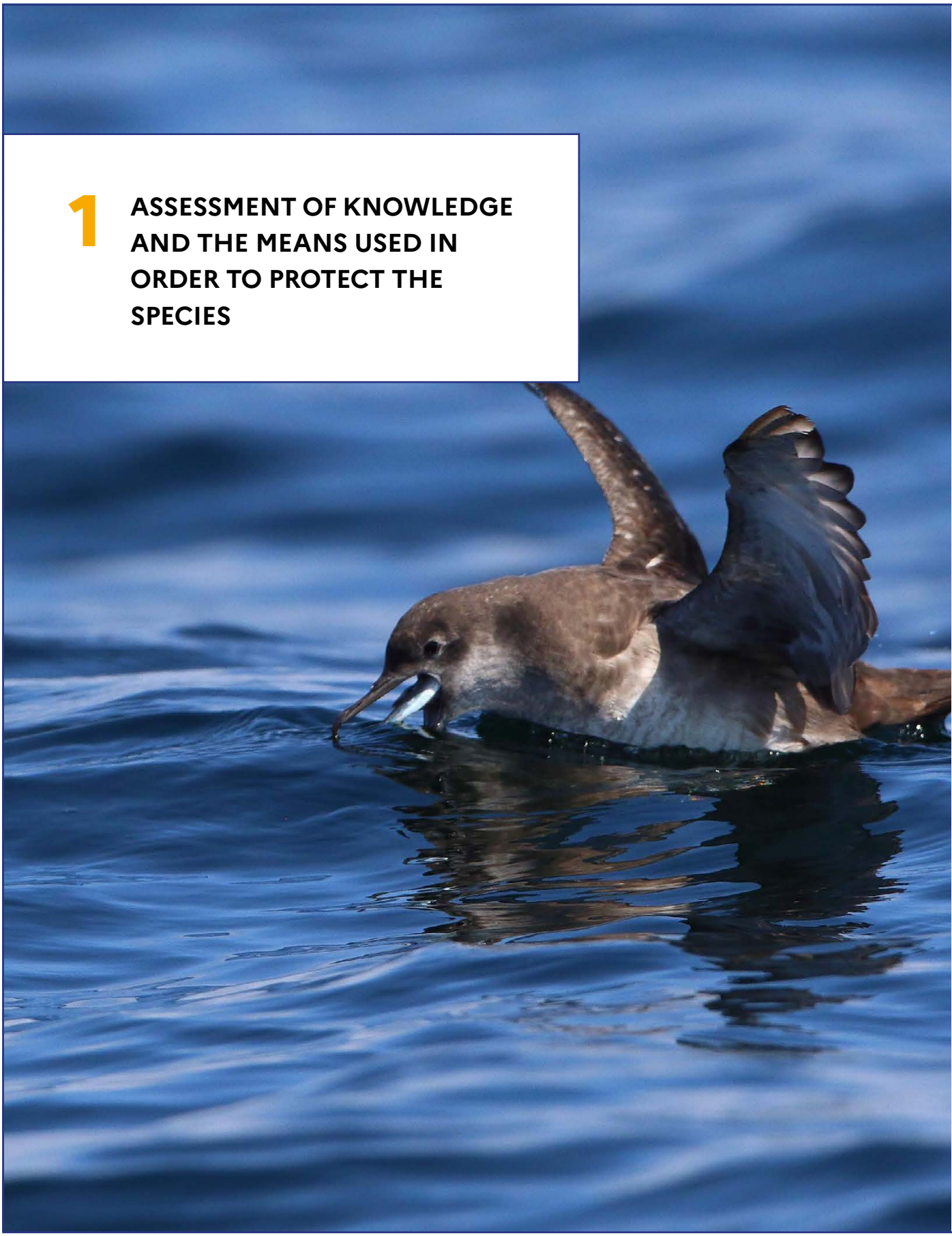
The objective of this National Action Plan for the Balearic Shearwater is to define a medium- and long-term strategy which aims to :

- organise coherent monitoring of populations of the species ;
- implement coordinated actions favourable to the restoration of the species and its habitat ;
- facilitate the integration of the protection of this species in human activities and public policies ;
- inform and raise awareness among the stakeholders concerned and the general public.

In order to respond to one of the first objectives, i.e., ensure monitoring of the species, it appeared necessary for the OFB to launch ahead of the NAP a study aiming to define a monitoring strategy for the species, in the light of the latest data that could be included (notably those derived from the impact studies of French offshore wind farm projects). This document, having benefited from the same requirements of consultation, agreement and validation with all the stakeholders involved, is a document in its own right, a summarised version of which is included in Part III of the NAP.

This Plan is the first strategic national document whose objective is to act with all partners having potential levers for improving the unfavourable status of this species. It provides first of all an assessment of the available knowledge (ecology, biology, distribution, threats ...), incorporating all the available data, whether published or not. A summary of the species' needs and a strategy specifying the orientations to be followed in the medium and long term are defined. Finally, this strategy is broken down into specific and operational objectives, combined with concrete actions to be implemented throughout the duration of this first Plan (2021-2025).

1 ASSESSMENT OF KNOWLEDGE AND THE MEANS USED IN ORDER TO PROTECT THE SPECIES



1.1 General description

The Balearic Shearwater is a medium-sized seabird (38 cm), with a shorter wingspan than the Black-headed Gull (76 to 89 cm), weighing between 350 and 500 grammes. Its plumage is relatively uniform dark brown on all the upper parts (head, back, top of wings, tail, upper flanks). The whitish background of the lower parts has varying amounts of brown markings depending on the individual. On the darkest birds, only the underneath of the wings, the throat and the belly are pale, the rest of the plumage being brown ,almost as dark below as above. On the lightest individuals, the brown markings are limited to below the tail and, sometimes faintly, to the neck and underwings. Between these extremes, there are birds numerous with intermediate colouring.

It can be confused with the Manx Shearwater, which has much more contrasting plumage and is a little smaller, with the Yelkouan Shearwater, together with which it previously formed the "Mediterranean Shearwater" species complex, and the Sooty Shearwater, which is larger and completely dark.

Figure 2 : Balearic Shearwater (Xavier Ruffray - Biotope)

1.2 Systematics

For many years the taxonomic status of the Balearic Shearwater Puffinus mauretanicus was contested. It was considered as a subspecies of the Manx Shearwater Puffinus puffinus until the late 1980s, then considered as a subspecies of the Yelkouan Shearwater Puffinus yelkouan (Bourne et al. 1988). Palaeontological studies (Walker et al. 1990, Altaba 1994) and molecular studies (Heidrich et al. 1998), together with morphological, ecological and behavioural considerations, led to Puffinus mauretanicus being considered as a species in its own right (Snow & Perrins 1998, Mayol-Serra et al. 2000, Sangster et al. 2002). The latter position was nonetheless called into question (Yésou 2006), after having discovered that the population which breeds in Menorca presented phenotypical and genotypical characteristics that are intermediate between mauretanicus and Yelkouan, due to the hybridisation of the two taxa in historical time (Ruiz & Martí 2004, Genovart et al. 2005, 2007). Nevertheless, the current data suggest that the Menorcan birds are more closely linked to mauretanicus (Genovart et al. 2007), and in the absence of further proof, Yelkouan and mauretanicus should be treated as two distinct species for the time being.

CLASSIFICATION

- Subphylum: Vertebrata
- Class: Aves
- Order: Procellariformes
- Family: Procellariidae
- Genus: Puffinus
- Species: mauretanicus

1.3 Legal protection status and other classifications

In France, the Balearic Shearwater benefits from integral protection in application of Articles L-141 and L-142 of the code of the Environment and features in Article 3 of the ministerial decree of 29th October 2009 specifying the list of protected birds throughout French territory and the ways of protecting them.

At European level, the Balearic Shearwater is listed in Annexe I of the 30 November 2009 directive (n°2009/147/CE, modifying the Birds Directive of 1979) concerning the conservation of wild birds. The species mentioned in Annexe I are covered by special conservation measures concerning their habitat, in order to ensure their survival and reproduction in their area of distribution.

The species is listed in Annexe II of the Bern Convention of 19th September 1979 with regard to the conservation of wild flora and fauna and their natural habitats in Europe (French government gazette 28/08/1990 and 20/08/1996) which confers it the status of a strictly protected species.

Finally, the Balearic Shearwater is listed in Annexe I of the Bonn Convention of 23rd June 1979 with regard to the conservation of wild migratory species (French government gazette 30/10/90). This annexe mentions that the migratory species is in danger and of extinction. The convention forbids any killing or capturing of species listed in this annexe.

At worldwide level, the species is in Annexe I of the multilateral agreement which seeks to conserve albatrosses and petrels by coordinating international activity to mitigate the threats to which they are exposed (ACAP)

In addition, the Balearic Shearwater is assessed as being "Critically endangered" at worldwide level due to a very unfavourable status corresponding to a decline in population (> 80% observed), estimated, deduced, predicted or assumed over a period of time including both the past and the future.

This status indicates that the species is confronted with an extremely high risk of extinction in the wild.

Red Lists: extinct species (EX), species extinct in the wild (EW), critically endangered species (CR), endangered species (EN), vulnerable species (VU), near threatened species (NT), least concern (LC), data deficient (DD), not evaluated (NE), not applicable (NA)

PROTECTION
▪ Birds Directive: Annexe I
▪ Bern Convention: Annexe III
▪ Bonn Convention: Annexe I
▪ National protection: yes - Decree of 29th October 2009 (Article 3)
▪ ACAP: Annexe I since 2012

RARITY/THREAT	
Red List worldwide	CR
Red List Europe	CR
Red List EU 27	CR
Red List France nesting species	/
Red List France migratory species	Na
Liste rouge France migrateurs	VU
Birds Directive	Annexe I
SPEC	1

1.4 Biology and ecology of the species

1.4.1 Reproduction

The Balearic Shearwater breeds exclusively in the Balearic Archipelago off the coast of Spain, and at present the known colonies are spread over the 5 main islands together with some islets offshore: Menorca, Mallorca, Cabrera, Ibiza and Formentera (but mainly Mallorca, Ibiza and Formentera). The Balearic Shearwater is very philopatric, nests on cliffs or small islets, and does not breed before it is three years old. The Balearic Shearwater nests on the ground under blocks of stone, in caves and cracks in coastal cliffs. Initially the species also nested on cliffs situated inland on these islands, some distance from the sea, but was eliminated there after human colonisation. While it still occupies some cliffs on the main islands, the species now mainly nests on their offshore islets. The breeding colonies are relatively small, isolated and sparsely distributed.

The nesting sites in the colonies are reoccupied as from late August (Oro, 2002) and the breeding season ends in June. The eggs are laid in February-March. The female lays a single egg in a cavity or cave. Incubation lasts approximately 50 days.

The young Balearic Shearwaters leave the nest in June.

The species is long-lived with a maximum lifespan of at least 23 years.

The species is monotypic (no subspecies). However, the small Menorcan population does present particular genetic and phenotypical features, signs of hybridisation with the Yelkouan Shearwater Puffinus yelkouan (Dupuy & Sallé, in prep, Austin et al., 2019).

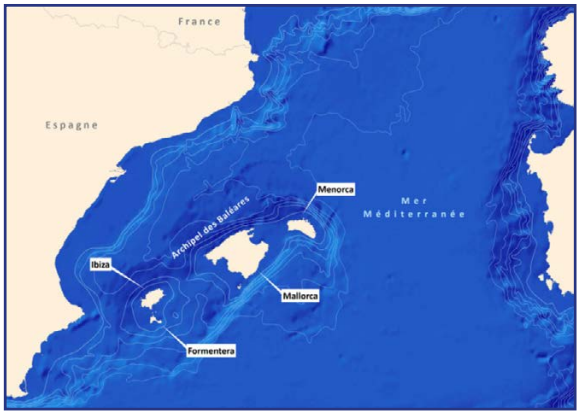


Figure 3 : Locations of Balearic Shearwater colonies in the Balearic Archipelago, the species' only breeding sites (www.lpo.fr).

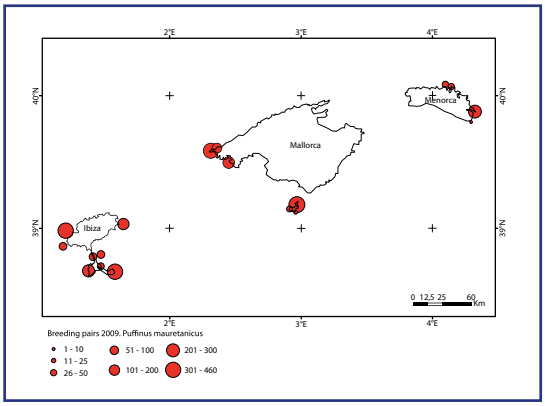


Figure 4 : Locations of breeding colonies and numbers of breeding Balearic Shearwater in 2009 (CMA, 2010).

1.4.2 Diet

In the breeding season (Mediterranean)

The diet of the Balearic Shearwater in the Mediterranean varies during the course of the breeding season (February/March to June) and depending on the sex of the individual.

Mainly ichthyophagous, during the pre-incubation period the adults (but to a lesser extent the females) feed more on demersal prey, derived from fishery discards, notably from trawlers. Anchovies and sardines (high in energy) are more actively sought after during the incubation and raising of the young. This variation in diet is very probably linked to the natural availability of prey (state of stocks) and/or their availability due to human activities (Navarro et al. 2009).

A study by Arcos in 2002 estimated that 40% of the energy needs of adult breeding Balearic Shearwaters in the nesting season (March-June) were provided by demersal prey made available by the discards of trawler fishing. 38% of the prey came from this source, 33% of the prey consisted of fish captured under floating/drifting objects (this feeding behaviour had already been described in a publication by Arcos in 2000), 10% consisted of fish captured thanks to the presence of sub-surface predators (dolphins), 10% were directly fished from shoals of fish, and 10 % consisted of plankton (Arcos 2000, 2002). A 2014 study confirmed that krill (macrozooplankton) was part of the species' diet in the breeding season (Louzao et al., 2014). Il was demonstrated that the breeding success of Balearic Shearwater colonies varied inter-annually and correlated both to the availability of small pelagic fish ("blue fish") and the availability of fishery discards from trawler fishing. The setting up of a moratorium on anchovy fishing near the Balearic Islands led to a reduction in the productivity of the shearwaters which, due to the lack of trawlers, had difficulty feeding their young (Arcos & Oro, 2012).

It was also demonstrated that trawler fishing activity significantly influenced the feeding trips and (macroscale) distribution of the Balearic Shearwater in the Mediterranean during the breeding season (Bartumeus et al. 2010).

The Balearic Shearwater mainly makes shallow dives, generally less than a few metres but sometimes more than 20 metres, in search of food (Palomera et al. 2007). Its diving capacities can put the Balearic Shearwater in direct interaction with various types of fishing.

In the non-breeding season (Atlantic)

In the same way, it was shown that in the non-breeding season the Balearic Shearwater feeds on both pelagic fish (blue fish = anchovies/sardines), and also fishery discards (demersal fish) (Le Mao & Yésou 1993, Meier, 2016).

In the Atlantic waters off the Portuguese coast, the diet is dominated by fish, which seems to confirm the results of other studies, notably in the Mediterranean, which tend to show the importance of small pelagic fish living in shoals such as anchovies and sardines, even sprats (Navarro et al. 2009, Dupuy & Sallé, in prep.). It also corroborates direct and opportunistic sightings of birds in the Atlantic feeding on this type of prey. Some of these small pelagic fish may also be derived from professional fisheries, given the recent proof of bycatches of Balearic Shearwater in purse seines or of reef nets. The Balearic Shearwater takes advantage of trawl fishing through discards (non-commercial species, gutted fish waste), and also the numerous blue fish (anchovies, sardines, sand eels, sprats) which escape through the mesh when hauling in the trawl or seine net (Yesou, 2003)

It is also likely that a major part of the diet consists of prey occupying a lower position in the food web, such as macrozooplankton, especially krill (Louzao et al., 2014)

In the Atlantic waters off the French coasts (Bay of Biscay), the diet seems to consist of a mixture in equal proportions of small pelagic fish and demersal fish, i.e., derived from fishery discards (Navarro and al, 2009). These results are coherent with opportunistic observation data of Balearic Shearwater associated with fishing boats in this area.

Older publications showed that, in general, the Balearic Shearwater can mix with other species at fishing sites.

In the Côtes-d'Armor department, the monitoring operations carried out in 2015 and 2016 highlighted fishing groups mixed with other species, with considerable variability over time. The groups or species observed fishing with the Balearic Shearwater are: Manx Shearwater (sometimes rafts mixed 50/50), Sandwich and Common Terns, Little, Black-headed and Mediterranean Gulls, Northern Gannet, Razorbill (Geoca, Bretagne Vivante, 2016), and also large gulls as in Douarnenez Bay.

During the exceptional wintering in Brittany, in the 2007/2008 then 2012/2013 seasons, shearwaters were frequently combined with other species of seabirds: auks (Razorbills) and gulls (Kittiwakes) in Douarnenez Bay and Saint Brieuc Bay (Pianalto et al., 2013, Plestan et al., 2009)

1.4.3 Moult phenology

The study carried out by Meier (2016) summarised the knowledge acquired on the moult from decades of observation (Mayaud as from the 1930s, Yésou 1986 in particular). The moulting season for the primaries occurs between June and October, a period during which the birds are mainly distributed in the Northeast Atlantic. The P1 primaries moult as soon as the birds arrive in the Atlantic (June/July), the P6 moult in the middle of the summer season, followed by the P9 and P10 which moult later in September and October (Meier et al., 2016).

The publication of Gil-Velasco et al. in 2015 gives the following results :

- main moulting areas off the coast of the Iberian Peninsula, with a breeding moult that starts with the internal primaries (late May to late July) then the external primaries (early July to mid-September) and finally the secondaries (late July to mid-October) ;
- the birds visiting the French waters of the Bay of Biscay and the Channel already moulted and have new plumage ;
- non-breeding birds may moult early.

At the time of the operation to capture 3 individuals and fit them with Argos tags in Mor Braz (southern Brittany) in September 2012, il was noted that the birds which visited this sector are indeed at the end of their moult in this period.

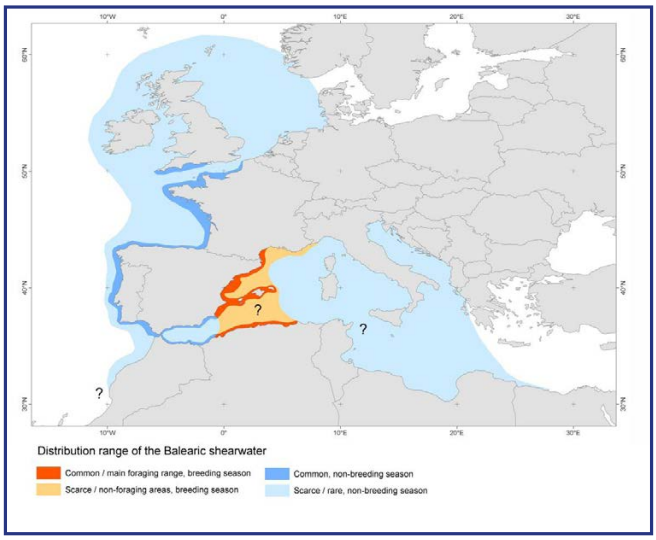
The status of these birds remained unknown, but it is possible that they were adults or juveniles given their moulting stage (Boué et al., 2014).

1.4.4 Phenology of the species' presence in function of the different major areas of distribution

The Balearic Shearwater breeds exclusively in the Balearic Archipelago off the coast of Spain. After breeding, the colonies disperse essentially in the Atlantic for the non-breeding season (Le Mao & Yésou 1993), even if a minority of individuals remain in the Mediterranean.

Some descend southwards along the Moroccan coast. The proportion of birds which takes this route is unknown, as is their area of distribution off the coast of Africa : the species is observed annually in very small numbers as far as Dakar, in Senegal.

Figure 5 : Area of distribution of the Balearic Shearwater according to the international action plan for the Balearic Shearwater (Arcos, 2011).



The northward migration is better known. Several thousand birds spend the summer along the coasts of Portugal and Galicia. Several thousand also reach the Bay of Biscay and the west of the Channel. The species is becoming rarer, although regular, further north: in recent years in the Eastern Channel and North Sea, sometimes as far as Scotland and off the coasts of Ireland (Mayol-Serra et al., 2000; Wynn & Yésou, 2007).

The vast majority of the population returns to the Mediterranean in the autumn and concentrates along the Iberian coast during the winter (Gutiérrez & Figuerola 1995, Arcos 2001a, b, Arcos 2008).

General phenology

The overall phenological pattern of annual presence seems to be distributed as follows :

- 3 months of nesting (laying, incubation, raising of the chicks) in the Mediterranean ;
- 5 months spent visiting more or less frequently the breeding colonies in the Mediterranean ;
- 4 months of the year spent in post-nuptial dispersion in the Atlantic (mainly off the coasts of Portugal and France).

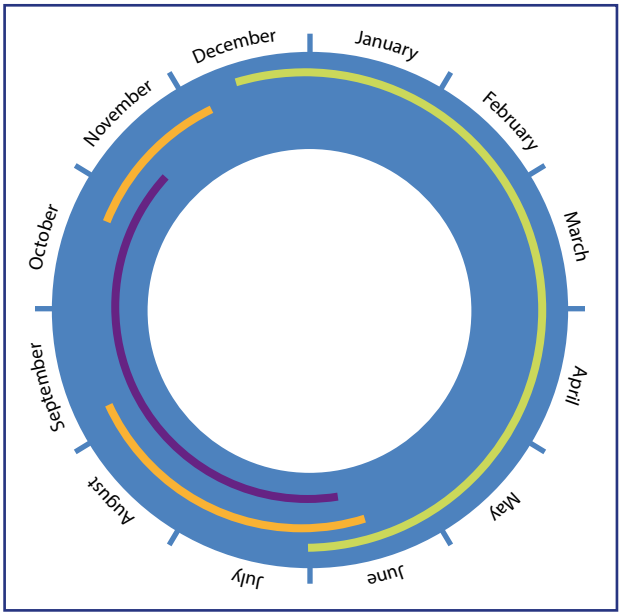


Figure 6 : Annual cycle of the Balearic Shearwater, periods of breeding (green), migration between the Mediterranean and the Atlantic (orange) and summering-moult (violet) (Boué et al., 2013).

Focus on the phenology of internuptial migration from the Balearic Islands

Recent bio-logging studies on the Balearic Shearwater (notably by GLS tags fitted on 28, then 21 adult nesting individuals in 2010 and 2011 respectively) significantly enhanced knowledge about the distribution and phenology of the species in the non-breeding season (Boué et al., 2013 and 2014).

All the individuals fitted with GLS in the Balearic islands migrated to the waters of the northeast Atlantic in the post-breeding period, then returned to their Mediterranean breeding grounds in autumn. The data collected in the framework of these studies, combined with "sea watch" censuses from the bottleneck of the Straits of Gibraltar also identified the migration dates (Boué et al., 2013 and 2014) :

- departure from the Mediterranean towards the Atlantic from mid-May to late June, in greater numbers late May / early June, with a peak of migration in the last week of May and the first ten days of June ;
- return to the Mediterranean from September to November. During this period, the birds alternately enter and leave Mediterranean.

However, a 2017 study (Pérez-Roda et al.) seems to show that there is "colony-specific" variability concerning the duration of presence in the Atlantic (1 month

longer for birds from the colonies in the archipelago) and the average date of return to Mediterranean waters.

The study by Guilford et al. (2012) shows that on average females spend more time than males on migration (respective median of 91 days and 83 days).

Focus on phenology in the Bay of Biscay

The capture and Argos tagging of 3 individuals in Mor Braz (southern Brittany) in September 2012 in the framework of the FAME programme, provided additional information on the migration behaviour of the species even if the number of individuals was very limited: after a period of short trips in Mor Braz (from 20/09/12 to their departure), they start a rapid migration very during which they cross the Bay of Biscay, fly along the Portuguese coast and stay there for a few days, before quickly entering the Mediterranean between Spain and the Balearic Islands, and visiting the breeding site on Mallorca (12/10/12 and 19/10/12). The return migration is therefore very fast, because the only bird for which we know the whole return migration left Mor Braz sector on 15th October 2012 and returned to the Mediterranean as early as 27th October (Boué et al., 2013 and 2014, Weimerskirch et al., 2013).

In 2013, the experiment was repeated with 4 individuals and :

- confirmed that the individuals captured at the end of the non-breeding season in the "broad" sector of the Mor Braz seem to stay there, the sector providing food and refuge to the birds exploiting it, for at least part of their moulting season ;
- highlighted that return journey to the south of one of the tagged individuals was very much along the coast.

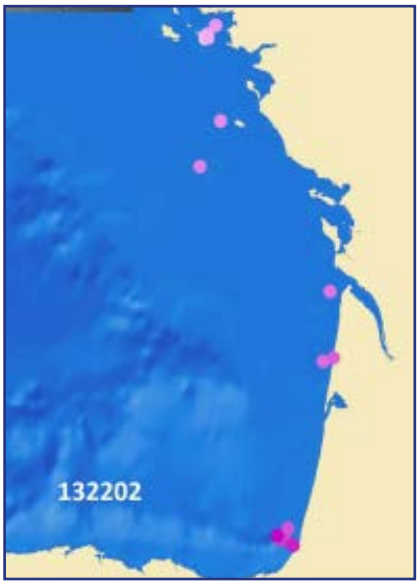


Figure 7 : Locations emitted by the Argos tag of one individual during its return migration between 21/09/2013 and 24/11/2013 (Boué et al., 2014).

For this chapter, see the details in Annexe 1: Lambrechts A. & Entraygues M., 2019. Summary of knowledge regarding the Balearic Shearwater (Puffinus mauretanicus). Here we simply provide a summary of this knowledge.

1.5 Distribution, abundance and preferential stopover areas in the non-breeding season

1.5.1 Overall pattern of distribution

During the course of this non-breeding season, all the birds migrate to the Atlantic, where they seem to concentrate in a limited number of key areas (Boué et al., 2013 and 2014, Weimerskirch et al., 2013) :

- off the coast of Portugal (notably the marine protected areas of Figueira da Foz and Cabo Raso) ;
- in the Gulf of Cadiz (see below) ;
- off the French Atlantic coasts (various sectors of the Bay of Biscay and Brittany - see below) ;
- off the coast of Morocco.

Various studies carried out between 2010 and 2013 on various breeding colonies in the Balearic Islands, with different types of bio-logger fitted to birds of different age and sex, show however that there seems to be an age-, sex- and colony-specific migration strategy (Pérez-Roda et al., 2017, Boué et al., 2013 and 2014, Weimerskirch et al., 2013, Guilford et al., 2012, Louzao et al., 2012, Militao et al., 2012, Louzao et al., 2011). For example, none of the 26 tagged breeding birds from a colony in Mallorca went beyond northern Gascony, whereas that same year no less than 25% of the worldwide population was censused off northern Brittany (notably Lannion and Saint Brieuc Bays).

Even if the excessively low number of juveniles tagged and the short emission duration of the bio-loggers used does not enable definitive conclusions to be drawn, it seems that after fledging the young rapidly leave the Mediterranean for the waters of the Atlantic (southern Portugal).

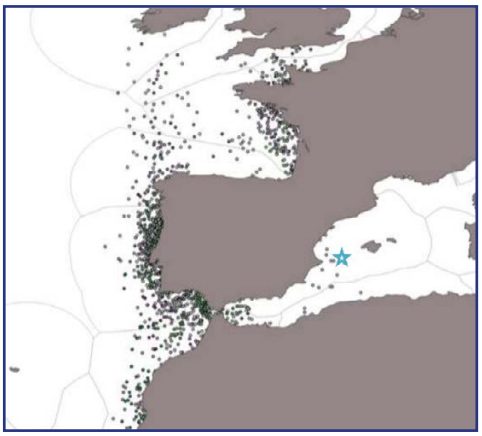


Figure 8 : Locations of 21 adults GLS tagged in the breeding colonies of the island of Ibiza during the course of the non-breeding season (June 2011 to November 2011). While most individuals spent the whole of this period off the coasts of Portugal, it should be noted that 1/4 of the individuals disperse off the French coasts (Northern and Southern Brittany) (This corroborates the fact that the French Atlantic seaboard hosts approximately 25% of the worldwide population (Weimerskirch et al.2013).

Likewise, it seems that the Bay of Biscay (in particular northern Gascony and the western Channel) may be preferentially used by females and by non-breeding individuals, whether adult or immature (Pérez-Roda et al., 2017). This hypothesis had been advanced as early as 1980s because the timing of the stopovers off the Vendée and in Mor Braz showed that the first waves of arrivals were incompatible with the breeding chronology (Yésou, 1986).

The results obtained by studies using the analysis of stable isotopes collected from birds' flight feathers corroborates this Atlantic inter-nuptial distribution, mainly centred on the west coast of the Iberian Peninsula and in the Bay of Biscay (Louzao et al., 2011).

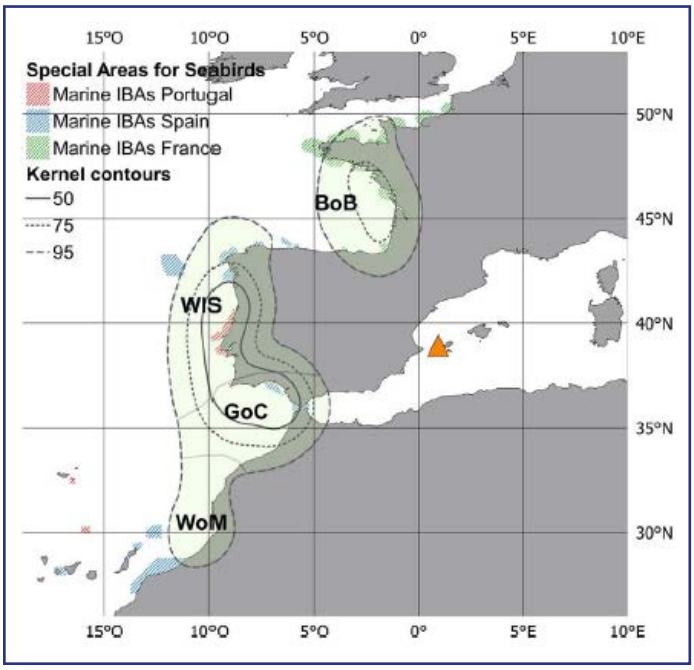
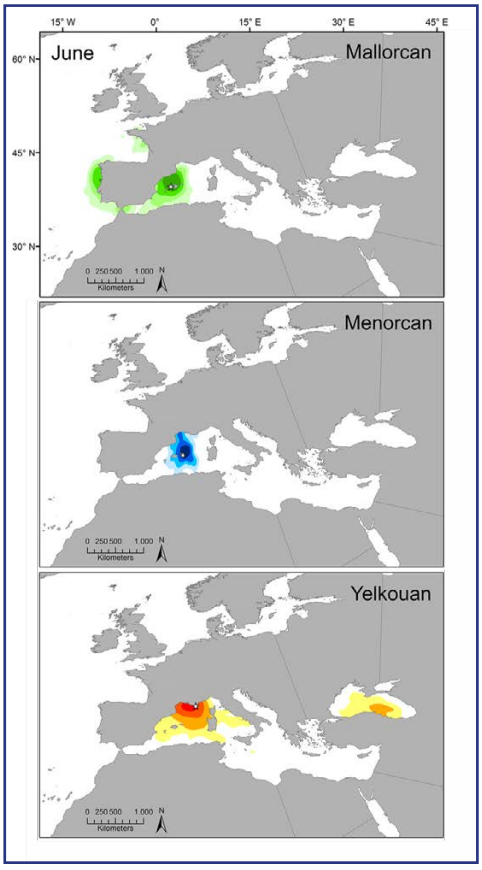


Figure 9 : Distribution in the non-breeding season of adults from the colonies of Eivissa & "important bird areas". (Pérez-Roda et al., 2017).

Off the coasts of Galicia and Cantabria, in northwest Spain, birds can be observed almost all year, but mainly from June to October. Major stopovers (150+ ind.) have been observed at various sites on this coast, notably Estaca de Bares or the Ria de Vigo and Ria de Pontevedra, where a high proportion of birds are moulting their primary and secondary flight feathers, especially in June. This sector seems to be crossed by migratory flows mainly during the flight up to the Bay of Biscay between June and August, whereas the return flow towards the Mediterranean seems much less significant in September/October (Mourino et al., 2003).

A recent publication (Austin & al., 2019) highlights the different behaviour of the Balearic Shearwaters belonging to the populations of the island of Menorca: they seem to adopt a migratory behaviour intermediate between that of the "generic" Balearic Shearwater and that of its close relation the Yelkouan Shearwater (which migrates to the eastern Mediterranean in the non-breeding season): the birds of the Menorca colonies remain in the western Mediterranean during the non-breeding season: Gulf of Lion, Gulf of Genoa, Alboran Sea.

Figure 10 : Comparison of the inter-nuptial distributions of the Balearic Shearwaters of Mallorca and Menorca and the Yelkouan Shearwaters of Hyères, represented by density kernels calculated from geolocator tracking (Austin et al., 2019).



The details of the contributions of the various major programmes (whether specific or not) carried out during the last decade is presented in Annexe 6. A summary is presented here.

1.5.2 Focus on the distribution and abundance of the species off the French coasts (Bay of Biscay and Channel)

The concentration points observed off French coasts concern above all the gathering of birds on sites with rich food potential. As from the 1980s, the use of satellite imagery had shown a strong link between the patches of cold water generated near the coasts of northern Gascony by tidal currents, and the summer concentrations of Balearic Shearwaters which were at that time essentially observed off the coast of Vendée and southern Brittany. More recently, other satellite data, and also the habitat model developed from the data gathered at sea between 2004 and 2018 (Lebras et al., 2019) showed that the chlorophyl concentration is another good indicator of sites' potential for the species. The richness of surface waters in chlorophyl results from both thermal fronts identified right from the first studies and inputs of nutriments of terrestrial origin in the plumes of rivers, plumes that also produce high turbidity which can be prejudicial to the birds: in fact, not all sites rich in chlorophyl have the same attractivity for the Balearic Shearwater. This attractivity also results, above all, from the abundance of fish prey (essentially small fish living in shoals: sardines, sprats, anchovies) whose distribution has considerably changed since the mid-1990s due to the warming of surface waters (Dupuy & Sallé, in prep). The first consolidated data date from the 1980s, a period during which monitoring and observation operations especially from customs boats led to the estimation that between 10 000 and 15 000 individuals summered in the Bay of Biscay, between the Spanish border and southern Brittany (Hemery et al., 1986). The sector of

Sables-d'Olonne in Vendée seemed to be a major stopover site at the time, with maximum stopovers of 6 000 to 7 000 individuals (40% to 50% of the French numbers evaluated at that date) during the months of July and August.

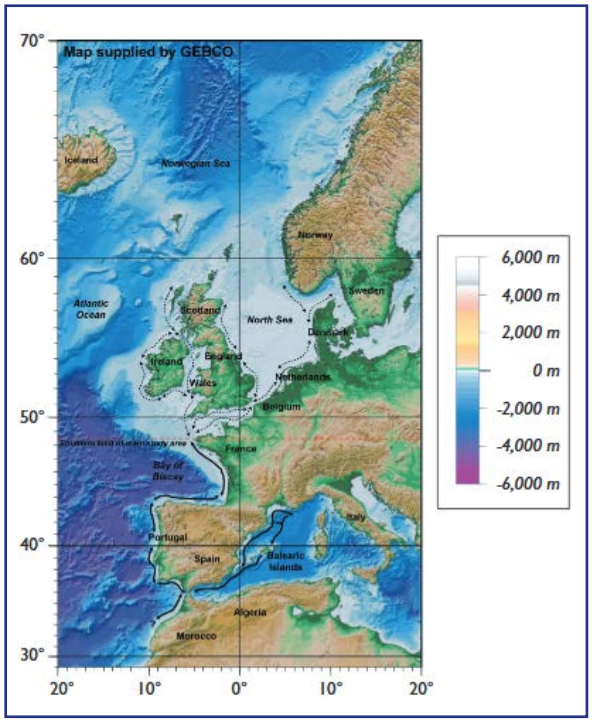


Figure 11 : Trend towards a northward extension of the postnuptial dispersion of Balearic Shearwater (Yésou, 2003).

However, as from the 2000s, a perceptible change was noted in the distribution of the Balearic Shearwater in French and northwest European Atlantic waters during the non-breeding season: the centre of gravity of Balearic Shearwater distribution tended to move towards the north. The (non-exclusive) hypotheses advanced to explain this northward shift are :

- oceanographic parameters: increase in surface temperatures in the Bay of Biscay, and/or increase in the frequency and duration of periods of warmer temperatures ;
- fish resources and availability (stocks): the modification of the distribution and availability of the main prey (anchovies, sardines, sprats), linked notably to fisheries and interannual variations in stocks.

It is now accepted that the warming of the Atlantic modified the distribution of populations of plankton and fish (including the anchovy and sardine), causing the species to move its traditional fishing grounds further north (Wynn et al., 2007).

Il also seems likely that this northward shift of the centre of gravity of the sectors occupied in the non-breeding season can be partly explained by the sharp decline in anchovy stocks in the Bay of Biscay during the 2000s, combined with the moratorium on fishing the species from 2007 to 2010, which reduced the available quantity of resulting fishery discards, habitually exploited by the Balearic Shearwater.

Another 2007 publication (Wynn & Yésou) underlines the same phenomenon, backed up by a summary of the data on observations of the species made from the coasts of countries in northwest Europe (Ireland, south of England, Scandinavian countries) which show an increase in occurrences in recent years.

In the same way, the summary of the sightings of Balearic Shearwater from Cap Gris-Nez in the Dover Strait shows a northward movement of the summer range, mainly since 2007-2008.

Description de la distribution du Puffin des Baléares dans la ZEE française à partir de données publiées (Boué et al., 2013, Geoca/BV, 2016, Castège, I., & Hémery, G. (2009), Castège I. & Milon É. (coord.) 2018)

The most important **stopover sectors** in terms of numbers and interannual stability identified in the recent literature are as follows :

- Mont Saint Michel Bay ;
- Saint Brieuc Bay ;
- Lannion Bay ;
- Vilaine Estuary/Mor Braz ;
- The "Vendée Corniche" ;
- The south of the Landes Shelf (coasts of the Landes and Pyrénées-Atlantiques departments).

Phenology of presence and principal stopovers

Off Vendée and Loire-Atlantique, birds are observed at the start of the summer season (June), with flows of several hundred birds, and become scarcer in August .

In the western Channel and of Brittany, the first sightings are signalled as early as April, but only in late May for more significant groups. At the start of the season (May to July), the major stopovers are observed off Finistère, especially in Douarnenez Bay, after which the department is gradually deserted and of the large groups occupy sites further east (Saint Brieuc and Mont Saint Michel Bays), for approximately 2 months, with several thousand individuals present au overall on the 2 sectors. The mass arrivals in the western Channel (Mont Saint Michel Bay) are observed during the course of July and the mass presence of birds lasts about 2 months, on the whole of the Normandy-Brittany Gulf (including the Cotentin), with of the probable exchanges between the various sectors: bay head, Les Havres coast.

The sector of the Vilaine Estuary / Mor Braz, on the other hand, is massively occupied rather at the end of the season, from August to October.

The sightings in the eastern Channel/North Sea are very limited, only a few individuals, from August to September.

During the prenuptial return movements to the Mediterranean (at the end of the season in France, i.e., from August to November), individuals seem to frequent in greater numbers the Landes coasts (sector of the Gouf de Capbreton).

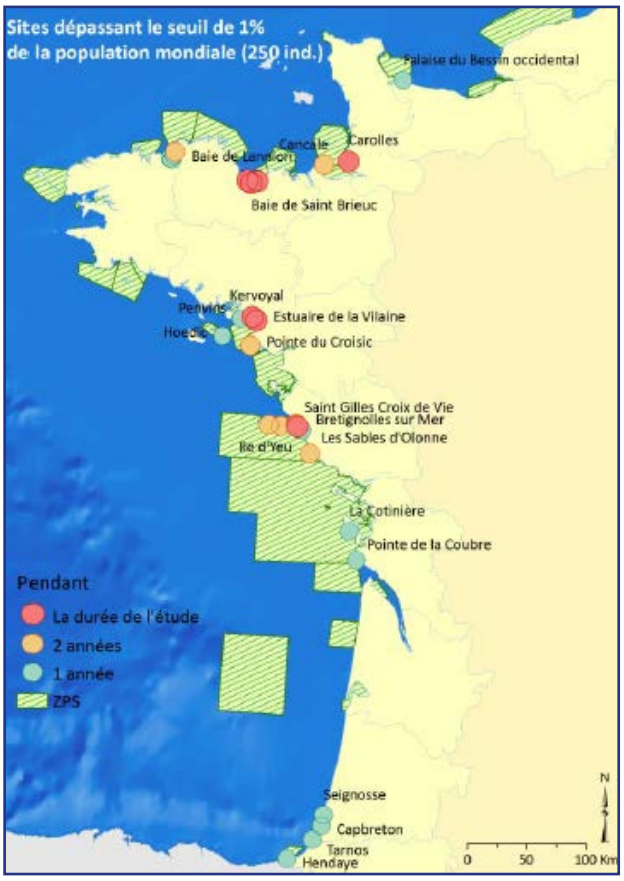
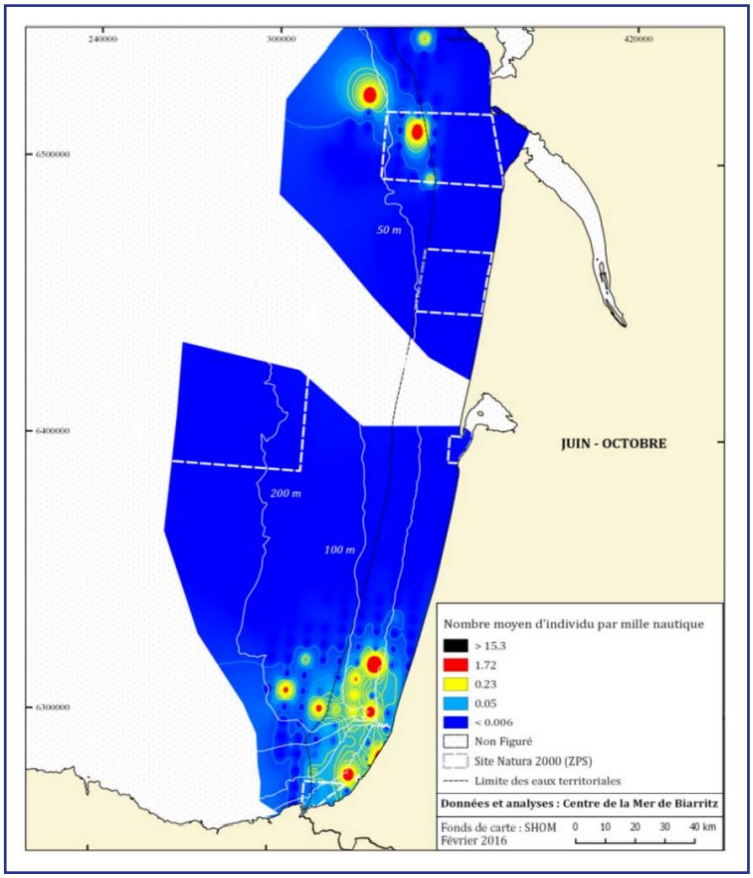


Figure 12 : Coastal sites harbouring more than 1% (250+ ind.) of the estimated global population (25 000 ind.) during 1, 2 or 3 years of monitoring by the FAME programme (Boué et al., 2013).

Figure 13 : Distribution of the Balearic Shearwater in southern Gascony over the period 2003-2015 (Castège I. & Milon É. (coord.) 2018).



Cases of the species wintering off Brittany (Plestan et al., 2009; Pinalto et al. 2013)

2 exceptional overwinters have been observed in 2007-2008 and 2012-2013, respectively.

In 2007-2008, whereas usually only a few birds, or up to a few tens, can be observed off Brittany between November and March, a large number of Balearic Shearwater frequented the northern coast of Brittany. In particular, Saint Brieuc Bay harboured several hundred and up to 710 individuals (January), between the months of November 2007 and February 2008. The shearwaters were frequently mixed with other species of seabirds: auks (Razorbills) and gulls (Kittiwakes). Groups of a few to a few tens of individuals were simultaneously observed off other sectors of northern Brittany (Lannion Bay, Roscoff, Le Conquet). The hypothesis that was advanced to explain this influx was the temperature of the water in the bay, 1.7° warmer than the following year.

During the course of the 2012-2013 winter, it was Douarnenez Bay which in its turn harboured exceptional numbers of Balearic Shearwater, between November and March. In late November, more than 1500 birds which were counted, several hundred remained in the company of other seabirds (auks, gulls) until March in various sectors of the bay. It seems that this influx was correlated with the presence of an unusual quantity of sardines and horse mackerel that winter.

Analysis of the abundance of the Balearic Shearwater in the French EEZ based on unpublished data (period 2004-2018)

In the framework of establishing the monitoring strategy for the Balearic Shearwater, a habitat model was constructed based on protocol-based data gathered at sea over the period 2004-2018, in particular by means of marine renewable energy (MRE) studies, IFREMER fish surveys and marine protected area (MPA) monitoring operations. Carried out in partnership with the organisations involved in the enhancing knowledge of the species, and combined with the analysis of protocol-based data gathered from the coast, it is covered in an extensive document available in Annexe 2. Le Bras Y., Lambrechts A. & Entraygues M., 2019. Définition d'une stratégie du suivi du Puffin des Baléares (Puffinus mauretanicus). Méta-analyse des données disponibles dans la ZEE française entre 2004 et 2018.

Initial, ambitious work on gathering the available data provided fine analysis of the past or contemporary methods used, presenting the historical background of the procedures and assessing the quality of the data collected and their geographical scope.

The habitat model then enables predictions of species density to be produced: this involves determining the functional relationships between environmental variables (explicative variables) on the one hand and the abundance of Balearic Shearwater (response variable) on the other. Notably, the relationship between detection distance and detection probability was modelled according to the method of Virgili et al. (2019), taking into account the potential effects of sea state and observation height.

The main results and information acquired are presented here in summary form :

- overall sampling coverage adequate for the Atlantic, but insufficient for the Mediterranean to produce a first exploratory map of data on the abundance of the species;

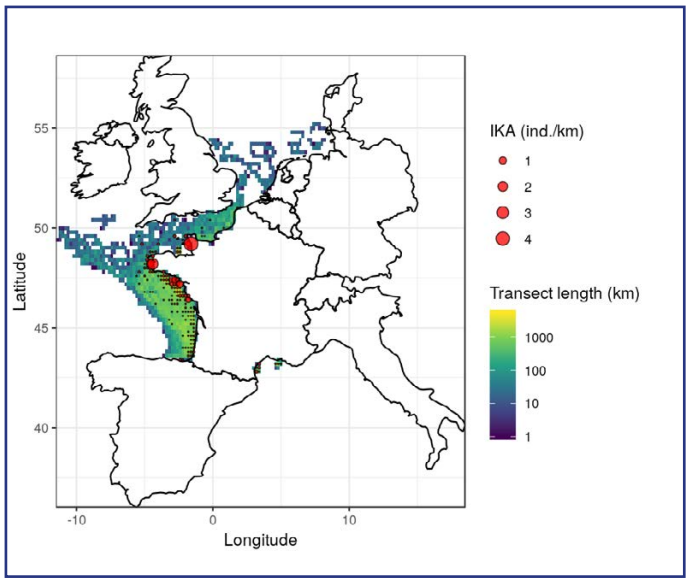
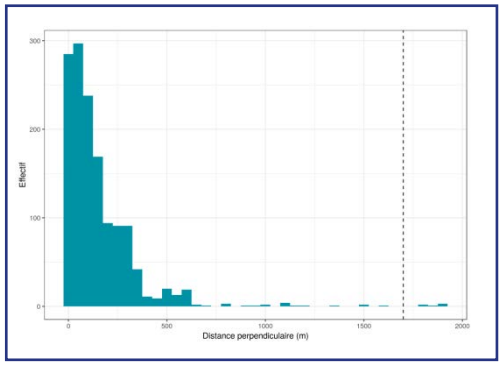


Figure 14 : Sampling effort and observations derived from data meta-analysed for absolute abundance. At this stage the detection probability is not taken into account: the map reveals the sampling effort and the relative abundance (in the form of IKA) calculated in a fifth of a degree grid network.

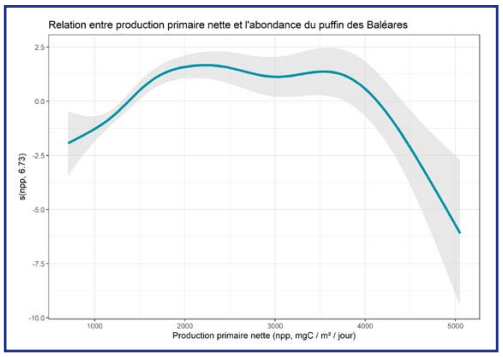
- the first steps in the analysis notably provided information on the relationship between protocol and detection distance (rapid reduction in the detection probability over the first 250 metres) and the relationship between observation conditions and detection probability: the major sources of variability in detection probability are the observation conditions, in particular the height of the viewing platform ;
- a detection probability which decreases rapidly over the 250 first metres, which shows that strip transect type monitoring protocols by boat are not effective ;
- a detection probability little influenced by the "observer effect", but much better (approximately 40% higher) when the observation platform on the boat is high ;

Figure 15 : Histogram (categories of 50 m) of detection distances. The vertical dotted line marks the distance threshold of 1700 m.



- the net primary production is the most significant environmental factor to explain the distribution of the species ;

Figure 16 : Functional relationship between the abundance of Balearic Shearwater and net primary production estimated by the best candidate model.



- concerning the Atlantic sector, the preferential areas of presence and concentration of Balearic Shearwater derived from gap analysis, which can determine the spatial extent of the sectors propitious for the extrapolation of the habitat model are :
  - the Normandy-Brittany Gulf, including the northeast part of the gulf, marked by the tidal front of Les Casquets north of the Cotentin ;
  - the northern Brittany / western Channel coast: the bays of Morlaix, Lannion, Saint Brieuc and Mont Saint Michel ;
  - the tip of Brittany, Iroise Sea, a sector marked by the vast tidal front of Ouessant, which appears as the area with the highest predicted density of birds ;
  - off the Vilaine Estuary south of Brittany : the area of Mor Braz, marked by the tidal fronts of northern Gascony ;

- To a lesser extent, but unexpectedly, the sector of the Gouf de Capbreton and off the Gironde Estuary appear to be attractive for the species.

- The peak of the species' presence in Atlantic France was confirmed to be situated between June and October.

In addition to the habitat model, this work also included comparative analysis of the various datasets (meta-analysis of absolute abundances from protocol-based data at sea, population trends derived from the habitat model, meta-analysis of relative abundances using data gathered from the coast). The complementarity of these datasets, and also their limits and constraints, now provide a high-quality state of the art on the species, which is the basis for the considerations and choices in terms of the methods, tools and protocols to be deployed in the framework of the action files regarding the "monitoring strategy" of this Plan.

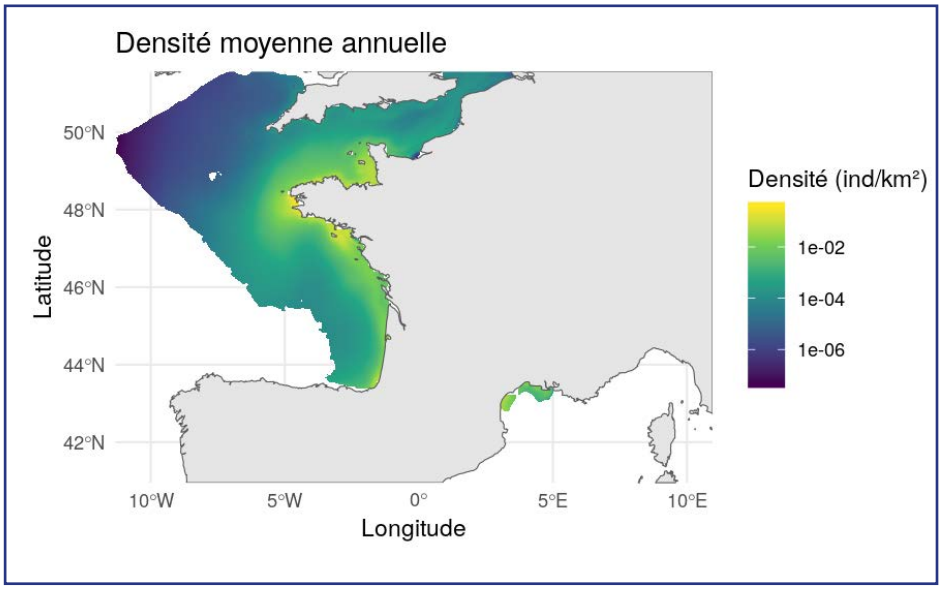


Figure 17 : Mean annual density of shearwaters (2017). Logarithmic scale to show the nuances of density over a broad range of densities.

1.5.3 Focus on the distribution of the species in the French waters of the Gulf of Lion

The species remains little known in the Gulf of Lion, with an observed major lack of monitoring programmes or regular data gathering for the species. Only PELMED surveys, the excursions of Découverte du Vivant and occasionally EcoOcéan Institut mention the species. The recent observation campaigns carried out in the framework of floating marine wind power projects off the coast of Gruissan, Leucate and Fos sur Mer have nevertheless provided interesting data.

We should also note that the birds from the Menorca colonies, whose phenotype is close to that of Yelkouan Shearwaters, and which furthermore seem to preferentially frequent the sectors of the Gulf of Lion, are difficult to distinguish at sea. Their numbers are therefore probably underestimated.

The sightings made during the campaigns of the programme trawling PELMED from 1994 to 2010 show that the species can be encountered on the whole of the Gulf, from the most coastal sectors to depths of 200 metres and more, with a higher concentration off the coast of the Gulf of Aigues Mortes and Sète (Beaubrun et al., 2013). The species essentially exploits the most coastal sectors, between the sounding lines of 5-10 m and 35-40 m, but it is not averse to going further offshore, attracted by the trawlers in whose wake it feeds on the discards. Nevertheless, compared to the 2 other shearwaters encountered in the Mediterranean, the Balearic Shearwater seems little dependant on human activities according to Beaubrun et al., 2013.

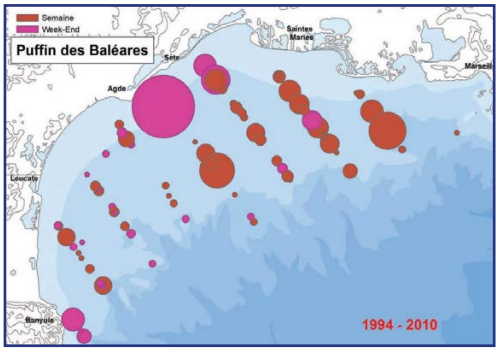


Figure 18 : Relative proportions of the numbers of Balearic Shearwaters seen during the week (brown) and at the weekend (cyclamen) during 84 of the trawls of the PELMED campaigns (1994-2010). Largest dot = 100 individuals.

The campaigns conducted in May and June by IFREMER in the framework of floating wind farm projects show that in this sector the distribution may favour two geographical nuclei: one a little north of Gruissan (in May) and the other just off Port la New. 2 hypotheses could explain this distribution :

- the birds are indirectly attracted by the activities of professional fishers ;
- these areas may have a particular hydrology which generates high densities of small pelagic fish, as was mentioned for the coasts of the Bay of Biscay (Yésou, 1993; Recorbet, 1996).

It is very likely that these two reasons are complementary, because during the weekends of May and June (very few fishing boats), the numbers of Balearic Shearwaters were a third of the numbers observed in the week.

This distribution, advanced by Beaubrun et al. 2013, needs to be completed with recent sightings from the coast and the sea trips made by the Découverte du Vivant team and EcoOcéan Institut which would tend to show that the Balearic Shearwater is more abundant in the sector of the Gulf of Lion Marine Natural Park (MNP) than in the Gulf of Aigues Mortes, although it is encountered between Agde and Sète.

Off the east of the Camargue, as from the Gulf of Fos sur Mer, the species seems scarcer even if no specific study has been carried out on its distribution there. During the 1994-2010 PELMED campaigns, it was observed only once directly off La Ciotat Bay in 1998.

For example, extraction of the opportunistic data entered in the collaborative database fauna-paca.org (administered by the LPO PACA) only provides 26 sightings, of between 1 and 6 individuals, between 2003 and 2017. All 4 seasons are included.

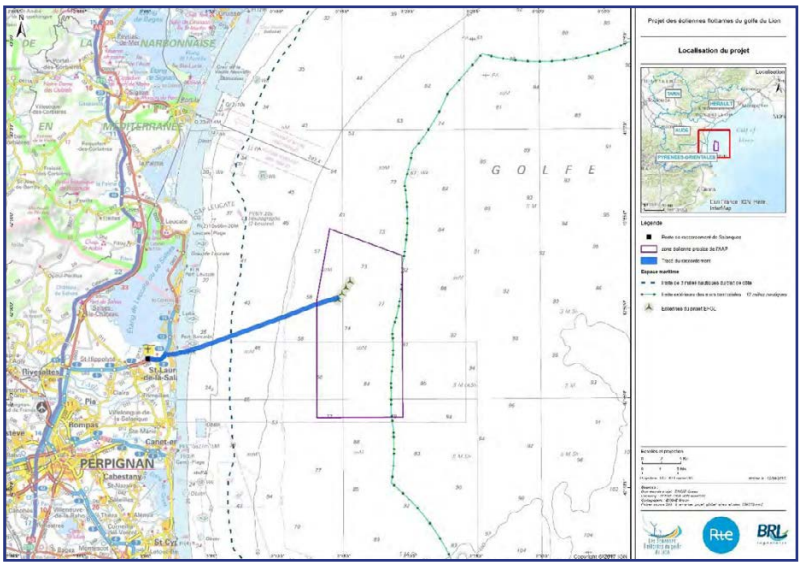


Figure 84 : Location of the pilot marine wind power project in the Gulf of Lion (source EFGL).

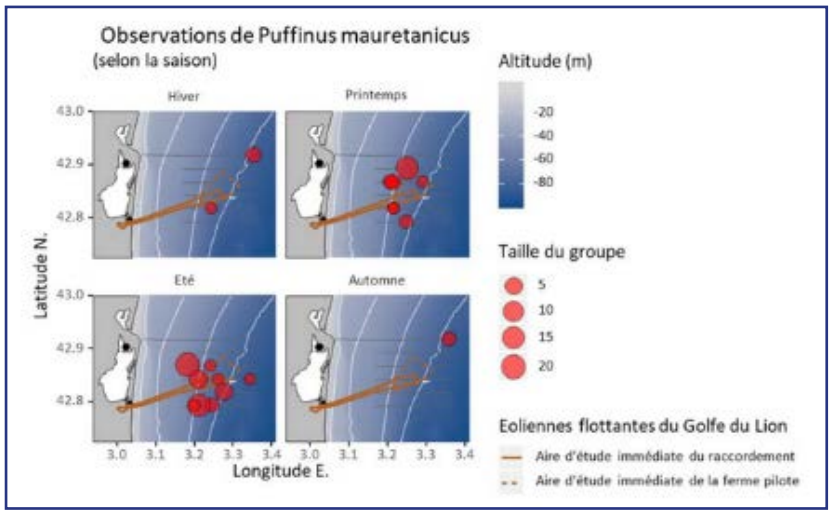
The data coming from the linked surveys carried out on the site of the pilot project off the coast of Gruissan confirm that the species was mainly observed in mixed groups with Yelkouan Shearwaters. The two species have very similar behaviour and share the same activities in the study area (rest, transit, feeding, moult).

Between 0 and 53 individuals were identified with certitude during the course of the boat trips (0 to 110 individuals if we estimate a proportion of 8% - derived from photo-identification - of Balearic Shearwaters amongst the small indeterminant shearwaters), essentially in May and June.

As for Yelkouan Shearwaters, individuals were observed on depths of 40 to 80 metres, at a distance of 5 to 20 km off the coast. the species is observed alone or in small groups, larger in summer (especially June).

The Balearic Shearwater was thus observed in the immediate study area, but in low numbers. However, the utilisation of the Gulf of Lion by the species is variable and there are gaps in knowledge about its period of presence in the Mediterranean (breeding season). Its distribution is paradoxically better known in the summer season when it frequents the coasts of the Atlantic and the Channel.

Figure 19 : Density of sightings of Balearic Shearwater along boat transects.



Data derived from marine wind farm projects and the study of marine SPAs

During the course of the 2000s and 2010s, a certain number of marine renewable energy projects were developed.

A summary of the knowledge regarding the Balearic Shearwater, acquired during the course of these studies, some of which mobilised the implementation of data acquisition campaigns at sea targeting marine megafauna (campaigns by boat, flyovers by plane, sightings from the coast) is presented in Annexe 7. A summary concerning monitoring of the marine SPAs is also presented in this annexe.

1.5.4 Focus on the distribution of the species in the Spanish Mediterranean in the breeding season (March to June): feeding grounds

Observations of the species made by boat in the Mediterranean in the breeding season suggest a mainly coastal distribution (isobath < 200m), in the most productive sectors of the continental shelf.

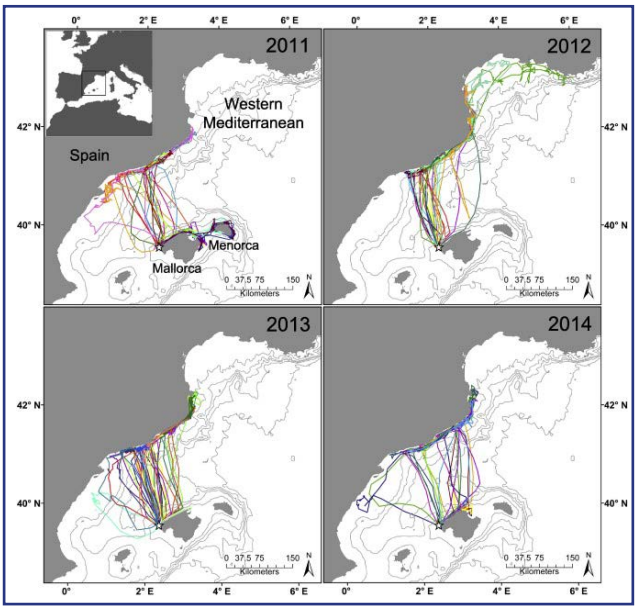
The local oceanographic conditions, which generate high-productivity water masses, condition the distribution of the small pelagic fish which constitute the principal food resource of the Balearic Shearwater, if we exclude fishery discards. Indeed, before the moratorium regulating fishery discards, Arcos and Oro (2002) demonstrated that a significant proportion (more than 40% of the energy input) of their food was provided by discards from trawlers between March and June on the Spanish Mediterranean coast.

During this breeding season (March-June), the species seems to exploit mainly (Boué et al., 2013, Meier et al., 2015, Louzao et al., 2011, Louzao et al., 2006, Arcos et al., 2012) :

- the Spanish continental shelf, situated a reasonable distance from the breeding colonies and favouring high-productivity sectors (especially with a high concentration of chlorophyl a) caused by meso-scale oceanographic topographical features such as canyons/trenches :
    - continental shelf opposite Cap Creus ;
    - continental shelf off the coast of Barcelona ;
    - continental shelf off the coast of the Ebro Delta ;
    - continental shelf off the coast of Cap Nao ;
    - alboran Sea.

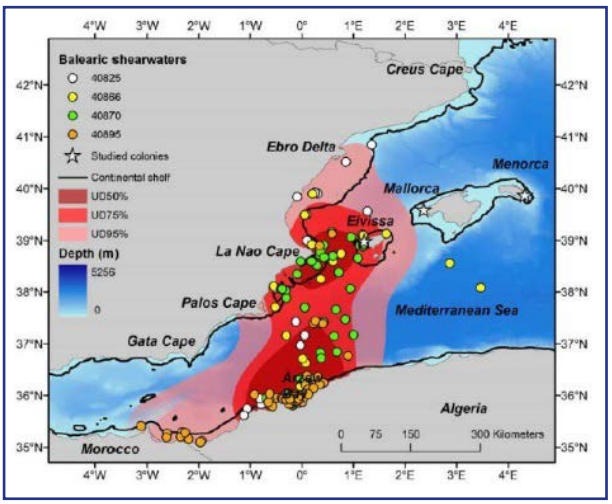
  Note that the flight corridors linking the colonies to these preferential feeding grounds seem to be stable and relatively narrow/well-defined ;

Figure 20 : Feeding trips during the incubation period in 2011 (n = 16), 2012 (n = 14), 2013 (n = 23) and 2014 (n = 14) (Meier et al, 2015).



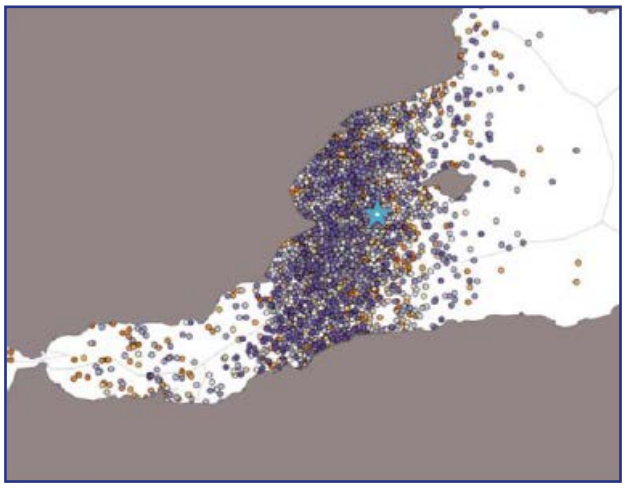
- less significantly, and to be confirmed by more in-depth studies, the northwest Algerian coast (Arzew Gulf) and northeast Moroccan coast, from Nador to Algiers. This is notably the case for adults in the period of raising their young from the colonies of the islands situated in the north of the archipelago (Menorca) and southwest (Ibiza) ;

Figure 21 : Satellite monitoring of adult Balearic Shearwater during the course of the period of raising their chicks in 2011 from a west Mediterranean breeding colony. (Weimerskirch et al., 2013).



- the nearby sectors immediately surrounding the breeding colonies on the Balearic Islands and their islets ;
- the French coasts of the Gulf of Lion (see below), especially for birds from the Menorca colony (cf. 2012 telemetric monitoring).

Figure 22 : Localisations de 21 adultes équipés de GLS sur les colonies de reproduction de l'île d'Ibiza au cours de deux périodes successives de reproduction (avril 2011 à juin 2011 et décembre 2011 à mars 2012). (Weimerskirch et al, 2013).



There seems to be a segregation of the feeding grounds depending on the colony of origin :

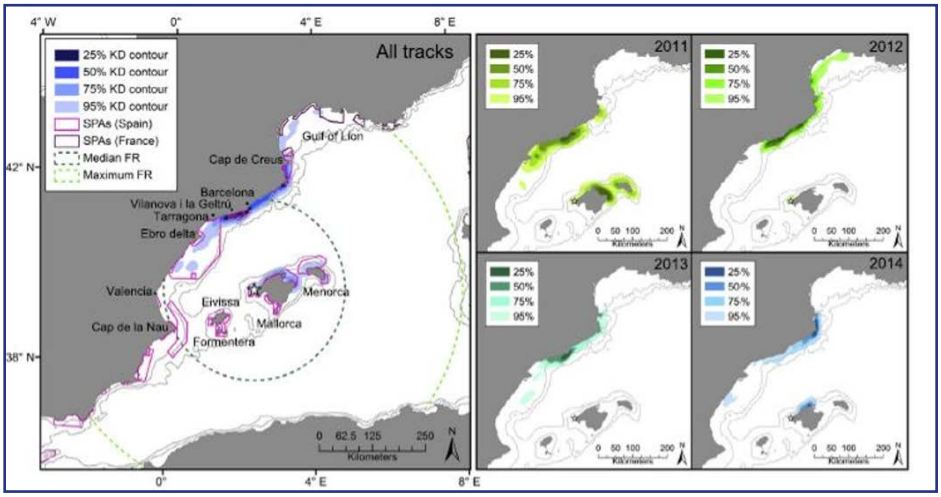
- the birds of the "subpopulations" of the islands in the south of the archipelago (Ibiza) seem mainly to exploit the eastern Spanish coast between Cap Palos and the Ebro Delta, although birds from these colonies have also been located in the sector of Malaga to the south (Alboran Sea) and as far as the French border to the north, and also on the North African coasts of Morocco and Algeria ;
- the birds of the "subpopulations" of the islands in the centre of the archipelago (Mallorca) also exploit the continental shelf of the eastern

Spanish coast, but seem overall to be distributed further north, between the Ebro Delta and the Gulf of Lion. Feeding trips to the North African coasts - seem to be rarer for these birds ;

- the birds from the colonies of the islands in the north of the archipelago (Menorca), seem to occupy sectors slightly further east, and potentially visit both the sectors around the Gulf of Lion (and as far as the Gulf of Genoa) and also the Algerian coasts.

In addition, the telemetric monitoring operations showed that tagged individuals could feed as far as 490 km from their colonies (average of 230 km) and travel more than 2100 km per feeding trip.

Figure 23 : Kernels of distribution (for feeding) of tagged Balearic Shearwaters in the breeding season from 2011 to 2014 (Meier et al., 2015).



1.5.5 Focus on the distribution and abundance of the species off the coast of Portugal

A recent study (Araujo et al., 2017) assessed the abundance and distribution of the Balearic Shearwater over the Portuguese continental shelf in the post-breeding period, notably using the results of 21 protocol-based flyover campaigns (line transect) carried out from 2010 to 2014 (in September or October) and analysed by the method of distance sampling.

On average, 10 182 birds are simultaneously present there over this period, with a minimum of 2338 birds in 2010 and up to 23 221 birds in 2012, which corresponds to no less than 96% of the worldwide population of the species according to the latest demographic estimations. The Portuguese continental shelf therefore appears to be of major importance for the conservation of the species, even if there seem to be considerable interannual variations and other Atlantic areas also harbour significant numbers during the post-nuptial dispersion of the species (notably off the coast of France).

The sectors the most favoured by the Balearic Shearwater prove to be the north and centre of the Portuguese coast: from Porto to Figueira da Foz, around the island of Berlenga and opposite Cap Raso. It should be noted that these sectors correspond relatively precisely with marine Natura 2000 sites (SPAs) and their recent extensions (Ria de Aveiro, Aveiro-Nazaré, Berlenga, Cabo Raso, Cabo Espichel). Indeed, the main previous data on the presence of significant groups had been noted (censuses from the coast or by boat) between Aveiro and Figueira Da Foz, near Lisbon (up to more than 1290 individuals on 2, 3 and 4 June 2004

between Guincho and Cascais), and in the sector of the IBAs of Berlengas, Figueira da Foz and Cabo Raso.

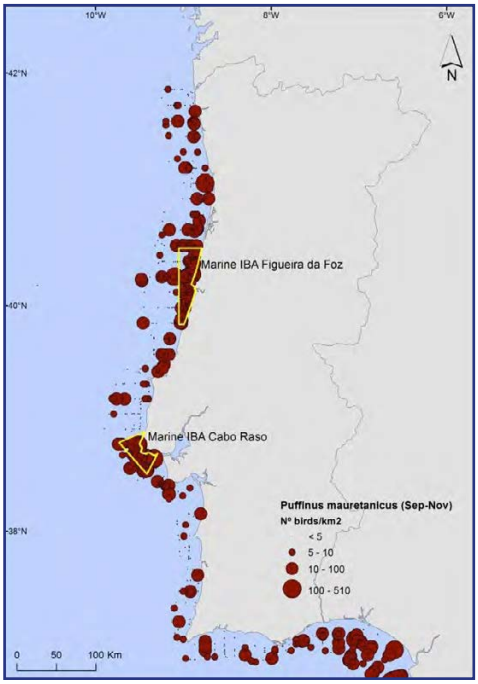


Figure 24 : Abundance and distribution map of Balearic Shearwater off the Portuguese coast, between September and November, based on boat-based ESAS surveys from 2005 to 2012 (Boué et al., 2013).

A habitat model was proposed on the basis of these data (MaxEnt software). The preferential habitats are made up of shallow sectors of the continental shelf, in particular when the shelf is at its widest. These areas are considerably influenced by upwelling phenomena, which explains why chlorophyl-α emerges as the most determinant environmental variable for the habitat of the Balearic Shearwater, as other studies had already shown, whether carried out in the western Mediterranean (Louzao et al., 2006, 2012) or in the Atlantic with an identified link with thermal fronts (Hemery et al.). The parameters SST (sea surface temperature), slope and bathymetry explain quant the distribution more or less positively, depending on the year.

1.5.6 Focus on the distribution and abundance of the species off the Moroccan coasts

Even though there are few data documenting this migration route, a certain number of individuals migrate south from the mouth of the Straits of Gibraltar, along the Moroccan coasts and as far as off the coast of Dakar (Yesou, 1986).

The online database e-bird.org does indeed indicate some sightings off the coasts of Morocco, the Canaries and Mauritania. In particular, Agadir Bay seems to account for a significant number of sightings.

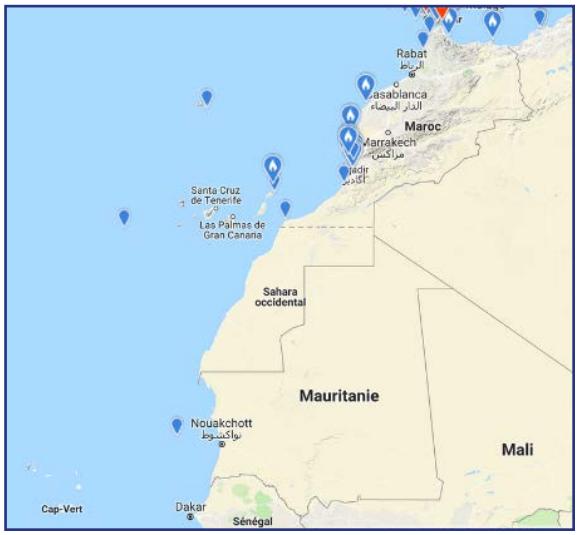


Figure 25 : Maps of sightings of Balearic Shearwater (from 1980 to 2019) from the online database e-bird.org.

1.5.7 Focus on the distribution and abundance of the species off the British and northwest European coasts

Even though no protocol-based or standardised monitoring of the Balearic Shearwater has been carried out in the countries of northwest Europe (British Isles, Denmark, Norway, Sweden), opportunistic data gathered in these countries from seawatching sites and analysed over the period 1980-2003 highlighted a significant increase the sightings of the species since the mid-1990s. These observations are made in late summer and in autumn, during inter-nuptial migration.

Peaks in abundance were notably observed in autumn 2001 off the coast of Britain and Ireland, with 3500 birds counted. This number very probably includes double-counts, given the mobility of these birds at this period and given the dates of the migration peaks observed in 2001 and 2003 for each of the subregions concerned: peaks of presence in July/early August in southeast England, and from late August to October further north as in Wales (Jones-Alice et al., 2014, Wynn and Yesou, 2007).

More recent sightings (after 2003) confirm this trend, with daily peaks of 100 to 280 birds censused from seawatch sites in southwest England: 268 individuals counted at Gwennap Head in September 2010, 283 at the same place in September 2011. This last daily record followed a few days after a (feeding) stopover of approximately 600 Balearic Shearwaters in Lyme Bay (Jones-Alice et al., 2014, Wynn and Yesou, 2007).

1.6 Population numbers

1.6.1 Worldwide population

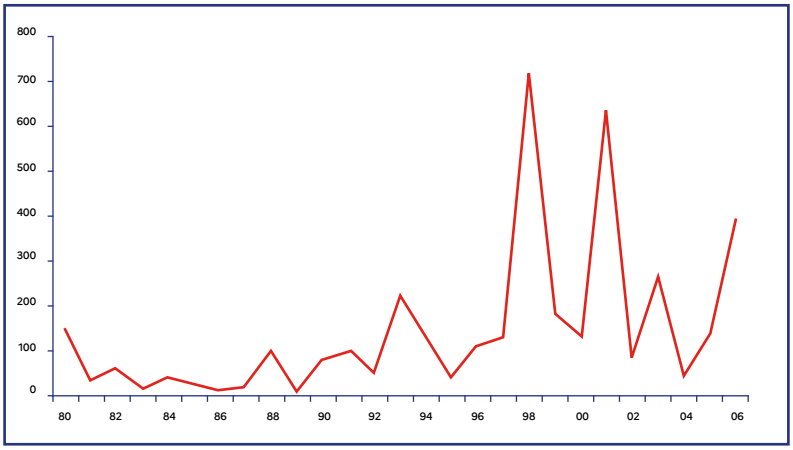


Figure 26 : Annual total of Balearic Shearwaters identified on the Portland Bird Observatory site in Dorset, between 1980 and 2006 (Wynn, 2009).

Considered as the most endangered seabird species in Europe, the population of Balearic Shearwater was estimated at 2000 pairs in 2004. The species is now facing extinction in 40 years (i.e., 3 generations), with a -7.4% population decline per year. The adult survival rate is assessed at 0.78, which is abnormally low for a species in the Procellariidae family. The hypotheses put forward are mortalities caused by unnatural causes, such as bycatch caused by professional fishing, or mortality due to mammalian predators introduced on the breeding sites (Oro et al., 2004).

From the 1980s until 2011, the estimation of the breeding population varied from 1300-2800 pairs (1984) to 2100-4500 pairs (between 1991 and 1999), 1750-2125 pairs (2001), and 2000-2400 pairs (2005). In 2011 Arcos proposed an estimation of 3193 pairs, revised to 4000 in 2012. The estimated global population of the species in the 2000s was between 8000 and 15 000 birds (Arcos et al., 2012).

The difficulty of quantitively assessing nesting populations is due to the inaccessible nature of most of the species' breeding colonies, situated on islands or craggy islets in the Balearic Archipelago in Spain.

In 2014, a study based on protocolised-data surveys at sea (2003-2005) and on coastal censuses from the Straits of Gibraltar (2007-2010) provided a new estimation of the global population, re-evaluated at 25 000 individuals (24 000 - 26 500). This number is double the expected number, considering that the number of nesting pairs was assessed at 3200.

Several hypotheses are therefore put forward to explain the significant difference between the overall population estimated at sea and the lower numbers based on the estimations of the number of nesting pairs :

- the number of nesting pairs in known colonies is higher than current knowledge is able to evaluate ;
- there are still unknown breeding colonies ;
- the proportion of non-breeding individuals (juveniles, immature individuals and non-breeding adults) is abnormally high for a Procellaridae species.

That same year, a new prediction of the extinction date of the species was calculated based on this new estimation of the number of nesting pairs (3200 to 7000 c). The species could face extinction within 70 to 80 years, with a 10% decrease of the current population in 23 years (Arroyo Gonzalo M. et al., 2014). This revised prediction maintains the IUCN status of the Balearic Shearwater at level CR (Critically endangered).

In 2017, a new study using more complete and more powerful demographic models predicted the species will face extinction within 61 years with a decrease of 14% per year. According to the latest assessments of the global population (25 000 individuals), the theoretical number of nesting pairs is assessed at **7200**. The adult survival rate remains abnormally low at around 0.80. This study also highlights the significance of the "bycatch mortality" parameter based on the alarming results of the model (Genovart et al., 2016).

However, this paper has been criticised in the light of a new estimation of the abundance of the Balearic Shearwater calculated based on the analysis of censuses carried out from the coast of the Straits of Gibraltar. Martin et al., (2019) suggest that the population of Balearic Shearwater is underestimated and that it had recently increased in numbers due to beneficial environmental and human factors for the species. While BirdLife International, the evaluation authority of the birds for the IUCN Red List programme, recognises the significant difference between results derived from the Génovart et al., and Martin et al. models, it is proposed to step up efforts in the monitoring of the breeding colonies to obtain solid data on the size and trends of the populations required for re-assessing the status of the species in 2026.

1.6.2 Estimated numbers in the non-breeding season in France

The results of the protocolised and simultaneous monitoring operations carried in the framework of the FAME programme between 2010 and 2011 indicate that when all the data collected by observers in the field is taken into consideration in 2011 and 2012, the maximum numbers of Balearic Shearwater were observed in August for 2011, and in September for 2012, with close to 7000 and 6000 individuals respectively (Boué et al., 2013).

Some of the sites monitored harboured record numbers of individuals, reaching significant proportions compared to the global estimated population, as in July 2010 when more than 5780 birds (approximately 25% of the worldwide population) stopped over in Lannion and Saint Brieuc Bays.

The results of this programme suggest that French coastal areas harbour during the peak of abundance a little under 30% of the population of Balearic Shearwater, which has been assessed at close to 25 000 individuals, confirming France's responsibility for the conservation of the species.

Double counts were eliminated, but the sightings being only coastal, this number (around 7000 individuals) remains a minimum estimation.

The demographic estimations that we carried out in 2019 in the framework of the "Meta-analysis of data 2004-2018" based on the results of the habitat model (on a sector and period maximising the homogeneity of sampling: the «Bay of Biscay between the Tip of Penmarc'h and the Pertuis Charentais» sector in October) confirm this hypothesis that, at least in certain years, this number is probably under-evaluated. For example, a population of 15 000 individuals was extrapolated in 2015 on this sector alone, in October (Le Bras et al., 2019).

Likewise, the statistical estimations taking into account the birds off the coast on some sites monitored locally, based on protocolised data at sea, support this hypothesis.

Analysis by distance sampling and extrapolation of the densities calculated on the study area of the wind turbine project at sea of Saint-Nazaire propose a mean density of 2,006 ind/km^2 with high estimated robustness. The population present in the study area is therefore estimated at 5460 individuals, close to 22 % of the worldwide population (Fortin et al., 2014).

Even though the margins of error are significant, the results derived from the digital monitoring operations (ensuring coverage using a reliable strip transect) of the SPZ «Ile d'Yeu» in August 2016 indicate that the Balearic Shearwater was the most recorded species during the course of this survey. The density was 1.79 birds / km^2, which is the equivalent of 4401 birds (± 95% IC 158 - 13596) over the entire study area.

1.6.3 Demographic recovery capabilities

Like many Procellariidae, the Balearic Shearwater is very philopatric and loyal to its nesting site. Its sexual maturity develops late, and it displays low fertility. Subject to considerable predation by rats and cats on the breeding sites, the adults are also affected by bycatch linked to professional fishing amounting up to 45% of adult mortality (Genovart et al., 2016).

This adult mortality has a major impact on long-lived species (with a long-term based life strategy) such as Procellariidae whose population growth is extremely sensitive to any variation in adult survival.

It is therefore by reducing predation at the nest and bycatch at sea that the trend can be reversed, and we can act concretely to improve adult survival rates, even though this recovery will be slow and delayed due to the late maturity and low natural fertility of the species.

1.7 Assessment of threats

1.7.1 General direct and indirect threats

Global climate changes

Seabirds are particularly sensitive to global warming (Croxall et al. 2012; Sydeman et al. 2012).

The main impact of climate change is the modification of the distribution and abundance of prey, making it less accessible to seabirds (Spear et al. 2001; Devney et al. 2009). Decreases in productivity at the base of the food chain can also occur, together and changes in the timing of the peak in the abundance of the prey and the seabirds' needs.

These phenomena can have many consequences such as reducing breeding success, reducing the number of breeding adults, delayed breeding season, smaller egg size, poorer chick body condition and increased adult mortality. (Ramos et al. 2002; Sandvik et al. 2012; Surman et al. 2012; Catry et al. 2013; Boersma & Rebstock 2014). All marine species' food habits and habitats risk are thus in danger of being disrupted and 40% of seabird species are becoming endangered due to these changes (Croxall et al. 2012).

On that subject, a noticeable change in the distribution of the Balearic Shearwater in French and Northwest European Atlantic waters during the non-breeding season has been observed since the 2000s. The centre of gravity of the distribution of the species is tending to move towards the north (Yésou 2003), due to the modification of the distribution of plankton and fish populations (including anchovies and sardines ; Wynn et al. 2007).

A workgroup bringing together various institutions involved in the monitoring of fish stocks, especially anchovies and sardines, will be created by the NAP facilitator: the WHAGANSA workgroup of the CIEN, IFREMER, PELAGIS observatory, AgroCampus Rennes. Their results will be compared to population/ phenology trends, as well as the spatiotemporal use of the Bay of Biscay and the Channel, via the monitoring strategy of the Balearic Shearwater, in order to highlight possible correlations with climate change while defining the dedicated methods of analysis (Action Sheet 4.1).

Food competition and availability

The impact of fisheries on the marine ecosystems of the world is now considered as a major threat for many species, threatening our own food security and numerous species dependant on marine resources. Overfishing has been endangering numerous fish stocks since the end of the 1980s and the emergence of industrial fishing, which extends the zones and depths that can be fished (Pauly et al., 1998, Pauly et al., 2005).

Seabirds are among the species the most concerned and are particularly vulnerable to this reduction in and competition for food resources.

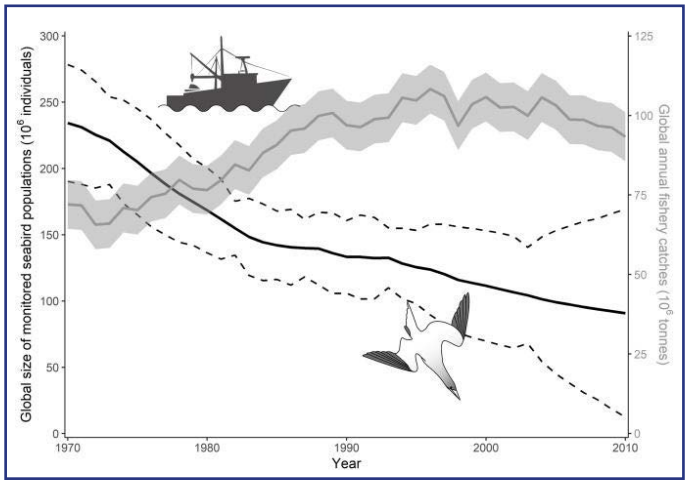
In 2011, a team of researchers evaluated the effect of the fluctuations in the abundance of food resources on the breeding success of seabirds. An threshold abundance of prey (fish + krill) below which the productivity of these species is constantly reduced and less stable was calculated for 14 species based on global data worldwide. This threshold is close to a third of the maximum biomass of prey observed in the long-term studies. This provides an indicator of the minimum biomass of prey (fish and krill) necessary to maintain productivity for seabirds in the long term (Cury et al., 2011).

A more recent study (Grémillet et al., 2018) demonstrates that the competition between seabirds and fisheries was a significant stress factor on a global scale over the period 1970-2010, for a worldwide population of seabirds which has declined by 70 % since 1950 (Paleczny et al., 2015).

In this study, the authors compared world maps of catches of marine organisms targeted by both seabirds and fisheries, with maps showing the predation pressure of seabirds. It is concluded that the annual worldwide food consumption of seabirds decreased by 19 %, going from 70 to 57 million metric tonnes between the period [1970-1989] and the period [1990-2010].

At the same time, the overall yield of world fisheries went from 59 to 65 million metric tonnes between these two periods, with an increase in 5 % of the capture of small pelagic fish, an 8 % increase for other fish, 91 % for squid and 48 % for krill. Surprisingly, despite the reduced predator pressure exerted by seabirds, the analyses indicate that the overall competition between the seabirds and the fisheries has remained at similar levels between these two periods. This competition between fisheries and seabirds with regard to resources had already been identified on a regional scale, notably for the California and Humboldt Currents, the North Atlantic and the Mediterranean (Karpouzi et al., 2007, Sydeman et al., 2017).

Figure 27 : Worldwide seabird population trends 1970-2010 (continuous black line with dotted lines to show uncertainty ranges) and worldwide fishery catches (grey line with uncertainty ranges shaded in grey).



Combined with the other threats facing seabirds (adult mortality by bycatch due to professional fishing, destruction of breeding habitats and their colonisation by invasive alien species and pathogenic agents, climate change, contaminants and micro-plastics), the significant and persistent food competition with fisheries must therefore be considered as one of the numerous stress factors which affect the adaptive value of different seabirds (Grémillet et al., 2016) and definitively the future of their populations (Krüger et al., 2018).

In this context, concerning the Balearic Shearwater and its presence in the waters off the Bay of Biscay during a part of its non-breeding season, it would be interesting to monitor trends in the stocks of sardines, sand eel sprats and anchovies. Based on current knowledge, they are considered as being the species' staple 'natural" food resources (not including fishery discards).

The 2019 assessment on the state of fish stocks in Europe, carried out annually as requested by the Commission European by the Scientific, Technical and Economic Committee for Fisheries (STECF), seems to indicate that the pressure of fishing is dropping very significantly in the European waters of the North Atlantic.

Compared to 2003 (first year of the studied series, considered here as the low point of the indicator), the mean abundance of stocks has significantly increased in in the North Atlantic (note D. Gascuel based on STECF report, April 2019). Nevertheless, and despite these encouraging trends, numerous stocks remain in a bad condition. For the last known year (2017), 41% of the stocks assessed in the Northeast Atlantic are still overfished. And among those which are not overfished, many remain at low biomass levels, below biological safety limits. Only 37% of known stocks are «in the green» (Gascuel, 2019).

Trends in the stocks of the main prey of the Balearic Shearwater, i.e., small pelagic fish such as sardines and anchovies, is specifically studied by an international workgroup (the Working Group on Southern Horse Mackerel, Anchovy and Sardine (WGHANSA), incorporated in the International Council for Exploration of the Sea (ICES)). In 2018, this workgroup published a report on a certain number of subregions monitored by the ICES, in the northeast

Atlantic. The trends, variable according to the subregion, are as follows (ICES, 2018) :

- Upward trend over recent years, with a peak in 2018 for anchovy stocks in the Bay of Biscay ;
- Fluctuations between 2012 and 2018 for sardine stocks (reduction between 2010 and 2012, fluctuations between 2012 and 2016, then an increase between 2016 and 2018.

A recent publication included the data gathered during the PELGAS fish surveys in the Bay of Biscay during the course of the 15 last years. It also demonstrated that small pelagic fish followed different trends, but a significant average weight decrease for 1- and 2-year-old sardines and anchovies (Doray et al., 2018).

Finally, it seems that the spatial correlations between small pelagic fish and their predators (notably birds, marine mammals) vary considerably depending on the year, and go from strong to weak correlations from year to year (Certain et al., 2011). Another study also assessed the level of spatial correlation between several species of cetaceans and seabirds in the Bay of Biscay. It also seems that once again that variability is high, according to the positive or negative correlation species, even if for seabirds, positive correlation is more common with the hypothesis that the prey displays avoidance behaviour in the presence of "flying" predators (seabirds) (Lambert et al., 2018).

A workgroup made up of various institutions involved in the monitoring of fish stocks, and especially anchovies and sardines, will be set up by the NAP facilitator: WHAGANSA workgroup the CIEN, IFREMER, PELAGIS observatory, AgroCampus Rennes. Their results will be compared to population/phenology trends, as well as to the spatiotemporal use of the Bay of Biscay and of the Channel, via the monitoring strategy of the Balearic Shearwater, in order to highlight the possible correlation with dedicated analysis approaches. (Action sheet 4.1).

Plastic pollution

The plastic pollution of the oceans is a worldwide phenomenon involving high concentrations (up to 580 000 plastic items per km^2) and is increasing exponentially (Cózar et al. 2014). The consumption of plastic by the marine fauna is increasing dramatically and seabirds are particularly vulnerable to this type of pollution (plastic causes the death of a million seabirds every year (Source: UNESCO).

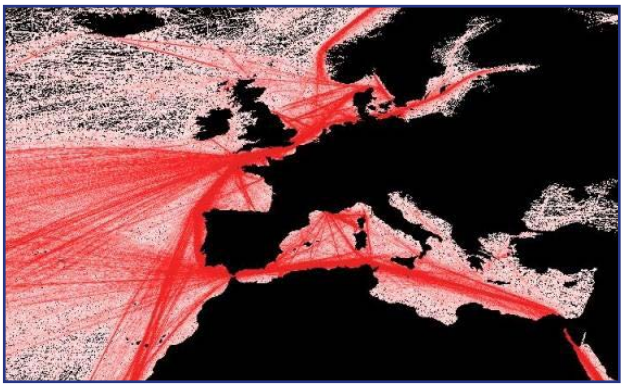
A modelling study on the risk of plastic pollution for seabirds predicts the presence of plastic in the digestive tract of 99% of all seabird species by 2050, and that 95% of the individuals of these species will ingest plastic between now and that year (Wilcox et al. 2015). The ingestion of plastic particles can cause stomach obstruction, internal injuries or mortality due to transfer of toxins, as well as a potential effect on reproduction (Teuten et al. 2009; Lavers et al. 2014).

The Balearic Shearwater has not been autopsied and had its stomach contents analysed to determine the amount of plastic ingested. Given its ecology (notably fishing technique), it would be very interesting to carry out opportunistic analysis (stranding, bycatch ...) to evaluate the level of pollution.

Other marine pollution

The feeding and wintering sites of the Balearic Shearwater overlap with important world sea routes. It is possible this sea traffic leads to chronic degassing causing surface hydrocarbon pollution. Moreover, due to its gregarious behaviour, an oil slick at a stop over site can seriously affect seabird populations (Ruiz & Martí 2004, Gutiérrez 2011).

Figure 28 : Map of worldwide oceanic trade routes.



The exposure of seabirds to environmental pollution is a major conservation issue within the context of deep environmental changes linked to climate change. The marine environment receives pollutants from human activities at sea, in coastal areas, and especially from continent. Once in the environment these pollutants are integrated in the food chains where their concentrations increase and accumulate in body tissues. Further to the development of anthropogenic activities in the countries of the Northern hemisphere, the concentrations of some pollutants, such as mercury have increased significantly during the course of recent decades. Other more recent chemical components, such as certain pesticides or perfluorinated compounds, are now also found in disturbingly and increasingly high levels in the food chain. Among marine organisms, higher

predators and especially seabirds, are the most exposed to this environmental contamination due to their position at the top of the food chain causing a bioaccumulation of these elements in the organism. The major challenge, besides the urgent need to reduce the emission of these pollutants, is to evaluate and understand the contamination of higher predators to pollutants on a very wide spatial scale and the risks linked the contamination of these vulnerable species. (Costa et al., 2016).

Major gaps in knowledge about the contamination levels of numerous species need to be filled in order to evaluate the effects on the species and understand how this contamination is linked to the wide-scale distribution of these predators. Even if these pollutants and contaminants are not considered as a direct cause of mortality for seabirds, they are at the origin of chronic afflictions such as hormonal, immunodepression or neurotoxic disturbances.

Concerning the Balearic Shearwater, we have access to the initial concentration of organic pollutants and metallic trace elements based on tissues (kidneys, livers, feathers, muscle) collected from 39 individuals between July and October in Portugal, in 2010 and 2011 (Costa et al., 2016).

They highlight :

- the concentrations of metallic trace elements are below values considered as having a significant adverse effect on the birds, despite certain relatively high values (notably of Mercury Hg) which does not endanger the survival of individuals, but which may disturb reproduction (the Hg rate can notably interfere in the production of prolactin, which is a brooding hormone), especially if it is combined with another stress (pathogens, food scarcity...) ;
- globally, organochlorine compounds do not show values significantly different between 2010 and 2011.

Finally, POPs, which have considerable impacts on the environment and marine fauna, are recognised as endocrine disruptors (Tanabe 2012) and were found in all the individuals tested (PCB 101, 138, 153, 180 and the 4.4 DDE). The results of this study can serve as a reference base for possible future analyses and will enable detecting the evolution of these pollutants over time.

In the framework of the NAP, new analyses on the concentrations of persistent organic pollutants are planned (POPs) and metallic trace elements in Balearic Shearwater. As a result of bird captures carried out within the framework of the bio-logging programme, tissues were collected from individuals captured and analysed as such. An action file overviews the objectives, modalities and partners of this programme.

The MSFD aims to maintain and restore the good functioning of marine ecosystems (biological diversity maintained and the correct interactions between species and their habitats, dynamic and productive oceans) while enabling the sustainable usage of the sea. The Action Plan for the Marine Environment (PAMM) is the application tool of the MSFD, applied at the scale of each seaboard and including 5 aspects which are revised every 6 years: 1. an assessment of marine waters, 2. a definition of good ecological status, 3. a list of environmental objectives and associated indicators, 4.a surveillance programme and 5. a programme of measures.

This NAP action responds to the objectives of the Marine Strategic Framework Directive (MSFD) :

- it is included in Subprogramme 2 « Nesting seabirds « of the Marine Environment Action Plan (PAMM), developed to support the strategy for achieving Good Ecological Status (GES) of French marine ecosystems (even though the Balearic Shearwater is not a nesting species) ;
- it can notably be included in one of the Surveillance Programme (PdS) actions of the PAMM, with regard to monitoring contaminants in seabirds, responding to the «Contaminants» descriptor of the associated Environmental Objective (Fact file D8 – Contaminants).

1.7.2 Predation and competition between species

Feral cats (Felis catus) have been introduced into many islands around the world. They are a major threat for seabirds, in particular procellariids which have characteristics that make them particularly vulnerable to these predators (Medina et al. 2011; Towns et al. 2011; Croxall et al. 2012). Feral cats predate mainly chicks and adults and exacerbate their impact through surplus killing. This adult mortality is particularly nefarious for long-lived species such as the Procellarids whose population growth is extremely sensitive to any variation in adult survival. This predation by feral cats can rapidly lead to a drastic reduction of the population, even an extinction (Russel et al. 2009; Dumont et al. 2010).

Rats, which are very widespread on the Balearic Islands, are formidable predators of seabirds, in particular the Black Rat (Rattus rattus) attacking the eggs and chicks (Jones et al. 2008; Russel et al. 2010). Cats and rats (and occasionally also the Common Genet (Genetta genetta)) are present in approximately 25% of the colonies, which affects approximately 38% of the breeding population (Ruiz & Martí 2004, Arcos et al. 2012).

Deratting programmes have been carried out for more than 20 years on various islands, thus reducing the pressure on nesting colonies (Oro et al. 2004)

There does not seem to be competition between species for access to breeding sites. Notably, concerning potential competition with the Yelkouan Shearwater for access to food resources during the raising of the chicks a certain level of geographical segregation seems to avoid this scenario.

1.7.3 Disturbance linked to nautical leisure activities

In the non-breeding season, the Balearic Shearwater preferentially frequents sectors close to the coast (Mor Braz, Vendée Corniche …) and bay heads (Lannion, Saint Brieuc, Douarnenez, Mont Saint Michel, Audierne …), forming gregarious gatherings in the form of rafts of several hundred to thousands of individuals. The disturbance (voluntary and involuntary) caused by the repeated passage of motorised (boats, sea scooters …) or non-motorised (kiteboards, funboards …) are likely, especially in high summer, to continuously impact the birds.

1.7.4 Bycatch linked to professional fishing

The accidental catching of marine animals which takes place during professional fishing (a phenomenon referred to as "bycatch") is a worldwide issue which affects numerous marine species, especially birds, sea turtles and marine mammals (Lewison et al. 2014).

Endangered with extinction, the Balearic Shearwater has an excessively low adult survival rate, mainly explained by significant mortality due to bycatch, itself consecutive to fishing activity. The current impact of fishing on this species, responsible for at least 45% of the current adult mortality rate, is now considered as non-compatible with its survival (Genovart et al. 2016).

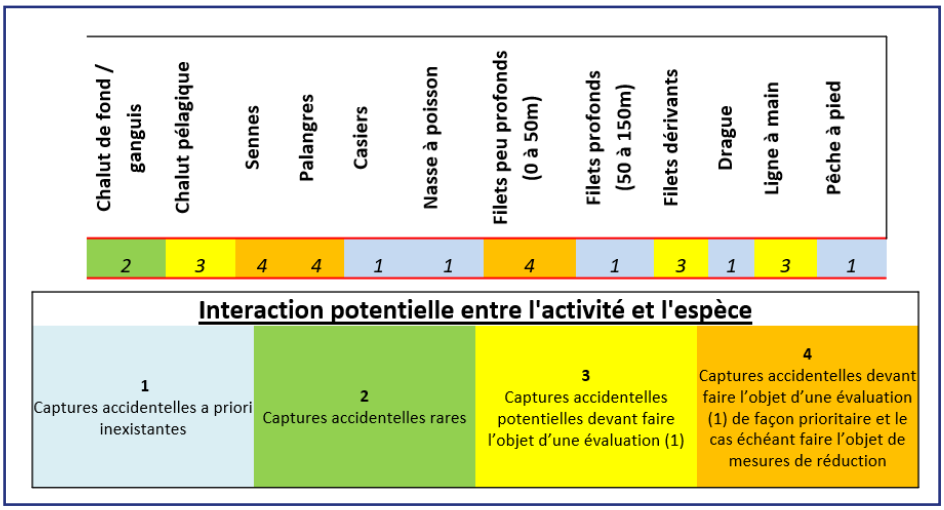
Several studies carried out in recent years have highlighted certain fishing techniques causing direct and negative interactions with the Balearic Shearwater (FAME 2010 – 2012, LIFE+ MarPro 2010 – 2015, LIFE+INDEMARES 2009 – 2014, Seabird Task Force 2014 – 2017).

Abello & Esteban 2012, Boué et al. 2013 and 2015, Oliveira et al. 2015, Tarzia et al. 2017, Cortes et al. 2017, report that several thousand Balearic Shearwater are captured (and die) every year mainly by fishing with longlines, gillnets (above all monofilaments), or with the pelagic seine net (Danish and purse) and to a lesser extent the bottom trawl net.

A state of the art of the available knowledge on the risks of bycatch regarding the Balearic Shearwater was carried out in the framework of the writing of the National Action Plan (Lambrechts A.1 & Entraygues M.2, 2019. État des connaissances relatives aux captures accidentelles de Puffin des Baléares par la pêche professionnelle). The document is available in extenso in Annexe5.

Moreover, the Marine Strategy Framework Directive (MSFD) identifies this bycatch as one of the major pressures on seabirds and makes "Reducing the bycatch of seabirds (off the coast and close to colonies), and in particular reducing the bycatch of the most vulnerable species such as Balearic, Yelkouan and Scopoli's Shearwater by longlines, reef nets and seine nets for small pelagic fish" an Environmental Target for Cycle 2. During the course of writing this NAP, we have entered into discussion with fishing stakeholders (CNPMEM, CRPMEM, CDPMEM) to inform them of the knowledge accumulated on this subject of bycatch, notably in Spain and Portugal. The methodology adopted in this phase of writing the NAP, based on concertation and establishing an assessment shared by everyone, and aiming to assess the interactions between the Balearic Shearwater and longliners, shortly followed by gillnetters and purse seiners, has initiated a programme of concrete actions and never done before in France.

Figure 29 : Matrix of sensitivity of the Balearic Shearwater to different fishing gear (OFB/GISOM, 2020).



The involvement and committed mobilisation of the CRPMEMs since the launching of the NAP has made it possible to submit a European Union project to initiate work on characterising the interactions as from 2021.

This methodological approach initiated to tackle the question of the interactions will contribute to future considerations about the "Analysis of the risk of damaging the conservation objectives of habitats and species of community interest by the activity of professional fishing".

1.7.5 Interactions with marine renewable energies (wind farms)

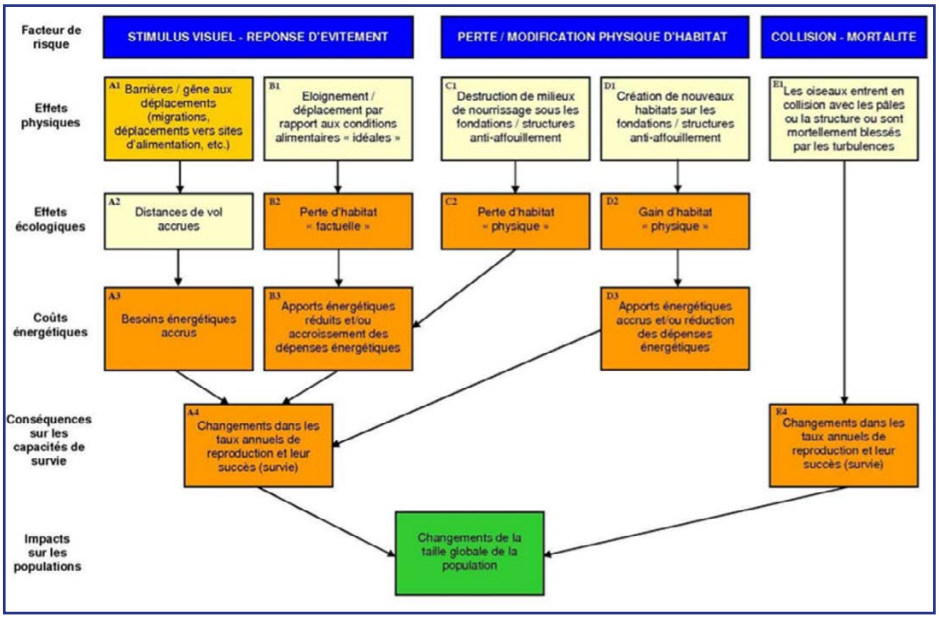
General points on the expected effects of offshore wind farms on avifauna

The development of offshore wind turbines is a new threat for the Balearic Shearwater which is at present difficult to assess precisely. Numerous sources are found in the bibliography which reveal four main effects: collision, displacement, barrier effect and modification of habitats, which depend on three major factors (see notably Dierschke et al., 2006; Petersen et al., 2006; Fox et al., 2006; Band, 2012; Langston, 2013; Schuster et al., 2014; Wade, 2015) :

- a direct demographic factor resulting from physical collision with the wind turbine (mortality) ;
- a behavioural factor due to the phenomenon of avoidance of wind turbines (physical response to a visual stimulus) and which can either cause the displacement of the birds (loss of feeding or resting grounds) or lead to the phenomenon of a barrier effect to migration or local movements (increased energy expenditure) ;
- a physical factor due to changes caused by the facilities (physical loss of habitats, modification of the flora and fauna, creation of new habitats) that can lead to a change in the food potential of the sector (reef effect, food chain, that are nevertheless complex for higher predators to comprehend because subject to numerous factors).

In addition to these effects linked directly to the wind farm, connected activities, notably the increase in local maritime traffic (for the construction or demolition works as well as during the operating phase) can also lead to behavioural effects (disturbance of bird stopovers for example). The following diagram presents the physical and biological effects, energy costs and consequences in terms of survival together with the ultimate impacts on populations (green box). The light-yellow boxes indicate the potentially measurable effects, those in dark orange the processes requiring modelling (the light-orange box concerns an intermediate situation).

Figure 30 : Main effects of offshore wind farms on birds and consequences for individuals and populations (Source: BIOTOPE, adapted from Pertersen et al., 2006).



The four main effects of offshore wind farms on avifauna are as follows :

- **"Collision" effect :** the direct effect on individuals of the movement of the blades, leading to mortality. This effect concerns mainly the operating phase (working wind turbines). The phenomena of collision with structures other than the blades (notably foundations) are also covered, although they are mentioned secondarily.
- **"Displacement"** : effect: the influence, variable depending on the species, of the presence of the wind farm on the distribution of the birds at sea, stopovers, feeding activities, etc. This effect concerns all the phases of construction, operation and demolition.
- **"Barrier effect"** : the influence of the presence of the wind farm on birds in flight, whether on migration or moving locally. This effect concerns mainly the operating phase, but also, to a lesser extent, the construction and demolition phases.
- **"Habitat" effect** : the influence of local modification of habitats around the wind farm on food resources and their accessibility. In practice, it is often difficult to assess the habitat effect, except in the particular case of the creation of a "reef" effect around areas without rocky habitats. It is also difficult to deal separately with the habitat effect and the effect displacement, all the more because repulsion (avoidance) or, on the contrary, attraction can influence the utilisation of given sector by the birds. This effect concerns mainly the operating phase, but also, to a lesser extent, the construction and demolition phases.

NAME OF EFFECT	CHARACTERISTICS	PROJECT PHASE		
		CONSTRUCTION	OPERATION / MAINTENANCE	DEMOLITION
MAIN DOCUMENTED EFFECTS				
Displacement / fleeing linked to infrastructures	Direct / permanent	(X)	X	(X)
Collision (mortality)	Direct / permanent	(X)	X	(X)
Modification / loss of habitats	Direct / permanent	X	X	(X)
Barrier effect (disturbance of birds in flight)	Direct / permanent	(X)	X	(X)
OTHER EFFECTS (GENERALLY COMBINED WITH THE ABOVE)				
Disturbance by maritime activities	Direct / temporary	X	(X)	X
Sound disturbance	Direct / temporary	X	(X)	X
Light disturbance	Direct / temporary	X	(X)	X

Table 1 : Main effects of offshore wind farms on avifauna (Biotope)

Legend : X = main effect / (x) = possible effect, but generally of secondary importance

Procellariforms (Shearwaters, Northern Fulmar and Oceanites species) have very low sensitivity to collision (mainly due to their very low flight altitude (Johnston et al., 2014; Cook et al., 2012; Moray Offshore Renewables Ltd, 2012; Driessen, 2013). Their great agility (remarkable aptitude for using marine air currents, long wingspan for a low mass) also contribute to their very low sensitivity to the risk of collision. They are also very flexible regarding their feeding habitat which gives them low sensitivity to habitat loss in general.

The bibliography includes only one assessment of the Balearic Shearwater's sensitivity to collision (Bradbury et al., 2014), assessed as "very low". The other procellariforms, with comparable habuts and activities, are also little-assessed, or assessed as having low sensitivity levels.

	SENSITIVITY TO COLLISION			
	LANGSTON (2010)	FURNESS ET AL (2013)	BRADBURY ET AL (2014)	HUMPHREYS ET AL (2015)
Balearic Shearwater	*	Not assessed	Very low	*
Yelkouan Shearwater	Not assessed	Not assessed	Not assessed	Not assessed
Manx Shearwater (for comparison)	*	0	Very low	*
Scopoli's Shearwater	Not assessed	Not assessed	Not assessed	Not assessed
Cory's Shearwater (for comparison)	*	Not assessed	Very low	*

Table 2 : Bibliographical summary of the level of sensitivity to collisions for the Balearic Shearwater and various procellariforms (Biotope)

Legend :
*Langston: * (low) to *** (high) / Furness et al.: Valeurs of 0 (low) to 1307 (very high) / Bradbury et al.: Very low to very high / Humphreys et al.: * (low) to ***** (very high)*

The bibliography gives little feedback on experience about the effect of wind farms on these species, as shown for example by the monitoring of the wind farm of Horns Rev 2 (2nd largest Danish offshore wind farm), where only 2 Sooty Shearwaters were observed between autumn 2010 and spring 2012 (Skov et al., 2012). For the Egmond aan Zee wind farm, the third largest offshore wind farm in the Netherlands, the only data concerning shearwaters are as follows: "the presence of procellariforms in the wind farm is limited to weather conditions preventing access to the tower for monitoring [...] Hundreds of the echoes in the database recorded by the vertical radar could be those of procellariforms" (Krijsveld et al., 2012).

The European reference documents covering the sensitivity of birds to offshore wind power nonetheless agree that the collision risk of these species should be considered as low, given that they always fly at very low altitude and are so agile (Wade 2015, Humphreys et al. 2015, Johnston et al. 2014, Bradbury et al. 2014, Furness et al. 2013, MacArthur 2012, Cook et al. 2012, Langston 2010, Garthe and Hüppop 2004).

However, all these studies are based on the behaviour of the birds observed during visual monitoring, therefore exclusively by day and essentially under favourable meteorological conditions. Very few studies concern the nocturnal behaviour of shearwaters, and no existing wind farm monitoring provides feedback on experience about the subject.

It is known that these species can move around at night, as shown by the high activity of the birds on breeding colonies (Gineste 2016), or the presence of individuals behind trawlers or other fishing boats working at night. Nonetheless, telemetric monitoring carried out on Yelkouan Shearwaters in France indicates that nocturnal movements are significantly less common than diurnal movements (80% of the time resting on the water at night compared to 32% by day, Péron & Grémillet 2014).

The situation of the Balearic Shearwater is nevertheless particular in the summer because it is a moulting season, during which the birds lose their agility in flight and are more sensitive to disturbance. Shearwaters and oceanites could be attracted by lights at sea, notably continuous ones (Wade, 2015).

Sensitivity specific to procellariforms: disturbance and loss of habitat

The sensitivity of the shearwaters to the loss of habitat caused by wind offshore turbines and disturbance by boats is considered as low in the literature (Humphreys 2015, Furness et al. 2013, MacArthur 2012, Cook et al. 2012, Langston 2010, Garthe and Hüppop 2004).

	SENSIBILITÉ AU DÉRANGEMENT ET À LA PERTE D'HABITAT			
	LANGSTON (2010)	FURNESS ET AL (2013)	BRADBURY ET AL (2014)	HUMPHREYS ET AL (2015)
Puffin des Baléares	*	2	Très faible	*
Puffin Yelkouan	Non évalué	Non évalué	Non évalué	Non évalué
Puffin des anglais (pour comparaison)	*	2	Très faible	*
Puffin de Scopoli	Non évalué	Non évalué	Non évalué	Non évalué
Puffin cendré (pour comparaison)	*	Non évalué	Très faible	*

Tableau 3 : Synthèse bibliographie du niveau de sensibilité au dérangement et à la perte d'habitat pour le Puffin des Baléares et pour différents procellariiformes (Biotope)

Légende :
*Langston : * (faible) à *** (fort) / Furness et Al : Valeurs de 0 (faible) à 1307 (très fort) / Bradbury et Al : Très faible à très fort / Humphreys et Al : * (faible) à ***** (très fort)*

For a similar species in terms of behaviour/habits, the Manx Shearwater, the impact study of the project to extend the Burbo Bank wind farm off the coast of Liverpool concluded that the impact through disturbance/loss of habitat was negligible for a project involving 32 8-MW wind turbines with of the monthly peaks of 730 individuals observed on the project zone extended by a buffer zone of 4 km (Ellis & Ward, 2013).

The particular case of the risk linked to light disturbance (attraction or avoidance)

The beaconing and lighting of operating wind farms, like the activities of construction and demolition, can create light sources at sea. These light sources are likely to disturb the behaviour of the birds, either by causing reactions avoidance or, on the contrary, **by attracting the birds and thus increasing the risk of collision**. The problem of the attraction of nocturnal migrants by light has above all been highlighted for oil rigs or lighthouses at sea (Hüppop & Hilgerloh, 2012; Hill et al., 2014; Schuster et al., 2015; Hüppop et al., 2016). These structures generally have powerful and continuous lighting, which is not the case of offshore wind turbines (particularly during the operating phase). Various studies tend to show that the attraction exerted by artificial lighting is higher when the visibility conditions are poor (Aumüller et al., 2011 in Schuster et al., 2015; Hill et al., 2014). For example, in a single night (November 2010) Aumüller et al. (2011) found 88 dead birds (passerines, mainly thrushes) on the (brightly lit) FINO I oil rig, on a night marked by unfavourable meteorological conditions having led to a considerable increase in migratory flight activity less than 200 m above the level of the sea.

One of the factors that may modify the behaviour of birds at sea and increase the risk of collision is therefore the potential attractivity of the lighting of the wind farm. **This attractivity is well-known and highly documented on land for procellariids**, especially when the birds make return trips to and from the colonies (Gineste 2016, Raine et al. 2007, Le Corre et al. 2002, Imber, 1975). When they

are attracted by a light source, their agility and perception of the environment are very altered, going as far as collisions against the light sources or nearby structures, or strandings on the ground (Gineste 2016, obs. pers.). The presence of continuous, low-intensity type-B obstruction lights (fixed red 32 cd) positioned on towers several tens of metres above the average level of the sea and lighting 360° could modify the behaviour of the shearwaters/oceanites and attract them towards the wind turbines.

In addition to the increase in the collision risk, the behaviours observed (flying in a circle around the light sources) can also increase **the risk of the birds becoming exhausted** (Hüppop et al., 2006; Blew et al., 2013; Hill et al., 2014). The most sensitive species to this type of effect seem to be passerines (Blew et al., 2011; Hill et al., 2014; Schuster et al., 2015) together with procellariforms (shearwaters and oceanites – see Rodrigues et al., 2012; Wade, 2015). The intensity of the light source together with whether it is continuous or intermittent play an important role in attraction phenomena. Two studies carried out in the North Sea on an offshore rig and on an island have shown that red and white lights are those which attract the most birds (Hill et al., 2014; Hill et al., 2015). It was also shown that the higher the intensity of these lights, the greater the number of birds attracted. The link between the colour ranges used and the attraction needs to be further specified (Blew et al., 2013; Hill et al., 2015). Certain studies seem to indicate that lights in the green and blue colour ranges also attract the birds, but in smaller numbers (Poot & al., 2008; Van der Laat, 2007). A study was carried out on the subject in the North Sea on oil rigs (FINO) and wind farms (Hill et al., 2015). The conclusions of this study indicate that all the lights used produce attraction phenomena, but the most attractive are combinations of several light ranges.

Interactions with the Balearic Shearwater

At present (2020), whether in France, Spain or Portugal, no offshore wind farm has been constructed within the (principal) area of distribution of the species. There is therefore no real feedback on experience on the effects of offshore wind turbines on the Balearic Shearwater. We do not have the bibliographical knowledge required to characterise the interactions with certainty, the species never having been confronted with the wind farms in northern Europe. No experience of behavioural reactions has been able to be observed based on real sightings, the operating main wind farms being located off North of England, Scotland, the Netherlands, Denmark, Germany and Scandinavian countries, outside the area of significant presence of the Balearic Shearwater. Nevertheless, the expected impacts were assessed during the course of the ex-ante environmental assessment process of the projects, through environmental impact studies (EISs) or applications to request dispensation from the rules on the destruction of protected species, for French projects whose sites are within the area of presence of the species :

- Dieppe Le Tréport offshore wind farm (TRE) ;
- Fécamp offshore wind farm (FEC) ;
- Calvados offshore wind farm (COU) ;
- Saint Brieuc Bay offshore wind farm (ST-B) ;
- floating offshore wind farm off the island of Groix (Gr) ;
- Saint-Nazaire offshore wind farm of (SNA) ;

- Noirmoutier-Yeu offshore wind farm of (NOY) ;
- 3 "pilot" floating wind farms in the Mediterranean : Provence Grand Large (PGL), Gulf of Lion (GdL) and Gruissan (GRU).

These measures are included in the NAP to ensure the general coherence of the initiatives for the species. Nonetheless, some of the measures proposed require prudence as to their ability to respond effectively to the issue encountered :

- some relatively unequal conclusions regarding the impact level for the various families studied, which are sometimes counterintuitive with regard to the context of the project: for example, the collision risk is considered medium on the site of Fécamp in the Channel, little frequented by the Balearic Shearwater, whereas it is estimated as negligible for the Saint-Nazaire project, a site situated in a sector with high presence of the species ;
- a possible underestimation of the collision risk caused by nocturnal photo attraction: an impact level either not assessed or judged to be negligible, low or medium, according to the various wind farms despite their being concerned by the presence or potentially significant passage of Balearic Shearwaters (SNA, NOY).

All the measures deployed in the framework of wind farm projects are detailed in Annexe 4.

1.7.6 Interactions with other industrial or aquacultural activities

Interactions with shellfish farming

These interactions are mentioned in the report on the monitoring commissioned by the OFB in 2016 (Bretagne Vivante & Geoca, 2016). These interactions are described as being potentially present in the sectors of the Bays of Saint Brieuc and Mont Saint Michel: the work of personnel and boats in the shellfish farms (above all mussels), throughout the year with greater seasonal pressures. They are assessed as not very significant. Indeed, mussel farming notably takes place above all at low tide or in shallow water, in periods during which the birds stay further from the coast, which reduces the risks of impact on the Balearic Shearwater.

Activities to scare and shoot Herring Gulls or Common Scoter (prefectural scaring and destruction authorisation on the mussel farms of the department of the Côtes-d'Armor and shooting of scoters on various mussel farming sites) above all from July to November in these mussel farming areas, could lead to incidences concerning birds coming to feed not far from the mussel poles, moreover this activity takes place during the stopover period of the species. However, there do not seem to be significant impacts either (Bretagne Vivante & Geoca, 2016).

The monitoring operations from the coast which will be carried out in the framework of the first cycle of the NAP will possibly provide new data documenting this type of interaction, in order to enhance knowledge on its nature and degree of intensity.

Interactions with the extraction of marine aggregates

Some aggregate extraction sites are situated within stopover or feeding areas of the Balearic Shearwater, notably in the west of Saint Brieuc Bay.

This activity, which takes place throughout the year, is likely to lead to indirect negative impacts by reducing the availability of its prey, in particular by modifying the conditions necessary for the development of the ichthyofauna linked to sandy seabeds, and of the food chain which depends on it (Bretagne Vivante & Geoca, 2016). The impacts on the local populations of Balearic Shearwater are potentially locally significant given the nutritional role of the banks of sand exploited and considering the possible accumulated effects with other human activities. The whole of the food chain is impacted, and especially the piscivorous birds situated at the end of the chain. Sand eels, potential prey for the Balearic Shearwater, could especially be impacted due to their ecology linked to sandy banks.

A study concerning the food level of the Balearic Shearwater in French waters, coupled with the telemetric monitoring operations, will improve knowledge on this aspect and specify the intensity of this type of indirect impact on the species.

Interactions with maritime transport

The disturbance caused by maritime traffic has not been studied specifically for the Balearic Shearwater, or even for the procellariid family, and overall knowledge with regard to this type of disturbance of seabirds sensitive to human activities is limited (Schwemmer et al., 2011). Nevertheless, a certain number of scientific publications describe and assess this category of impact on seabirds in general, in northern Europe and in the context of offshore wind farms. In the German North Sea, where numerous offshore wind farms have been constructed, there was shown to be a significant negative effect of the presence of the wind farms themselves, **combined with the resulting maritime traffic**, on the abundance and distribution of divers (Gavia sp.) (Mendel. et al., 2019). In 2011, a study using of seabird distribution data acquired by flyovers on the Baltic Sea / German North Sea sector, and cross-referencing experimental data on sensitivity to disturbance, assessed the impacts of maritime traffic routes on patterns of distribution, loss of habitat and flight reactions of some seabirds, and also on possible habituation phenomena. This study demonstrated the following effects :

- significant avoidance by divers (Gavia sp.) regarding high maritime traffic sectors ;
- very variable fleeing distances among the 4 species of sea ducks (maximum distance for the Common Scoter (Melanitta nigra) and minimum distance for the Common Eider (Somateria mollissima). This fleeing distance is positively correlated to the size of the group ;
- among the 4 species of sea ducks, the duration of temporary loss of habitat is longer for the Common Scoter ;
- indications suggesting the hypothesis of a "habituation" phenomenon are highlighted among sea ducks in the traffic routes, but the unpredictable character of the routes of "free" vessels makes this hypothesis uncertain, in the long term.

The authors of the article recommend marine spatial planners to favour the "canalisation" "channelling" of maritime traffic routes in order to minimise the fragmentation of habitats and enable the possibility of habituation, at least for certain species (Schwemmer et al., 2011). Finally, in 2019, a team of researchers proposed an index of vulnerability to disturbance by maritime traffic for a selection of seabirds in northwest Europe as a marine spatial planning tool of (Fliessbach et al., 2019). Their study indicates notably :

- that Red-throated Divers (Gavia stellata) and Common Scoters have the longest fleeing distance, and also the largest proportion of individuals fleeing the source of disturbance ;
- the global disturbance vulnerability index (DVI) is maximum for the following species: Red-throated Diver, Black Guillemot (Cepphus grylle), Black-throated Diver (Gavia arctica), Velvet Scoter (Melanitta fusca), and Red-breasted Merganser (Mergus serrator) ;
- the global disturbance vulnerability index (DVI) is minimum for gulls and terns ;

- contrary to theoretical considerations, the timidity of a species correlates positively with the energy cost of fleeing, the most timid species also being the most vulnerable among the species studied ;
- the strong reactions of several species to disturbance by o vessels suggest the need to create undisturbed or only slightly disturbed zones in some marine protected areas, in order to act as refuges for vulnerable species. This index (DVI) can be used in combination with distribution data to identify the zones the most vulnerable to disturbance.

The monitoring operations carried out in the framework of offshore wind farm projects (BACI monitoring by flyovers, monitoring) will highlight any correlations between the radar corridors of maritime traffic (especially those caused by the presence of the wind farms themselves – maintenance vessels) and the distribution/abundance of the Balearic Shearwater. The impact of disturbance by maritime traffic on the Balearic Shearwater (loss of habitats, energy loss, etc) will also be able to be assessed, especially in sectors of high concentrations with the presence of an offshore wind farm in the direct vicinity: Saint Brieuc Bay, Mor Braz and Loire Estuary, Vendée coast. The considerations will be guided by the principle of (geographical and/or technical) avoidance, the first stage in the ARC triptych. Avoidance and reduction measures could be proposed, if necessary.

1.8 Assessment of the expertise available in France and abroad

The writing of this National Action Plan was supported by a network of essential contributors which at this stage is the basis for successfully carrying out initiatives for the Balearic Shearwater.

In France

The RESOM (Seabirds Network) is a network of stakeholders involved in the conservation of seabirds. It brings together :

- researchers from the CNRS (CEFE, CEBC-Chizé), the MNHN and various universities (La Rochelle, UBO ...) ;
- members of nature protection associations (Bretagne Vivante, LPO, GEOCA, GONm, GON, LPO Paca, Meridionalis ...) ;
- skilled and experienced individual experts (P. Yésou ...) ;
- representatives of the OFB and the DREAL.

Other organisations were considerably involved in the considerations leading to this National Plan and will be full stakeholders in future actions :

- the Regional Committees for Maritime Fishing and Marine Aquaculture (CRPMEM of Brittany, Normandy, Nouvelle Aquitaine and Occitanie, COREPEM Pays de la Loire), and the National Committee for Maritime Fishing and Marine Aquaculture (CNPMEM) ;
- producers' organisations (Sathoan, OP du Sud ...) ;
- companies developing marine renewable energies (EDFRe, ENGIE Green, Wings Marine, Eolfi, Quadran, France Energie Marine, WPD Offshore, Fortum) ;
- the Regional Environment, Planning and Housing Directorates (Brittany...) ;
- professional organisations for nature tourism and nautical activities (sports, leisure ...) ;
- marine environment management organisations (MNPs, managing bodies of marine Natura 2000 sites ...).

Abroad

The international network involved during the writing of the NAP and in facilitating it during the course of the first implementation cycle of the plan gathers together the following organisations:

The member associations of the BirdLife International network in Spain and Portugal :

- the Portuguese Society for the Study of Birds (SPEA) in Portugal ;
- the Spanish Ornithology Society (SEO) in Spain.

Other associations and institutional or academic organisations :

- Centro tecnológico experto en la cadena de valor del mar y la alimentación (AZTI) in Spain (Atlantic) ;
- Ministry of Ecology and Ecological Transition in Spain ;
- Government of the Balearic Islands ;
- Departamento de Biologia, Centro de Estudos do Ambiente e do Mar (CESAM) in Portugal ;
- Royal Society for the Protection of Birds (RSPB) ;
- University of Oxford ;
- NGOs of the Channel Islands: ABO, Alderney Wildlife… ;
- Northern New Zealand Seabird Trust.

1.9 Conservation actions already carried out in France

Censuses and various monitoring operations were carried out between the 1980s and 2000s, notably by Yésou and Thébault.

Between 2010 and 2012, despite certain methodological limits, the European Union programme FAME produced simultaneous protocol-based censuses of 30 strategic passage and/or stopover sites from Normandy to the Spanish border. These censuses highlighted that French coasts harbour nearly 30% of the Balearic Shearwater population.

In 2016, a summary regarding the stopovers, transit and dispersion of the Balearic Shearwater on the Channel/ North Sea and Atlantic seaboards (between the departments Nord and Vendée), coordinated by the GEOCA and Bretagne Vivante and financed by the OFB, updated the information on the species and thus specified the trends and phenology of the presence of the birds on our coasts.

Finally, in 2018, the OFB launched the drawing up of a monitoring strategy applied to the Balearic Shearwater prior to the writing of this action plans (Annexe 3). This monitoring strategy was the object of a very broad consultation process to define and validate the materials and methods to be implemented to ensure high-quality protocol-based monitoring of the species.

Despite these various initiatives aiming to enhance knowledge regarding the abundance of the species in France (phenology, distribution, numbers), there are still gaps in knowledge concerning the spatio-temporal utilisation of French waters in the inter-nuptial season for this very mobile and ecologically complex pelagic species highly influenced by a marine environment that is also highly variable and complex. At present, no conservation actions in the strict sense specifically targeting the Balearic Shearwater have been implemented in France. This NAP is the first French programme to include concrete measures aiming to improve the conservation status of the species.

1.10 Economic and cultural aspects linked to the species

Although the species is very coastal, it is little-known to the general public and does not benefit from any particular recognition or attention like other seabirds such as the Atlantic Puffin or Northern Gannet. This lack of current consideration may be an asset in the perspective of wishing for a better comprehension of the species by users and residents. Indeed, there is no negative history or belief with regard to this bird. In the framework of the NAP, communication and awareness-raising actions will be carried out essentially with sea stakeholders potentially in direct interaction with the bird (professional and amateur fishers, promoters of wind farm projects, coastal tourism in motorised vessels).

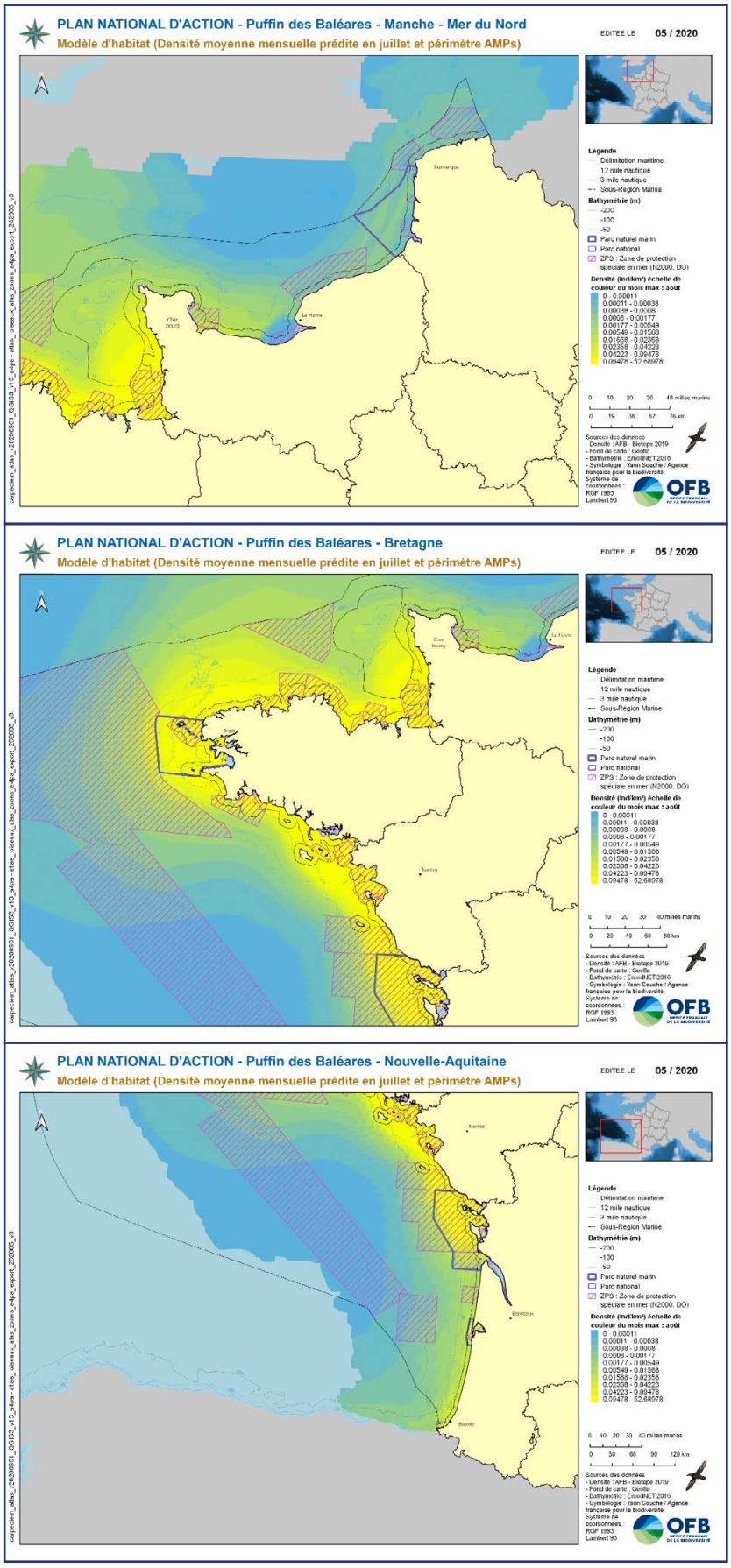
1.11 Consideration of Balearic Shearwater issues by type of regulated zone

1.11.1 Situation concerning the taking into consideration of Balearic Shearwater habitats by marine protected areas (MPAs)

Comparing maps established in the framework of the habitat model with the maps of the perimeters of MPAs in Metropolitan France (Marine Natural Parks, Special Protection Areas and Special Conservation Areas) provides an overview of the current taking into consideration of the preferential stopover areas of the Balearic Shearwater by these regulated zones, and especially by the network of marine Natura 2000 sites (NB: in the final version of this document, only SPAs will appear in the maps below).

On the Atlantic seaboard, most of the known preferential stopover sectors (Normandy-Brittany Gulf, Saint Brieuc Bay, Iroise Sea, Mor Braz, Vendée Corniche/ Île d'Yeu) are fully or partly covered by a marine Special Protection Area. However, some areas lack appropriate management tools. In the Mediterranean, the habitat model is less precise (limited number of protocol-based data) and the distribution of the Balearic Shearwater is more diffuse and spread throughout the Gulf of Lion, a significant proportion of which is covered by the Gulf of Lion Marine Natural Park and coastal Natura 2000 sites.

Figure 31 : Habitat model (predicted mean monthly density in July and perimeters of MPAs)



1.11.2 Criteria justifying the launching of a concertation process to study the possible setting up of new regulated zones

The recommendations of the Birds Directive for the designation of marine Natura 2000 sites indicate that each designated site should target the biologically necessary area and ensure its ecological coherence :

"The objective when drawing up the perimeter of sites is to retain […] the area biologically necessary for the conservation of the habitats and species justifying the designation of each site, ensuring its ecological coherence in particular with regard to management concerns."

On the basis of this objective of taking into consideration the "biological areas necessary for the conservation of the species", the knowledge covered in this chapter, and comparing the current MPA with the proposed habitat model, we are able to suggest some criteria that could justify the launching of a concertation process on the proposition of new regulated zones, or even the creation or extension of dedicated marine protected areas for the Balearic Shearwater.

These criteria are as follows :

- population ratio (density)/recurrence of the presence of the Balearic Shearwater on a given sector, especially with the presence of feeding and/or resting "rafts" ;
- proven and significant ecological function of a given sector for the species (feeding ground, resting area) ;
- observed pressure from one or more activities on a proven and regular area of presence.

Proposition of criteria to combine for proposing candidate sites for the creation/extension of an MPA. Needs and issues for the conservation of the species and definition of a strategy

	MINIMUM ELIGIBILITY THRESHOLDS
NUMBERS/DENSITY	Regular presence of concentration(s) of more than 500 birds (2% of the population worldwide)
INTERANNUAL RECURRENCE / ANNUAL OCCURRENCE	More than 7d/yr and ≥ 3 years per 5-year cycle
FUNCTIONALITY	Proven presence of rafts (stopover groups) of birds feeding and/or resting
PRESSURES	Presence during the high-risk period (June-October) of one or more of the following activities: professional fishing (longlines, trammel nets, gillnets, ring nets or seine nets), motorised nautical activities (personal watercraft, pleasure boating), offshore wind farms

2 NEEDS AND CONSERVATION ISSUES FOR THE SPECIES AND DEFINING A STRATEGY

2.1 Recapitulative summary of the species' optimal needs

Like all procellariforms, the Balearic Shearwater spends most of its life at sea and only returns to land to breed. Therefore, the species conservation strategy, with regard to France, takes into account the marine and coastal area.

Demographic aspects *(Demographic aspects (Courbin et al., 2019. Note sur la démographie pour une aide à la gestion et à la conservation des populations d'oiseaux marins nicheurs du littoral français)*

From a demographic point of view, the Balearic Shearwater is a species with a slow strategy characterised by :

- a long lifespan ;
- late sexual maturity ;
- a low fertility rate: usually only 1 egg ;
- theoretically high inter-annual adult survival probabilities (generally > 0.95, although it is indeed much lower in the Balearic Shearwater).

The species therefore invests little in reproduction, but heavily in maintenance and survival.

During its movements and its stopovers along French coasts in the non-breeding season, based on the currently available knowledge, detailed in the first part of this NAP, the Balearic Shearwater needs to be able to meet the following conditions to guarantee its survival :

- have access to summering and feeding sites without being restricted by habitat fragmentation caused by future wind farms ;
- have the full benefit of quality summering, resting and stopover areas in order to moult, a fundamental stage in its biology, under good conditions ;
- have access to feeding grounds free from disturbance and threats from fishing bycatch or the effects of offshore wind farms ;
- benefit from good availability of the food resources targeted by the species, with the maintenance of these resources ensured (against the potential effects of global changes on food resources and competition with fisheries).

The main lever for increasing (or decreasing) the size of such a population is change in adult survival rate. The potential to «compensate» for mortality by improving reproductive parameters is very limited. **Actions ensuring a high adult survival rate are therefore to be prioritised**.

As already seen, the main threats to the Balearic Shearwater come from fishing bycatch. The effect of these additional mortalities has all the more impact when seabird populations are faced with significant environmental fluctuations.

In this framework, it therefore appears to be a priority to promote measures avoiding these mortalities rather than relying on the effectiveness of more local measures, particularly if these measures are aimed at improving fertility, which would be very ineffective due to the demographic strategy of these species. For this reason, it is proposed as part of the first cycle of the NAP to particularly focus on characterising and reducing interactions with fisheries.

2.2 Long-term conservation strategy

The general objective is to reduce pressure at sea and near the coast so as to improve the adult survival rate and to contribute to the international work carried out in favour of the species. The main challenges of this strategy also include enhancing knowledge on the species, particularly in terms of the spatio-temporal use of French coastal waters and feeding ecology, in order to improve conservation actions.

Long-term conservation strategy :

- characterise, in partnership with professional organisations, the interactions between the Balearic Shearwater and the various professional fisheries, and develop mitigation measures where appropriate ;
- describe and reduce, in partnership with relevant stakeholders, the impacts associated with the creation of offshore wind farms and associated maritime and air traffic ;
- characterise and reduce disturbances from recreational fishers and other users of coastal waters (power boats, etc.) in conjunction with local and federal institutions ;
- improve knowledge on the Balearic Shearwater by carrying out coordinated protocol-based surveys and monitoring at sea and from the coast throughout waters in metropolitan France, as well as by tagging individuals and analysing tissue samples in order to gain a better understanding of the specific ecological characteristics of the species.

2.3 Long-term monitoring strategy

The work dedicated to defining a monitoring strategy for the Balearic Shearwater was addressed in parallel to the writing of the NAP. It mobilised, in the form of a technical committee, the stakeholders involved in the conservation of the species along the three seaboards of metropolitan France. The document is available in extenso in Annexe 3. The aim of this strategy is to include coordinated actions around the South Atlantic (SA), North Atlantic/West Channel (NAWC) and East Channel/North Sea (ECNS) seaboards, and the Gulf of Lion on the Mediterranean seaboard (Medit) to provide information on :

- changes in **abundance** (and therefore the degree of responsibility of France for this species) within this perimeter ;
- the **phenology of the arrival and presence** of individuals, in order to adapt the timing of the management/conservation measures to be implemented within the framework of the NAP ;
- the **spatial distribution** of individuals in order to identify the areas at stake, where the implementation of management/conservation measures will be prioritised within the NAP framework ;
- the **behavioural ecology** in order to refine and adapt as finely as possible the management/conservation measures to be implemented within the NAP framework.

In general, the study of seabirds involves 3 main types of observation, associated with the types of data collected.

2.3.1 Opportunistic observations, from the coast or at sea

Opportunistic observations provide data on presence and relative abundance only, with **no measure of sampling effort**. They are not based on a data collection protocol, and any spatial data (location of individuals observed or location of the observation point) can be used. The absence of data does not necessarily indicate the absence of the species.

Applicability to the Balearic Shearwater

The use of these data is limited, even though there are many sources of available data: collaborative, such as Visionature (Faune-France. org), or associative (ClicNat) databases, monitoring of other taxa at sea (fishery observers, participatory programmes such as OBSenMER), etc.

Opportunistic data can, subject to some restrictions, give an account of the overall pattern of the species' presence phenology, even enable the detection of marginal/exceptional phenomena (in terms of numbers, phenology or location) which could herald more lasting evolutionary trends. They can also confirm the interest of a sector that is not yet subject to protocol monitoring (as was the case for the Iroise sector following the analysis of absolute abundance presented in Annexe 2).

They also have the advantage of interesting/raising the awareness of the general public and naturalist communities about this emblematic species of great heritage interest.

2.3.2 Protocol-based observations, from the coast or at sea

These are standardised observations, with measurement of sampling effort. This type of data provides estimates of relative, or even absolute abundance, depending on the type of protocol applied.

Protocol-based observations from the coast by «seawatch» - Applicability to the Balearic Shearwater

In order to achieve sufficient observation pressure to be able to robustly analyse the data, the GISOM, which was consulted on this issue, recommends an observation frequency of one observation every two days. To achieve such an observation level on several sites would require the mobilisation of excessive financial and human resources. This «seawatch» system has therefore not been included in the strategy.

Although each method can provide complementary information, the other monitoring systems proposed in the strategy (protocol-based data collected at sea, GPS bio-logging, coastal stopover monitoring, opportunistic observations) will make it possible to answer the questions raised by the monitoring of this species (abundance, phenology, distribution).

Protocol-based observations from the coast «Monitoring of stopovers» - Applicability to the Balearic Shearwater

It is therefore proposed that only the protocol-based coastal monitoring of «stopovers» be used according to the dedicated protocol sheet during the 5 years of the NAP. This monitoring, which provides information on the phenology and relative abundance of the species, also makes it possible to collect qualitative data on the ecology of the species, but also on possible interactions with human activities (professional fishing, recreational fishing, water sports and leisure activities, aquaculture, etc.).

At the end of those 5 years of monitoring, the NAP coordinator will produce a statistical analysis of these data.

Protocol-based observations at sea - Applicability to the Balearic Shearwater

The different analysis methods for protocol-based data acquired at sea by boat/aircraft are relevant and could be tested and presented in the framework of the meta-analysis of data available in the French EEZ between 2004 and 2018. 72p (Le Bras et al., 2019). The NAP will integrate and support the monitoring envisaged in the framework of a number of projects (marine renewable energy, establishment/monitoring of marine protected areas, Megascope observation platform on IFREMER fishery campaigns, SAMM 2...).

2.3.3 Telemetric monitoring (biologging)

This involves the automatic collection of information on the location (and environment) of individuals equipped with tags: GLS, ARGOS (tags = Platform Transmitters Terminals, or PTT), GPS.

Applicability to the Balearic Shearwater

Tagging Balearic Shearwaters with biologging devices is possible and has already been put to test on birds captured on their breeding colonies in Spain and on birds caught at sea in the Bay of Biscay.

The monitoring strategy (see Annexe 3) identified the importance of telemetry monitoring for knowledge acquisition, which is still lacking, on the spatio-temporal use of French waters (both Atlantic and Mediterranean) by the Balearic Shearwater, particularly in relation to its feeding ecology. A dedicated action sheet is presented with the aim of tagging between 20 and 40 individuals in 2020, under the coordination of the CNRSCEBC.

2.3.4 A multi-system strategy

The achievement of the various objectives set by the National Action Plan implies the joint implementation of various monitoring systems. Some of these measures constitute programmes that already exist and financed from elsewhere (MRE monitoring, Megascope monitoring, ERMMA). It is relevant to take advantage of them in order to enable the collection of a maximum amount of data, ensuring greater analysis reliability and robustness.

At the end of these 5 years of protocol-based coastal monitoring, it is proposed to produce a statistical analysis of these data (following on from the first comparisons carried out in the framework of the meta-analysis of available data in the EEZ between 2004 and 2018) in order to refine the relevance of the monitoring frequency (possibility of reducing the frequency or not), monitoring periods (possibility of reducing them or not) and the sites selected, and to evaluate the ratio of coastal/offshore numbers, the influence of weather conditions on species detectability, the accuracy of the data collected in relation to the effort deployed. The analysis will also include data from telemetric monitoring and monitoring at sea, particularly with regard to the spatio-temporal distribution of numbers between coastal areas (visible from the coast) and areas further offshore (not visible from the coast): proportion of individuals at the coast and at sea, proportion of time spent inshore/offshore. This will also make it possible to compare changes in relative abundances calculated via the monitoring of stopover sites with the changes in relative abundance calculated from the results of the habitat model approach.

Hence, it is a complete set of monitoring operations that provide the architecture of the Balearic Shearwater monitoring strategy on French coasts (English Channel Northern sea (ECNS), Northern Atlantic and West Coast (NAWC), South Atlantic (SA) and Mediteranean Sea (Med).

The monitoring strategy is therefore based on the implementation of different programmes and actions, at different scales and according to device-specific time frames.

The choice and technical content of the monitoring that makes up the national strategy were developed in consultation with the members of the Technical Committee, which brings together all the stakeholders (NGOs, decentralised government services, representatives of socio-professional organisations, scientific experts) involved in the conservation of the Balearic Shearwater on the 3 seaboards of metropolitan France.

Summary of the strategy and implementation schedule

Monitoring Types	Monitoring objectives	Interannual frequency	Intra year sampling	2021	2022	2023	2024	2025	Total budget (NAP duration)
Opportunistic observation	Phenology, seawatch	Every year	Continuous annual cycle	C/ A	C/ **A**	C/ **A**	C/ **A**	C/ **A**	5 000 €
Coastal stopover monitoring	Behaviour, phenology, relative abundances	Every year	01/06 -> 31/10 (every 10)	**C/ A**	**C/ A**	**C/ A**	**C/ A**	**C/ A**	125 000 €
Habitat model approach Aircraft/boat distance sampling (MRE, AMP, IFREMER)	Phenology, absolute abundances, spatial distribution	Analysis every 3 years	Model with monthly prediction	C*	C*/ **A**	C*	C	C/ **A**	Analyses : 40 000 € - 60 000 € Specific funding for the Capbreton Gouf sector : 15 000 €
GPS biologging	Spatial distribution, precise spatiotemporal occupation	two 2-year programmes (before and after works)	Tagging of individuals in summer, tag lifespan several months	**C**	**C/ A**	C/ A	C/ A	C/ A	600 000 €

* Funding by NAP for 4 campaigns/year over 3 years in the Gouf of Capbreton sector

C: Field campaign

A: Analysis carried out in the NAP framework

In green and bold: funded by the NAP

Specific monitoring
Non-specific monitoring

3 STRATEGY FOR THE DURATION OF THE PLAN AND ASPECTS OF IMPLEMENTATION

3.1 Duration of the plan

This first National Action Plan for the Balearic Shearwater is planned for a period of 5 years (2021–2025). At the end of this period, an assessment of the plan will be carried out, followed by its evaluation, which will be outsourced, if possible, to obtain the most objective possible analysis. Depending on the change in conservation status of the species, a second plan may be defined to continue, reinforce and redirect the actions carried out in order to achieve the objective of restoring good conservation status of the species.

This Plan needs to be accessible to all state services, the professional organisations concerned, local authorities, managers of marine protected areas, NGOs and all the Plan's partners. The dissemination of this plan via the Internet and all possible and appropriate media is therefore essential to promote it and facilitate adherence by the stakeholders concerned.

3.2 Specific objectives

3.2.1 OBJECTIVE 1 : promote the conservation issues of the species

Operational objectives :

- dissemination of the NAP to stakeholders and decision-makers through specific facilitation ;
- creation of communication tools around the NAP and implementation of a specific communication programme.

3.2.2 OBJECTIVE 2: assess the impact of the threats to the species

Associated targeted threats :

- mortality due to fishing bycatch and possible collisions with industrial infrastructures at sea (offshore wind farms) ;
- sustained disturbance in some key areas due to water sport and leisure activities ;
- fragmentation of feeding grounds due to the installation of industrial infrastructures and the presence of sea activities and sea use ;
- reduction in resource availability due to climate change and food competition with fisheries ;
- direct contamination (ingestion of microplastics and other anthropogenic contaminants) or indirect contamination (through the food web).

Operational objectives :

- characterise interactions with professional and recreational fishing ;
- assess the effects and impacts of offshore wind farms (barrier effect, habitat loss effect, collision effect) ;
- evaluate the sources and intensity of disturbance in the areas of concentrated presence ;

- ensure the monitoring of the availability of small pelagic fish resources (distribution, density, trends) ;
- investigate levels of exposure to contaminants.

3.2.3 OBJECTIVE 3: reduce the threats identified at sea and in coastal waters

Operational objectives :

- avoid effects induced by offshore MRE facilities through an avoidance approach in the project planning phase («de-risking» stage) ;
- if required by characterisation results: implement measures to reduce bycatch in the fisheries concerned, test experimental measures ;
- improve the consideration of the species in framework documents by participating in ongoing processes of creation/extension of marine protected areas ;
- raise awareness of threats to the species among sea users ;
- reduce the effects caused by offshore MRE facilities as soon as they are identified by adapting/improving the mitigation measures provided for in the framework of operating permits ;
- reduce sources of disturbance in the most fragile areas ;
- organise an exchange of feedback on experience with Portuguese fishers involved in reducing threats at sea.

3.2.4 OBJECTIVE 4: enhance knowledge on the demography and ecology of the species

Operational objectives :

- absolute abundance: assess and update France's degree of responsibility in the conservation of the Balearic Shearwater ;
- relative abundance: monitor changes in the abundance of the species (in France) in order to assess the effectiveness of measures and the status of populations ;
- spatialise and characterise the high-issue areas for the species: areas of significant presence on a global scale and sectors used on a finer scale, during the different stages (transit, feeding, resting, moulting) ;
- regularly update knowledge on species distribution (presence hotspots, duration of stays/activity), in order to spatially adapt management measures ;
- update knowledge on the phenology of the arrival and presence of the species in order to adapt management and conservation measures in time to recognise any changes in the spatio-temporal pattern of the use of French waters in the breeding season ;
- improve knowledge on the ecology of the species: home ranges, preferential habitats, feeding ecology, flight altitudes in relation to weather conditions, nychthemeral rhythms and movements, functioning of rafts, etc,) ;
- enhance knowledge on the trophic level of the species ;
- develop a database to centralise and bank the data collected, aimed at operational use.

3.2.5 OBJECTIVE 5: maintain a high level of partner involvement

Operational objectives :

- contribute to the international action plan, participate in international seminars, organise an international seminar in France, ensure regular communication with Spanish, Portuguese and British partners ;
- promote exchanges and feedback with socio-professional fishery representatives (national and international level) ;
- participate in socio-professional actions and events to promote partnerships ;
- stimulate the emergence of local contact-persons ;
- report on the progress of the NAP and discuss future actions during the annual steering committees.

3.2.6 OBJECTIVE 6: Disseminate/share knowledge

Operational objectives :

- Facilitate the network of stakeholders involved in the conservation of the Balearic Shearwater ;
- Implement a dedicated communication programme aimed at sharing the issues and actions of the NAP among a maximum number of stakeholders and the general public ;
- Disseminate the progress of the NAP's actions, and also the programmes of actions carried out in the countries concerned (Spain, Portugal, ...) ;
- Promote positive trends with regard to practices.

Summary of the objectives and actions of the NAP

OBJECTIVES AND ACTIONS	FIELD	PRIORITY	ORGANISATION(S)
OBJECTIVE 1 : promote the conservation issues of the species			
Action 1.1 : Action 1.1: facilitation of the National Action Plan	Facilitation	1	OFB, DREAL Bretagne
OBJECTIVE 2 : assess the impact of the threats to the species			
Action 2.1 : characterise interactions with professional fishing - Saint Brieuc Bay sector	Assessment	1	AGLIA, CRPMEM Bretagne, CDMP 22, OFB, DREAL Bretagne
Action 2.2 : characterise interactions with professional fishing - Iroise Sea sector	Assessment	1	AGLIA, CRPMEM Bretagne, CDPM 29 ; OFB, DREAL Bretagne
Action 2.3 : characterise interactions with professional fishing - Mor Braz sector	Assessment	1	AGLIA, CRPMEM Bretagne, COREPEM, CDPM 56, CDPM 44, OFB, DREAL Bretagne
Action 2.4 : characterise interactions with professional fishing - Ile d'Yeu SPA sector	Assessment	1	AGLIA, COREPEM, CDPM 44, OFB, DREAL Bretagne
Action 2.5 : characterise interactions with professional fishing - southern Landes Shelf sector	Assessment	1	AGLIA, CRPMEM Nouvelle Aquitaine, AZTI, OFB, DREAL Bretagne
Action 2.6 : characterise interactions with professional fishing - Gulf of Lion sector	Assessment	1	AGLIA, CRPMEM Occitanie, OP Sathoan, OP Sud, PNM Golfe du Lion, OFB, DREAL Bretagne
Action 2.7 : characterise interactions with professional fishing Development of applications	Assessment	1	GECC, OP Sathoan, CRPMEM, OFB, DREAL Bretagne
Action 2.8 : assess interactions with angling and nautical activities	Assessment	1	Confédération du nautisme, French motorboating, sailing and angling federations, UFOLEP, OFB, DREAL Bretagne
Action 2.9 : assess interactions with MREs (monitoring of ARC measures)	Assessment	1	EDF-RE, ENGIE Green, Wings Marine, Eolfi, Quadran, France Energie Marine, WPD Offshore, Fortum, OFB, DREAL Bretagne

OBJECTIF N°3 : reduce the threats identified at sea and in coastal waters			
Action 3.1 : test measures for reducing bycatch	Conservation	1	AGLIA, CNPMEM, CRPMEM Bretagne and Occitanie, COREPEM, OP Sathouan, OP Sud, CDPM 56 et 54, SEO, SPEA, AZTI, OFB and DREAL Bretagne
Action 3.2 : benefit from feedback on international experience	Conservation	1	Specialist service provider, CRPMEM Bretagne, COREPEM, CDPM 29, CDPM 56 and 44, PNMI, SPEA, OFB and DEAL Bretagne
Action 3.3 : Confirm, refine and share the issues regarding the Balearic Shearwater in the "Les Havres coast" sector	Conservation	2	DREAL Normandie, DDTM/DML 50, Maritime Prefecture, LPO Normandie, GON, CRPMEM Normandie, CDPM Manche, DREAL Bretagne, OFB
Action 3.4 : Taking into consideration the issues regarding the Balearic Shearwater in Douarnenez Bay	Conservation	2	Cap Sizun Natura 200 site Steering Committee, CC Cap Sizun, DREAL Bretagne, Maritime Prefecture, Finistère Prefecture, DDTM 29, Iroise MNP, Bretagne Vivante, other NGOs, DREAL Bretagne, OFB
Action 3.5 : Taking into consideration the issues regarding the Balearic Shearwater in the SPA Saint Brieuc Bay – East	Conservation	2	Saint Brieuc Bay – East Natura 200 site Steering Committee, DREAL Bretagne, DDTM/DML 22, Maritime Prefecture, Saint Brieuc Bay NNR, Pays de Saint-Brieuc, Bretagne Vivante, GEOCA, DREAL Bretagne, OFB
Action 3.6 : Confirm, refine and share the issues regarding the Balearic Shearwater in the Gouf de Capbreton sector	Conservation	2	DREAL Nouvelle Aquitaine, DDTM/ DML 64/40, Maritime Prefecture, LPO Aquitaine, CRPMEM Nouvelle-Aquitaine, OFB

OBJECTIVE 4 : enhance knowledge on the demography and ecology of the species			
Action 4.1 : set up a specific workgroup for questions of food resources	Knowledge	2	CIEN, IFREMER, PELAGIS, AgroCampus Rennes, CNRS (CEBC and CEFE), GISOM, OFB, DREAL Bretagne
Actions 4.2 : study of trophic level and monitoring of contaminants	Knowledge	1	La Rochelle University (LIENSs and CEBC-CNRS), OFB DREAL Bretagne
Action 4.3 : analysis of data acquired at sea – absolute abundance and habitat model	Knowledge	2	Centre de la mer de Biarritz, IFREMER/ PELAGIS (Megascope platform), MRE developers, MPA managing bodies
Action 4.4 : analysis of data acquired at sea and from the coast– opportunistic observations	Knowledge	2	LPO and Faune France Steering Committee, Picardie Nature, Collectif Meridionalis, Trektellen
Action 4.5 : observations from the coast – monitoring of stopovers	Knowledge	2	GONm, LPO Normandie, GEOCA, Bretagne Vivante, LPO 44 and 85, LPO France, OFB
Action 4.6 : telemetric monitoring of individuals	Knowledge	2	CNRS CEBC, Bretagne Vivante, Northern New Zealand Seabird Trust, LPO 44 and LPO 85 GEOCA, ENGIE Green, EDF-RE, OFB
OBJECTIVE 5 : maintain a high level of partner involvement			
Action 5.1 : facilitation of the network of partners abroad	Cooperation	1	SPEA, SEO, AZTI, international experts, OFB, DREAL Bretagne
OBJECTIF N°6 : diffuser / partager les connaissances			
Action 6.1 : create communication tools about the NAP	Communication	1	OFB

3.3 Details of the actions

3.3.1 OBJECTIVE 1: promote the conservation issues of the species

PROMOTE THE CONSERVATION ISSUES OF THE SPECIES

FACILITATION OF THE NATIONAL ACTION PLAN

CODE 1.1 PRIORITY 1

GENERAL OBJECTIVES OF THE ACTION

Ensure the steering, coordination/facilitation and reporting of the measures intended by the NAP.

OPERATIONAL OBJECTIVES OF THE ACTION

Hire a specific facilitator to ensure the steering, coordination and reporting of the measures intended in the Plan.

CONTEXT AND GENERAL DESCRIPTION OF THE ACTION

The Balearic Shearwater (*Puffinus mauretanicus*), a nesting bird species endemic to the Balearic Islands, is considered to be the most endangered seabird in Europe. France has a major responsibility for the conservation of this species in the non-breeding season (presence in French territorial Atlantic waters from May to October), and to a lesser extent in the breeding season (presence in the Mediterranean Sea). After joint action by the OFB and DREAL Bretagne, the species was added to the list of species to benefit from a NAP. This enabled the Water and Biodiversity Directorate (DEB) to designate DREAL Bretagne as Coordinating DREAL of the NAP. DREAL Bretagne then designated the French Biodiversity Agency (OFB) for the writing phase of the plan, launched in December 2018 and finalised in late 2020. This plan defined a medium- and long-term strategy which aims to :

1. organise coherent monitoring of populations of the species through a specific monitoring strategy ;
2. implement coordinated actions favourable to the restoration of the species and its habitat ;
3. facilitate the integration of the protection of the species in human activities and public policies ;
4. inform the stakeholders concerned and the public.

The concrete implementation of the action plan, after formalisation of the document in late 2020, is led by the French Biodiversity Agency (OFB). It requires the hiring of a specific facilitator who will ensure the steering, coordination/facilitation and reporting of the measures intended in the Plan.

DETAILED DESCRIPTION OF THE ACTION AND THE OPERATIONS TO BE CARRIED OUT

As from the first year of implementation of the NAP (1st quarter 2021), the OFB will hire a project manager who will specifically work 60% of his/her time (60% FTE) on the facilitation of the plan. Joining the Atlantic Seaboard Delegation of the OFB, he/she will ensure the coordination and successful carrying out of the actions intended in the Plan, then report-writing, and especially (non-exhaustive list) :

- coordination and facilitation of the **monitoring strategy of the species**, working with the various NGOs in charge of protocol-based monitoring operations from the coast, and also mobilising the various organisations producing data gathered at sea (MRE developers, MPA managing bodies, research organisations, IFREMER, etc.) which will feed into the monitoring programme ;
- technical and organisational support for AGLIA (lead-organisation of the **CARI3P project** to characterise interactions with professional fishing) ;
- support for the national, regional and local organisations, and also private local organisations, representing **nautical sports and leisure activities** ;
- following on from the results of the CARI3P programme, developing Research & Development projects and implementing **tests of measures to reduce** bycatch from professional fishing ;
- support for facilitating, with regional and departmental fishing committees (CDPM and CRPMEM), and also Professional Organisations (POs), the utilisation of the **OBSenMer and ECHOSEA tools** for voluntary declarations of Balearic Shearwater bycatch ;
- facilitation of the **MRE workgroup** (see specific action file), especially the structuring of the various phases of the biologging monitoring programme ;
- Facilitation of the **"Food competition and access to food resources" workgroup** (see specific action file) ;
- support for **MPA managing bodies**, especially for the implementation of regulatory measures: managing authorities/facilitators of marine SPAs, marine natural parks, etc. ;
- support for the relevant **departments of the State services in charge of administrating marine regulations** (assessment of Natura 2000 incidences, delivering and renewing license authorisations, etc.): DDTM/DML, DREAL etc. ;
- facilitation of NAP **communication/awareness-raising** : updating the Internet site, organisation of specific awareness-raising events, creation and dissemination of presentation and information leaflets ;
- **administrative and contractual monitoring** of the various projects developed in the framework of the NAP ;
- **reporting** on the actions carried out, writing annual activity reports, minutes of meetings and steering committees.

Also, the NAP facilitator will ensure the facilitation of the **international network**, prolonging the work initiated during the phase of writing of the NAP. This will involve sharing the information gathered in the framework of the French NAP, seeking the opinions of foreign partners, coordinating certain actions with measures implemented in Spain, Portugal and the UK, even mobilising their skills for participating/collaborating in joint knowledge acquisition, monitoring or conservation status improvement actions.

The international network mobilised during the writing phase and to be facilitated during the course of the first cycle of this NAP is made up of the following organisations and contact-persons :

- SEO in Spain: Pep Arcos, Beatriz Barajas Elizo
- SPEA in Portugal: Nuno Oliveira, Ana Almeida
- AZTI in Spain (Atlantic): Maite Louzao, Nicolas Goni
- Helena Moreno Colera of the Spanish Ministry of Ecology
- Chris Gaskin of the Northern New Zealand Seabird Trust
- Ivan Ramos of the Government of the Balearic Islands
- Helder Araujo (Departamento de Biologia, Centro de Estudos do Ambiente e do Mar (CESAM))
- Yann Rouxel (RSPB)
- Tim Guilford (University of Oxford)
- Channel Islands : John Horton & Justin Hart

The NAP facilitator will represent the Balearic Shearwater NAP by participating in seminars and conferences relevant to the issue of conserving the species (conservation of seabirds, bycatch issue, etc.) organised abroad. Notably, he/she will take part in the annual seminars organised in Spain in the framework of the International Action Plan for the species. The facilitator of the NAP will also be in charge of the administrative work of drawing up contracts and agreements with the various organisations contacted in the framework of the implementation of the NAP: writing of specifications and participation in the process of selecting candidates for providing services, writing and setting up data access agreements, etc. Finally, he/she will ensure the work of ongoing reporting of the actions carried out, and their annual summary to be presented to the steering monitoring committee of the NAP.

GEOGRAPHICAL LOCATION

Atlantic and Mediterranean seaboards.

LINK WITH OTHER ACTIONS

All the action files of the NAP.

MONITORING AND ASSESSMENT INDICATORS

Number of meetings organised by the facilitator. Level of activity of the international network: email exchanges, meetings, conferences, etc. Participation in seminars and conferences abroad Progression of the actions of the NAP.

DELIVERABLES EXPECTED (INCLUDING MAPS)

Specific reports on the meetings and exchanges carried out in the framework of the facilitator's work (with the various workgroups, partners, etc.), annual summaries, NAP facilitation activity assessment.

STAKEHOLDERS AND ORGANISATIONS MOBILISED

- Operator/Service provider: Facilitator of the NAP (OFB).
- Partners : steering committee of the NAP.
- Project supervision : OFB.

ESTIMATED BUDGET AND FUNDING SOURCES AVAILABLE

Hiring and remuneration of one 60% FTE by the OFB (30 500 €/yr). The 2 first years are financed by the EMFAF project "AMOPUFOM", submitted in 2020: 61 000 € intended for the facilitation of the NAP over 2 years. Co-funding EMFAF/OFB/ Water and Biodiversity Directorate Funding for the facilitation of the last 3 years of the first cycle of the NAP to be sought.

PROVISIONAL SCHEDULE

Duration of the first cycle of the NAP: January 2021 – December 2025.

Annual reports and summary report at the end of the 5 years.

BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

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3.3.2 OBJECTIVE 2: assess the impact of the threats to the species

INTERACTIONS WITH HUMAN ACTIVITIES

CHARACTERISATION OF INTERACTIONS WITH PROFESSIONAL FISHING SECTOR BRITTANY – SAINT BRIEUC BAY

CODE 2.1 PRIORITY 1

GENERAL OBJECTIVES OF THE ACTION

Enhance knowledge about bycatch of Balearic Shearwater in French territorial Atlantic waters by professional fishing.

OPERATIONAL OBJECTIVES OF THE ACTION

The Balearic Shearwater, whose total population is estimated at 25 000 individuals, is endangered with extinction and the latest demographic models tend to show that it will have effectively disappeared within 60 years. They also show that the adult survival rate is excessively low, mainly explained by significant mortality due to bycatch from professional fishing. The current impact of bycatch on the species, accounting for at least 45% of the current adult mortality rate, is now considered as incompatible with its survival (Genovart et al., 2016). But it must be possible to inverse this trend by acting on the factors which lead to this bycatch.

The knowledge about bycatch regarding the Balearic Shearwater comes from Spain and Portugal, where characterisation studies and even tests of reduction measures with specific procedures have been implemented.

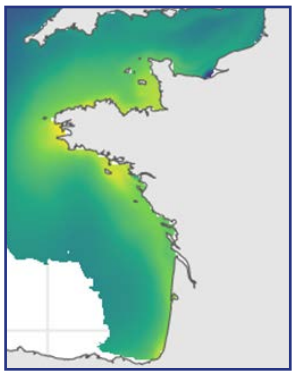
In the Atlantic, Portuguese studies showed that, in their waters, the most problematic fishing techniques for the Balearic Shearwater seem to be :

- **small coastal multi-purpose boats** which fish using **demersal longlines or nets (gillnet + trammel)**. Rate of Balearic Shearwaters killed/yr 1660 ;
- **purse seine** fishing, used to catch small pelagic fish such as the sardine. Rate of Balearic Shearwaters killed/yr 368.

The action developed here aims to implement procedures to characterise interactions (bycatch) with French Atlantic fisheries, within pilot sites selected with regard to the probability of presence of the species and the predominant fishing activities.

The monitoring operations and studies carried out in the Atlantic identified the preferential occupation sectors along the French coasts. In 2019, a habitat model was produced on the basis of protocol-based observations at sea compiled over the period 2002-2018.

Figure 33 : Mean annual density of shearwaters (2017). Logarithmic scale to assess nuances of density over a broad range of magnitudes.



Hotspots of presence of the species in France :

- **Normandy-Brittany Gulf**
- **Northern Brittany coast**
- Iroise Sea
- Mor Braz
- Vendée coast / Île d'Yeu
- Southern Landes Shelf / Gouf de Capbreton

In the Atlantic, the species is mainly present as from the month of May and until the month of October.

Figure 34 : Detail of the evolution in abundance in the Brittany sector between May and October

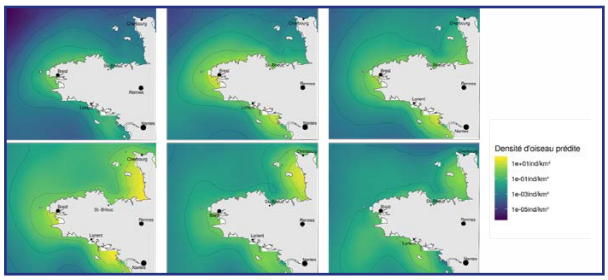
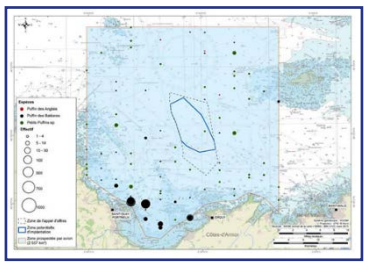


Figure 35 : Distribution and numbers of Balearic Shearwaters (in black) in Saint Brieuc Bay – boat surveys 2012/2013/2014 (Ailes Marines)



In the framework of the NAP, the CARI3P project was submitted to the EMFAF for the funding of a programme covering 3 pilot sites: Mor Braz, the Île d'Yeu sector and the Gulf of Lion. This project will be carried out in collaboration with the CRPMEM concerned by the 3 pilot sites, and the OFB as technical partner. It breaks down into two distinct actions which aim at precisely characterising interactions by means of 2 complementary methods :

1. Assessment of the fleets on each pilot site and development of questionnaires/ interviews for the fishers (nets, longlines and surrounding pelagic seines). The targeted objective is to cover 30 % of the vessels identified in the 3 study sectors.
2. Placing onboard observers on the longliners, over 2 seasons. The targeted objective is to cover at least 5 % of the catches of the boats concerned (longline fishing).

The action here consists in adding the pilot site "Saint Brieuc Bay" to this programme, under the same conditions as CARI3P, by seeking further funding.

DETAILED DESCRIPTION OF THE ACTION AND THE OPERATIONS TO BE CARRIED OUT

Setting up procedures and programmes to characterise/quantify any bycatch of Balearic Shearwater in the following ways :

- questionnaires/interviews with fishers ;
- onboard observers.

The programmes will primarily target the vessels working inside Saint Brieuc Bay delimited by the Bréhat Archipelago / Cap Fréhel.

The programmes will primarily target the period (May) June-October (November). The types of fishing considered to pose an interaction risk within Saint Brieuc Bay are :

- **longliners ;**
- **netters.**

SUMMARY DESCRIPTION OF FISHING PRACTICES IN THE PERIOD OF PRESENCE OF BALEARIC SHEARWATER IN THE SECTOR OF SAINT BRIEUC BAY

1/ LONGLINERS (DATA VALPENA 2017 – RATE OF QUESTIONNAIRES/ INTERVIEWS CÔTESD'ARMOR 70%)

Between June and October 2017, 8 longliners declared activity in the study area. They essentially use bottom longlines, only 1 vessel having fished using drifting longlines. The number of active vessels is highest in the summer period and decreases in the autumn (see graph).

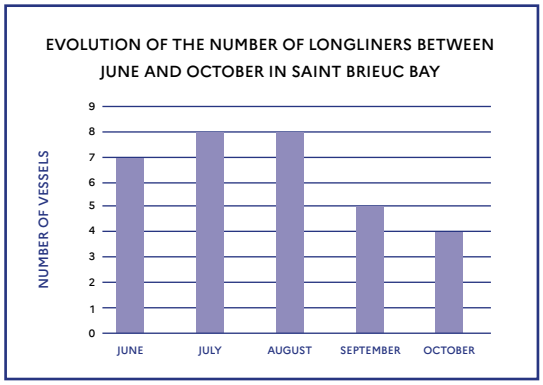


Figure 36 : Evolution of the number of longliners in Saint Brieuc Bay over the period June-October 2017 (source Valpena)

Target species

This fishing essentially targets Sea Bass, Gilthead Bream and Pollack, and to a much lesser extent Red Mullet, Mackerel, Black Seabream or Bluefin Tuna.

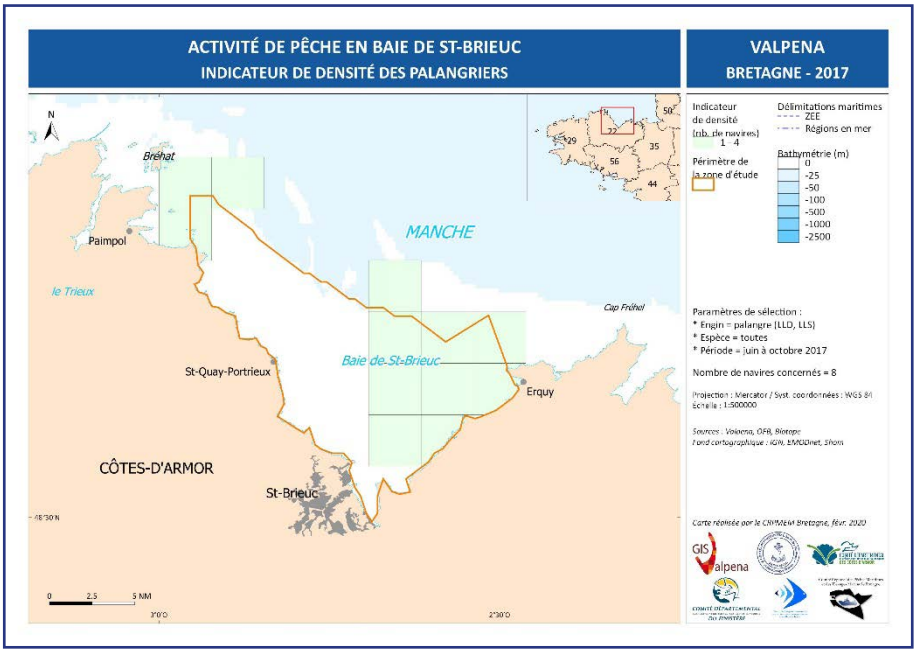
Description of the practice

The longlines are moored for between 2 and 6 hours depending on practices. The fishing takes place by day. The fishers alternately moor different longlines which they haul in successively, therefore the time spent in the water by the fishing gear rarely exceeds 6 hours.

Spatialisation of the activity

Fishing is not very intense in Saint Brieuc Bay and is located preferentially in the northwest of the study area (sector of Paimpol / Bréhat) together with the eastern half of the bay (sector Erquy / Grand Léjon). Activity is distributed homogenously, each Valpena grid square containing only 1 to 4 vessels (see map).

Figure 37 : Indicator of density of longliners in Saint Brieuc Bay (total number of vessels per grid square) over the period June-October 2017 (source Valpena).

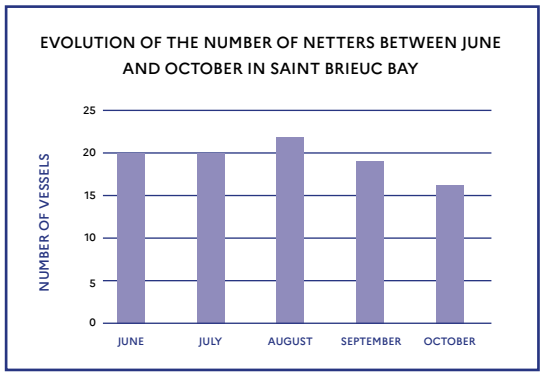


The 8 longliners are attached to several ports in Côte d'Armor: Erquy (2), Dahouët (2), Porz Even (2), Loguivy de la Mer (1), Saint-Cast-le-Guildo (1). They are small units, between 6m and 12m (average length 8.3 m). All these vessels are multi-purpose, and during the course of the year practise one or more other types of fishing (mostly: line, pot, net, drag).

2/ NETTERS (DATA VALPENA 2017 – RATE OF QUESTIONNAIRES/INTERVIEWS CÔTES-D'ARMOR 70%)

Between June and October 2017, 23 netters declared activity in the study area. They mostly used trammel nets (14 vessels) and less frequently gillnets (7 vessels) or trammel nets and gillnets combined (3 vessels, including 1 also using trammels alone). Activity is globally stable during the course of the study period, although with a reduction in the number of active vessels as from October (start of drag fishing for scallops) (see graph).

Figure 38 : Evolution of the number of netters in Saint Brieuc Bay over the period June-October 2017 (source Valpena)



Target species

The species fished are very diverse. Among the main target species are Sea Bass, Gilthead and Black Seabream, Pollack and Red Mullet. Less frequently, the fishers declare that they are fishing for Spider Crab, Dover Sole, Cuttlefish, John Dory, Plaice or Anglerfish, together with various other species.

Description of the practice

In Saint Brieuc Bay, the professionals use different types of nets in function of the target species. The nets are moored between 6 and 48, even 72, hours depending on the species fished. The length of the nets together with the mesh also vary in function of the type of net (floating gillnet, trammel or mixed) and of the species.

Spatialisation of the activity

Net fishing takes place in the whole of Saint Brieuc Bay. It is nonetheless not distributed homogenously, with an area of higher concentration of vessels in the west (sector Paimpol / Bréhat), where up to 11 vessels declared activity during the course of the period June-October. In the rest of the study area, the intensity of the practice is more limited, with 2 to 5 vessels identified in each Valpena grid square (see map).

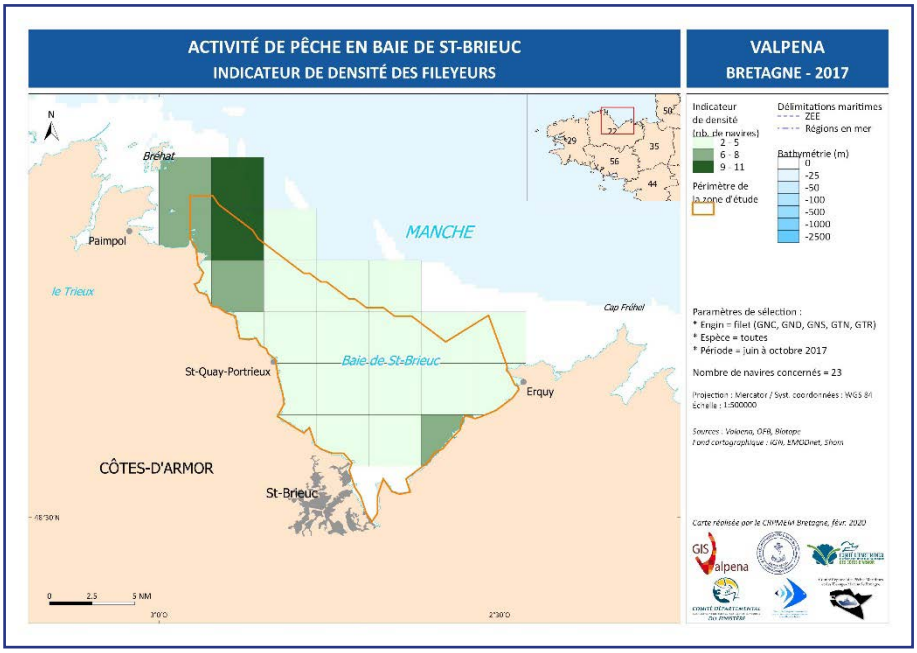


Figure 39 : Indicator of density of netters in Saint Brieuc Bay (total number of vessels per grid square) over the period June-October 2017 (source Valpena)

The netters come from the various ports around the bay: Saint-Quay Portrieux (7 vessels), Porz Even (7 vessels), Loguivy de la Mer (3 vessels), Erquy (2), Dahouët (2), Saint-Cast-le Guildo (1), Paimpol (1). They are small units, between 5m and 12m (average length 8 m). 4 of them are exclusively netters. But the other vessels are all multi-purpose and therefore practise one or more other types of fishing during the course of the year (mostly: pot, line, drag).

Onboard observers

The aim will be to respond to the specific issues of the Balearic Shearwater by ensuring sufficient sampling pressure on the longliner fleet.

For the onboard observations, 1 trained employee will be hired and hosted by AGLIA for the pilot Saint Brieuc Bay site. He/she will start work right from the launching of the project, in collaboration with CRPMEM Bretagne. His/her objective will be the observation of 5% of the vessels identified for the longliner fleet, in the high-risk period adjusted for each pilot site.

CRPMEM Bretagne will ensure technical and organisational support for the observer.

Objective: 5% of the 800 catches assessed from June-October, i.e., 40 catches observed, for vessels mainly attached to the ports of Erquy, Dahouët, Porz Even, Loguivy de la Mer, Saint-Cast-le-Guildo.

Gathering of data regarding fishing activity: measurement and description of the fishing effort, location of fishing grounds, description of the configuration and utilisation of the fishing gear (fish targeted, steps in fishing operations, types of baits, etc.), sea state and weather conditions.

Gathering of data regarding bycatch: counting of the birds observed, description of the interactions observed, number of bait attacks observed, distance of bait attacks from the vessel, catch details (species, location, fishing step – laying or hauling in – time of day, position of the hook on the captured bird, photo of the bird, etc.).

Questionnaires/interviews with fishers :

The questionnaires/interviews will aim to characterise the interactions between the types of fishing practised and the Balearic Shearwater, to assess the rate of bycatch by type of fishing gear and any avoidance strategies already used, while informing and raising the fishers' awareness about the issue.

For the questionnaires/interviews, 1 trained employee will be hired and hosted by AGLIA. He/she will start work in the Saint Brieuc Bay pilot site right from the launching of the project, in collaboration with CRPMEM Bretagne. The intended objective will be to achieve 30 % of vessels questioned out of those identified by pilot site and by target fleet (longliners, trammel netters and gillnetters, purse seiners).

Objectif : 30% of the 8 longliners (i.e., 3 vessels) and of the 23 netters (i.e., 8 vessels), mainly attached to the ports of Erquy, Dahouët, Porz Even, Loguivy de la Mer, Saint-Cast-le-Guildo, Saint Quay-Portrieux, Paimpol.

GEOGRAPHICAL LOCATION

- Fishing ports of the boat registration districts of the vessels operating in Saint Brieuc Bay: Lézardrieux, Loguivy, Pors Even, Paimpol, St-Quay Portrieux, Dahouet, Erquy, St-Cast-le-Guildo ...
- Saint Brieuc Bay : delimited by the Bréhat archipelago and Cap Fréhel.

LINK WITH OTHER ACTIONS

- Other actions to characterise fishing interactions (Atlantic).
- Action files linked to the CARI3P programme.
- OBSenMER/ECHOSEA action file.

MONITORING AND ASSESSMENT INDICATORS

- Number of interviews or questionnaires and ports questioned, and %age attained.
- Number of onboard observation surveys.
- %age of onboard observation pressure (in %catches/fleet).
- Number of birds captured.
- Rate of bycatch and mortality rate.

DELIVERABLES EXPECTED (INCLUDING MAPS)

For the questionnaires/interviews :

- report presenting the various interviews carried out for the 2 types of fishing gear targeted (transmission of the completed questionnaires) ;
- assessment report on the interviews characterising interactions by pilot site (analysis of the responses derived from the interviews) ;
- recommendations on sampling by onboard observers.

For the onboard observers :

- a descriptive assessment of each of the onboard surveys by pilot site covering the expected information ;
- the data entered in OBSenMER ;
- the number of catches sampled and type of fishing ;
- number and nature of the bycatch identified ;
- an overall assessment of the 2 years of surveys, summarising the main data derived from the onboard observations, in terms of interaction with the Balearic Shearwater.

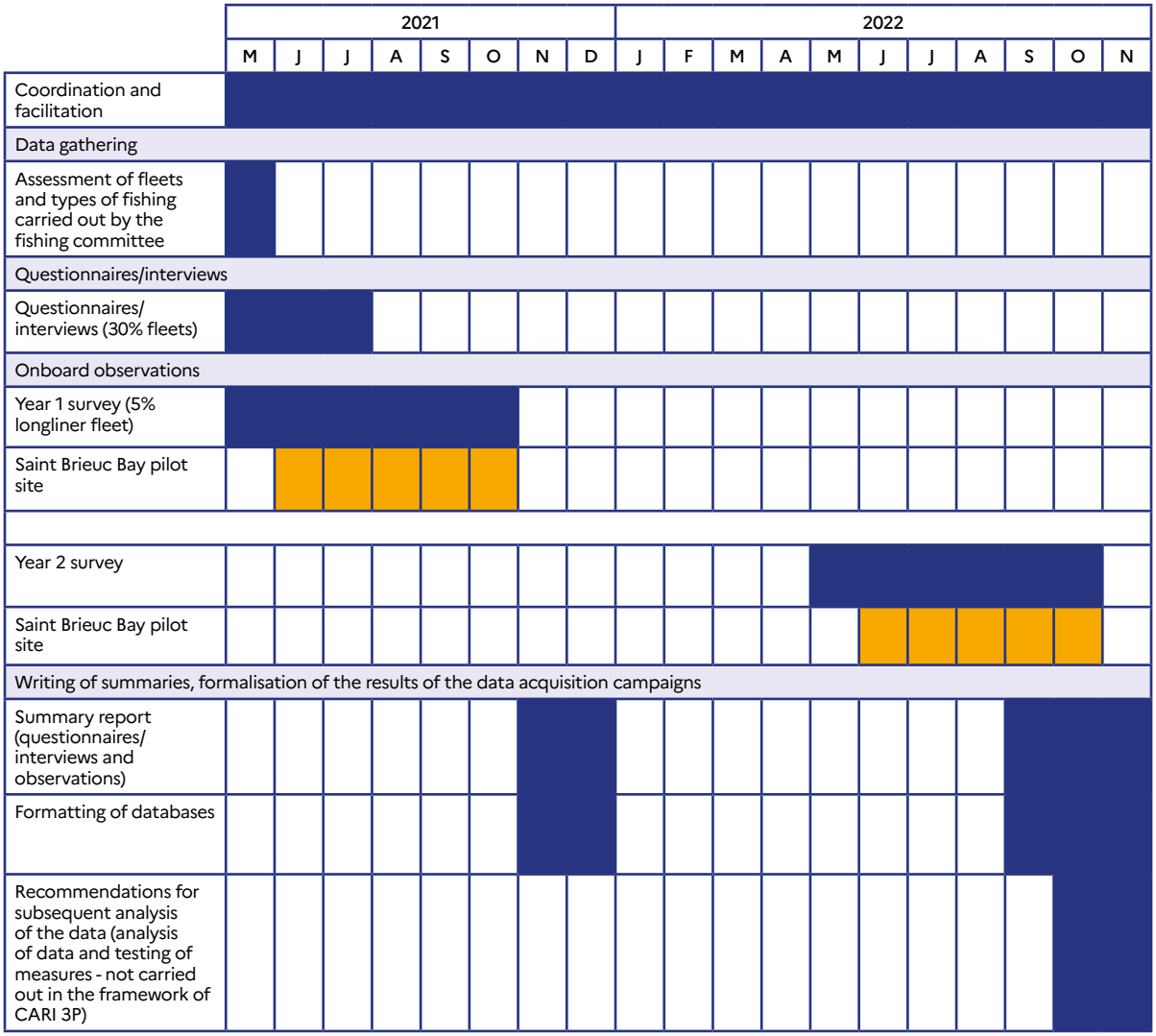
STAKEHOLDERS AND ORGANISATIONS MOBILISED

- operator/Service provider: to be defined ;
- partners: CRPM Bretagne, CDPM 22, DIRM NAMO, Natura 2000 managing authorities concerned ;
- associated partners: OFB, DREAL Bretagne ;

ESTIMATED BUDGET AND FUNDING SOURCES AVAILABLE

Funding –OFB (+ remainder DREAL Bretagne) – Estimated budget = 78 000 €.

PROVISIONAL SCHEDULE



BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

Genovart & al., 2016, Cortes & al., 2017 and 2018, Boué & al., 2013, Boué et al., Oliveira & al, 2015, Summary of the Spanish CSWG 2017.

CHARACTERISATION OF INTERACTIONS WITH PROFESSIONAL FISHING SECTOR BRITTANY – IROISE SEA

CODE 2.2 PRIORITY 1

GENERAL OBJECTIVES OF THE ACTION

Enhance knowledge about bycatch of Balearic Shearwater in French territorial Atlantic waters by professional fishing.

OPERATIONAL OBJECTIVES OF THE ACTION

Set up specific procedures aiming to characterise and quantify the rate of bycatch of Balearic Shearwater by potentially high-risk fisheries in the sector of the Iroise Sea off Brittany.

CONTEXT AND GENERAL DESCRIPTION OF THE ACTION

The Balearic Shearwater, whose total population is estimated at 25 000 individuals, is endangered with extinction and the latest demographic models tend to show that it will have effectively disappeared within 60 years. They also show that the adult survival rate is excessively low, mainly explained by significant mortality due to bycatch from professional fishing. The current impact of bycatch on the species, accounting for at least 45% of the current adult mortality rate, is now considered as incompatible with its survival (Genovart et al., 2016). But it must be possible to inverse this trend by acting on the factors which lead to this bycatch.

The knowledge about bycatch regarding the Balearic Shearwater comes from Spain and Portugal, where characterisation studies and even tests of reduction measures with specific procedures have been implemented.

In the Atlantic, Portuguese studies showed that, in their waters, the most problematic fishing techniques for the Balearic Shearwater seem to be :

- small coastal multi-purpose boats which fish using demersal longlines or nets (gillnet + trammel). Rate of Balearic Shearwaters killed/yr 1660 ;
- purse seine fishing, used to catch small pelagic fish such as the sardine. Rate of Balearic Shearwaters killed/yr 368.

The action developed here aims to implement procedures to characterise interactions (bycatch) with French Atlantic fisheries, within pilot sites selected with regard to the probability of presence of the species and the predominant fishing activities..

The monitoring operations and studies carried out in the Atlantic identified the hotspots of presence along the French coasts. In 2019, a habitat model was produced on the basis of protocol-based observations at sea compiled over the period 2002-2018.

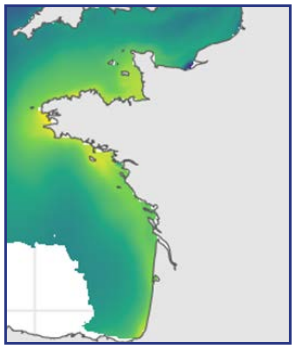


Figure 33 : Mean annual of the density of shearwaters (2017). Logarithmic scale to assess the nuances of density over a broad range of magnitudes.

Hotspots of presence of the species in France :

- Normandy-Brittany Gulf
- Northern Brittany coast
- **Iroise Sea**
- Mor Braz
- Vendée coast / Île d'Yeu Southern Landes Shelf / Gouf de Capbreton

In the Atlantic, the species is mainly present from May to October.

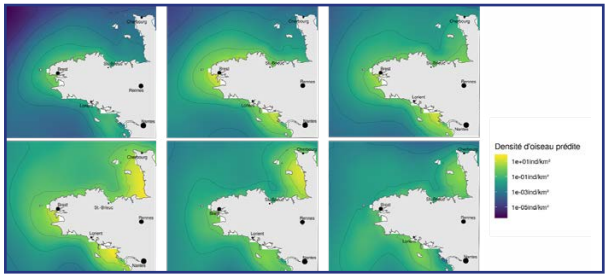


Figure 34 : Details of the evolution of abundance in the Brittany sector between May and October

In the framework of the NAP, the CARI3P programme was submitted to the EMFAF for the funding of a programme covering 3 pilot sites: Mor Braz, the Île d'Yeu sector and the Gulf of Lion. This project will be carried out in collaboration with the CRPMEM concerned by the 3 pilot sites, and the OFB as technical partner. It breaks down into two distinct actions which aim at precisely characterising interactions by means of 2 complementary methods :

1. Assessment of the fleets on each pilot site and development of questionnaires/ interviews for the fishers (nets, longlines and surrounding pelagic seines). The targeted objective is to cover 30 % of the vessels identified in the 3 study sectors.
2. Placing onboard observers on the longliners, over 2 seasons. The targeted objective is to cover at least 5 % of the catches of the boats concerned (longline fishing).

The action here consists in adding the "Iroise Sea" pilot site to this programme, under the same conditions as CARI3P, seeking funding aimed at completing the onboard survey campaign which will be launched by the PNMI in 2021. This PNMI campaign targets firstly netters and to a lesser extent longliners. The NAP will therefore complete the observation pressure on longliners to achieve the 5 % (by providing one extra observer in 2021 and of two observers in 2022).

DETAILED DESCRIPTION OF THE ACTION AND THE OPERATIONS TO BE CARRIED OUT

Setting up procedures and programmes to characterise/quantify any bycatch of Balearic Shearwater in the following ways :

- questionnaires/interviews with fishers ;
- onboard observers.

The programmes will primarily target the period (May) June-October (November).

The types of fishing considered to pose an interaction risk within the Iroise Sea are :

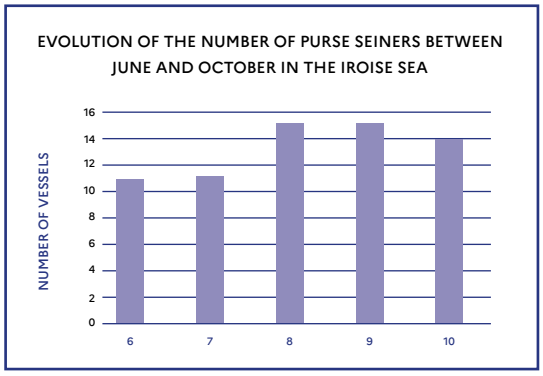
- **purse seiners ;**
- **netters ;**
- **longliners.**

SUMMARY DESCRIPTION OF FISHING PRACTICES IN THE PERIOD OF PRESENCE OF BALEARIC SHEARWATER IN THE SECTOR OF THE IROISE SEA

1/ PURSE SEINERS (DATA VALPENA 2017 – RATE OF QUESTIONNAIRES/ INTERVIEWS FINISTÈRE 80 %)

Between June and October 2017, 15 purse seiners declared activity in the study area (PNMI easement). Over the period, the number of active vessels is highest at the end of the season summer. (see graph).

Figure 40 : Evolution of the number of purse seiners in the Iroise Sea over the period June-October 2017 (source Valpena)



Target species

Mainly small pelagic fish - sardines form the vast majority of catches - but also anchovies and horse mackerel and more occasionally Black Seabream or Common Pandora.

Description of the practice

- Fishing at night (from nightfall to early morning).
- The target species being gregarious pelagic fish, the shoals are located and targeted by acoustic methods (sonar, echo-sounder) then the seine net is cast in order to encircle the shoal or school. The seine net is then hauled in and brought alongside the vessel.
- The catch is emptied from the seine net by means of a brail net (a sort of large dip net) then stored in refrigerated tanks.

Spatialisation of the activity

The frequentation of the Iroise Sea by purse seiners is, over the period considered, rather coastal and mainly between the south of the archipelago of Molène and the north of Cap Sizun as well as to the west and south of the Chaussée de Sein and in Douarnenez Bay.

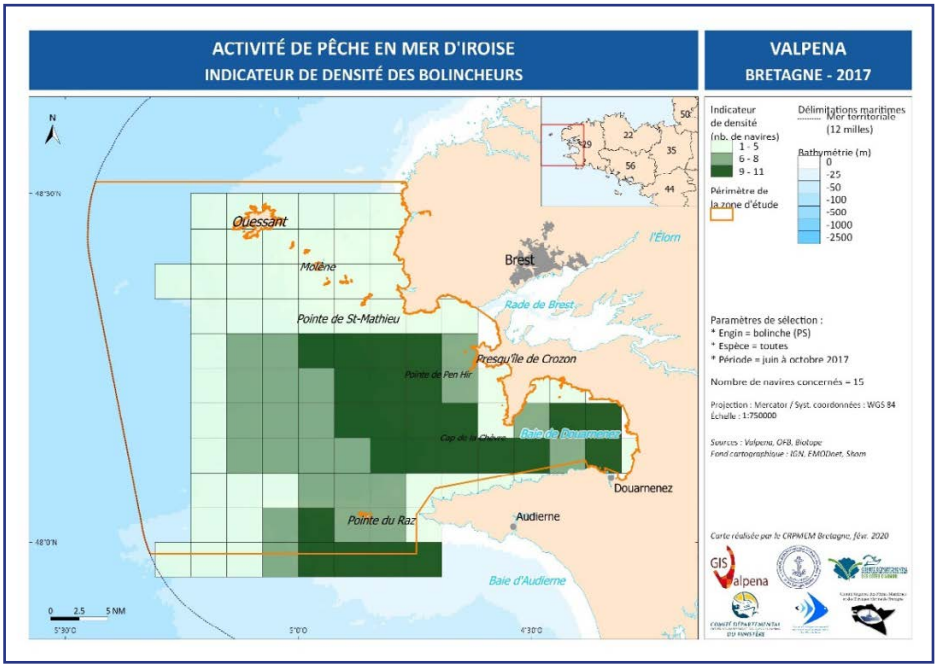


Figure 41 : Indicator of density of purse seiners in the Iroise Sea (total number of vessels per grid square) over the period June-October 2017 (source Valpena)

The vessels represented here are from the ports of Pays Bigouden (Saint Guénolé and Le Guilvinec) and Concarneau.

2/ LONGLINERS (DATA VALPENA 2017 – RATE OF QUESTIONNAIRES/INTERVIEWS FINISTÈRE 80 %)

Between June and October 2017, 20 longliners declared activity in the study area. They essentially use bottom longlines. The stable number of active vessels in the period was between 11 and 13 vessels (see graph).

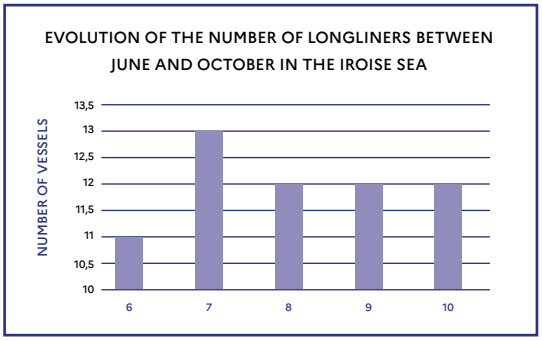


Figure 42 : Evolution of the number of longliners in the Iroise Sea over the period June-October 2017 (source Valpena)

Target species

Summer activity targeting mainly Sea Bass, Black Seabream, Pollack, Gilthead Bream and Conger.

Description of the practice

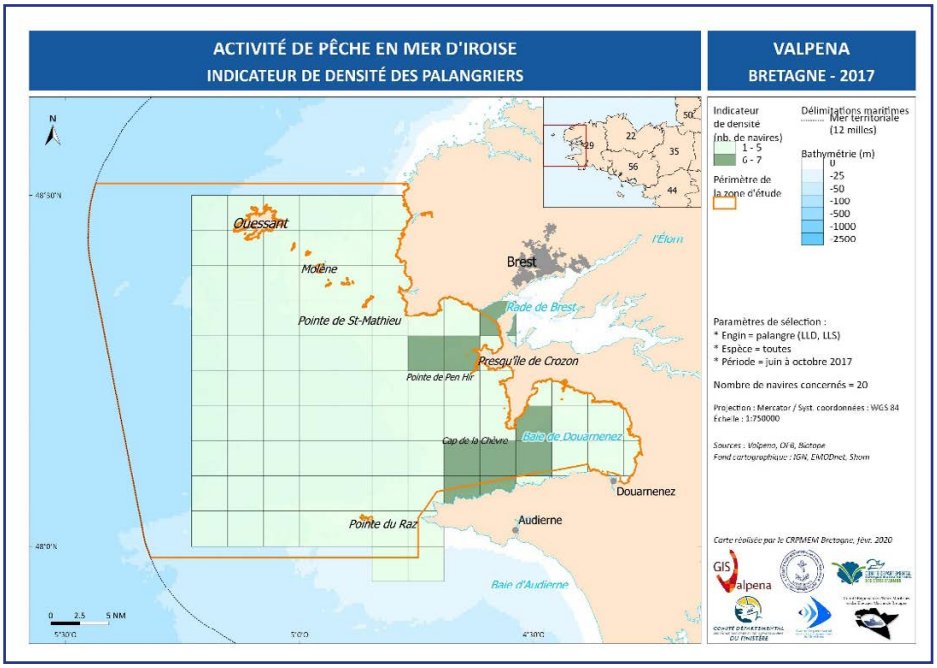
- The longline is fixed or placed for a few hours or for a whole night.
- Fishing by day with live bait (sand eels) for Sea Bass or with sardines or other bait for the other species.
- Low-ballast longline (slow descent) of small size (30 to 40 hooks), seabeds approximately 20m.
- The catch is hauled onboard, removed from the hooks and packed in boxes.

Spatialisation of the activity

The frequentation of the Iroise Sea by longliners is, over the period considered, rather coastal and mainly between the harbour of Brest, the peninsula of Crozon and close to Douarnenez Bay.

Figure 43 : Indicator of density of longliners in the Iroise Sea (source Valpena)

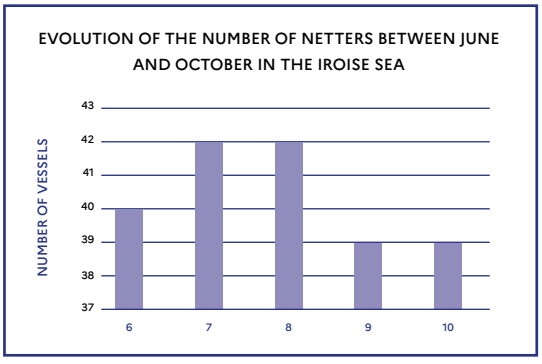
The vessels represented here are from the ports of the Pays de Brest (Camaret, Brest) Pays de Bigouden (Saint-Guénolé and Le Guilvinec) Audierne and Douarnenez.



2/ NETTERS (DATA VALPENA 2017 – RATE OF QUESTIONNAIRES/INTERVIEWS FINISTÈRE 80 %)

Between June and October 2017, 49 netters declared activity in the study area. Net fishing is performed by means of trammels or gillnets. Activity is globally stable during the course of the study period, between 39 and 43 vessels (see graph).

Figure 44 : Evolution of the number of netters in the Iroise Sea over the period June-October 2017 (source Valpena)



Target species

- Trammels: flatfish, Anglerfish, Dover Sole, Ray, Brill …
- Gillnets: Red Mullet, Whiting, Coley.

Description of the practice

- The nets are used on seabeds as deep as 120 m during neap tides (tide coefficient less than 70). The types of fishing gear to be considered r the framework of the study of interactions with the Balearic Shearwater are those mentioned below.

- Trammel nets of small size (height<1m) targeting flatfish (sole), on seabeds of 20m to 30m.
- Gillnets (or floating gillnets), height 1 to 4m, on small seabeds (approximately 10m). They target Red Mullet, Whiting and Coley.

Spatialisation of the activity

The frequentation of the Iroise Sea by netters is, over the period considered, rather coastal and mainly between the mouth of the harbour of Brest, Douarnenez Bay and Pointe du Raz.

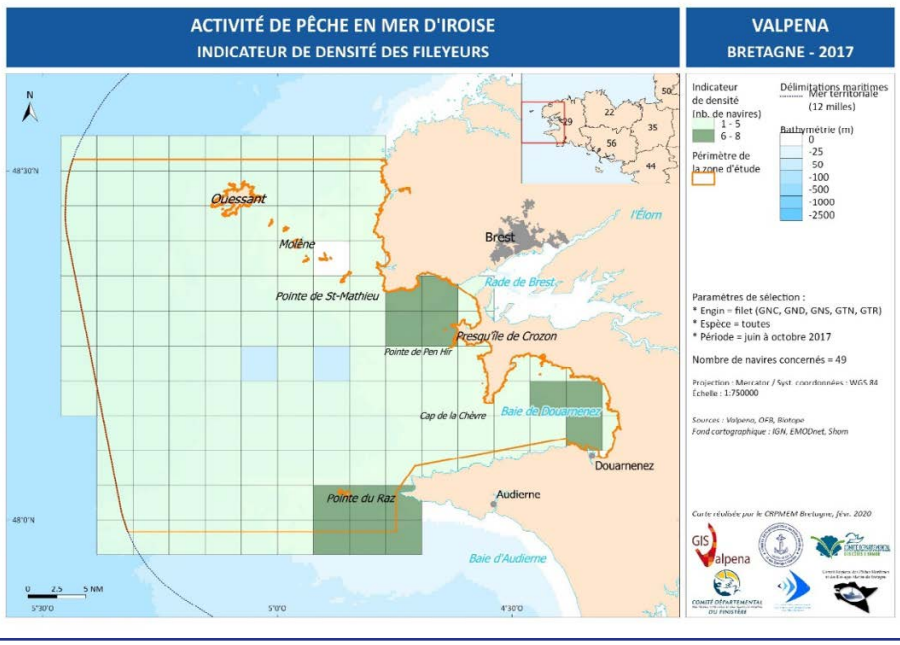


Figure 45 : Indicator of density of netters in the Iroise Sea (source Valpena)

The vessels represented here are mainly from the ports of the Pays de Brest (Le Conquet, Camaret, Brest, Molène …) Audierne, Douarnenez and the Pays de Douarnenez.

Onboard observers

The operation will be based on the 2021 PNMI observation programme, extending the programme so as to complete the resources/funding dedicated to observations. The aim will be to respond to the specific issues of the Balearic Shearwater by increasing the sampling pressure on longliners. For the onboard observations, 1 trained employee will be hired and hosted by AGLIA for the Iroise Sea pilot site. He/she will start work right from the launching of the project, in collaboration with CRPMEM Bretagne. His/her objective will be the observation of 5% of the vessels identified for the longliner fleet, in the high-risk period adjusted for each pilot site.

CRPMEM Bretagne will provide technical and organisational support for the observer.

Objective: 5% of the 2000 catches from June-October, i.e., 100 catches observed, for vessels mainly attached to the ports of Brest, Camaret, Saint-Guénolé, Le Guilvinec, Audierne, Douarnenez.

Gathering of data regarding fishing activity: measurement and description of the fishing effort, location of fishing grounds, description of the configuration and utilisation of the fishing gear (fish targeted, steps in fishing operations, types of baits, etc.), sea state, weather conditions.

Gathering of data regarding bycatch: counting of the birds observed (photos taken), description of the interactions observed, number of bait attacks observed, distance of bait attacks from the vessel, catch details (species, location, fishing step – casting or hauling in – time of day, position of the hook on the captured bird, etc.).

Questionnaires/interviews with fishers

The questionnaires/interviews will aim to characterise the interactions between the types of fishing practised and the Balearic Shearwater, to evaluate the rate of bycatch by type of fishing gear and any avoidance strategies already used, while informing and raising the fishers' awareness about the issue.

For the questionnaires/interviews, 1 trained employee will be hired and hosted by AGLIA. He/she will start work in the pilot site Iroise Sea right from the launching of the project, in collaboration with CRPMEM Bretagne. The intended objective will be to achieve 30 % of vessels questioned out of those identified by pilot site and by target fleet (longliners, trammel netters and gillnetters, purse seiners).

Objective: 30% of the 20 longliners (i.e., 7 vessels), of the 49 netters (i.e., 16 vessels) and of the 15 purse seiners (i.e., 5 vessels), mainly attached to the ports of Brest, Molène, Le Conquet, Camaret, Saint-Guénolé, Le Guilvinec, Audierne, Douarnenez.

GEOGRAPHICAL LOCATION

- Fishing ports of the boat registration districts of the vessels operating in the Iroise MNP: Brest, Molène, Le Conquet, Camaret, Saint-Guénolé, Le Guilvinec, Audierne, Douarnenez.
- Perimeter of the PNMI.

LINK WITH OTHER ACTIONS

- Other actions to characterise fishing interactions (Atlantic).
- Action files linked to the CARI3P programme.
- OBSenMER/ECHOSEA action file.
- Number of interviews or questionnaires and ports questioned, and %age attained.
- Number of onboard observation surveys.
- %age of onboard observation pressure (in %catches/fleet).
- Number of birds captured.
- Rate of bycatch and mortality rate.

DELIVERABLES EXPECTED (INCLUDING MAPS)

For the questionnaires/interviews :

- report presenting the various interviews carried out for the 3 types of fishing gear targeted (transmission of the completed questionnaires) ;
- assessment report on the interviews characterising interactions by pilot site (analysis of the responses derived from the interviews) ;
- recommendations on sampling by onboard observers.

For the onboard observers :

- a descriptive assessment of each of the onboard surveys by pilot site covering the expected information ;
- the data entered in OBSMER ;
- the number of catches sampled and type of fishing ;
- number and nature of the bycatch identified ;
- an overall assessment of the 2 years of surveys, summarising the main data derived from the onboard observations, in terms of interaction with the Balearic Shearwater.

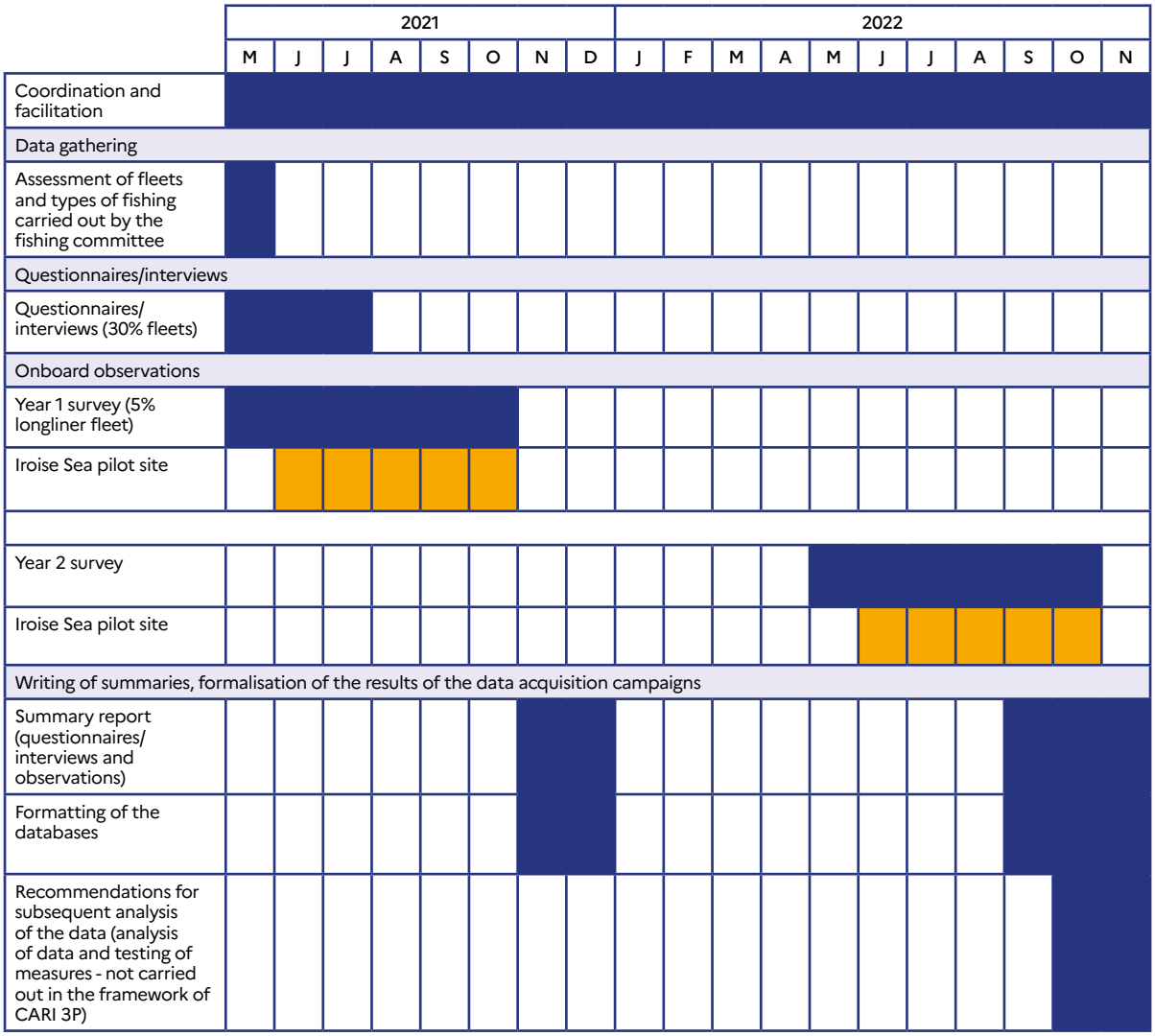
STAKEHOLDERS AND ORGANISATIONS MOBILISED

- Operator/Service provider: to be defined.
- Partners: Iroise MNP, CRPMEM Bretagne, CDPM 29, DIRM.
- Associated partners: OFB, DREAL Bretagne.

ESTIMATED BUDGET AND FUNDING SOURCES AVAILABLE

Intended option: Dedicated call for tender (OFB) – estimated budget = 130 000 €.

PROVISIONAL SCHEDULE



BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

Genovart & al., 2016, Cortes & al., 2017 and 2018, Boué & al., 2013, Boué et al., Oliveira & al, 2015, Summary of the Spanish CSWG 2017.

CHARACTERISATION OF INTERACTIONS WITH PROFESSIONAL FISHING SECTOR BRITTANY – MOR BRAZ

CODE 2.3 PRIORITY 1

GENERAL OBJECTIVES OF THE ACTION

Enhance knowledge about bycatch of Balearic Shearwater in French territorial Atlantic waters by professional fishing.

OPERATIONAL OBJECTIVES OF THE ACTION

Set up specific procedures aiming to characterise and quantify the rate of bycatch of Balearic Shearwater by potentially high-risk fisheries in the sector of Mor Braz in Brittany.

CONTEXT AND GENERAL DESCRIPTION OF THE ACTION

The Balearic Shearwater, whose total population is estimated at 25 000 individuals, is endangered with extinction and the latest demographic models tend to show that it will have effectively disappeared within 60 years. They also show that the adult survival rate is excessively low, mainly explained by significant mortality due to bycatch from professional fishing. The current impact of bycatch on the species, accounting for at least 45% of the current adult mortality rate, is now considered as incompatible with its survival (Genovart et al., 2016). But it must be possible to inverse this trend by acting on the factors which lead to this bycatch.

The knowledge about bycatch regarding the Balearic Shearwater comes from Spain and Portugal, where characterisation studies and even tests of reduction measures with procedures specific were implemented.

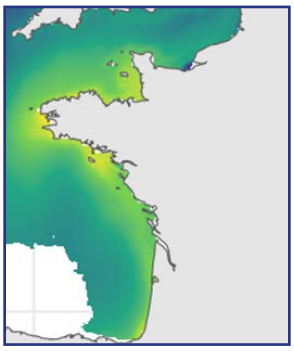
In the Atlantic, Portuguese studies showed that, in their waters, the most problematic fishing techniques for the Balearic Shearwater seem to be :

- **small coastal multi-purpose boats which fish using demersal longlines or nets (gillnet + trammel)**. Rate of Balearic Shearwaters killed/yr 1660 ;
- **purse seine** fishing, used to catch small pelagic fish such as the sardine. Rate of Balearic Shearwaters killed/yr 368.

The action developed here aims to implement procedures to characterise interactions (bycatch) with French Atlantic fisheries, within pilot sites selected with regard to the probability of presence of the species and the predominant fishing activities.

The monitoring operations and studies carried out in the Atlantic identified the hotspots of presence along French coasts. In 2019, a habitat model was produced on the basis of protocol-based observations at sea compiled over the period 2002-2018.

Figure 33 : Mean annual of the density of shearwaters (2017). Logarithmic scale to assess the nuances of density over a broad range of magnitudes.

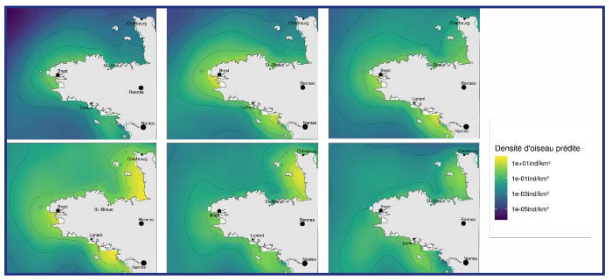


Hotspots of presence of the species in France :

- Normandy-Brittany Gulf
- Northern Brittany coast
- Iroise Sea
- **Mor Braz**
- Vendée coast / Île d'Yeu
- Southern Landes Shelf / Gouf de Capbreton

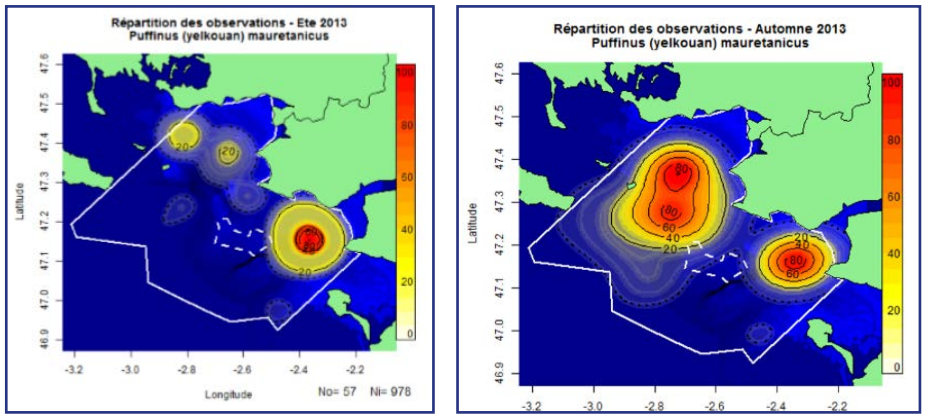
In the Atlantic, the species is mainly present as from the month of May and until the month of October.

Figure 34 : Details of the evolution of abundance in the Brittany sector between May and October



In the framework of the NAP, the CARI3P programme was submitted to the EMFAF for the funding of a programme covering 3 pilot sites: Mor Braz, the sector Île d'Yeu SPA and the Gulf of Lion.

Figure 46 : Geostatistical representation of the densities of Balearic Shearwater in the sector Mor Braz in 2013 (EDFRE / Périscope; 2015)



This project headed by AGLIA will be carried out in collaboration with the CRPMEM concerned by the 3 pilot sites, and the OFB as technical partner. It breaks down into two distinct actions which aim at precisely characterising interactions by means of 2 complementary methods :

1. Assessment of the fleets on each pilot site and development of questionnaires/ interviews for the fishers (nets, longlines and surrounding pelagic seines). The targeted objective is to cover 30 % of the vessels identified in the 3 study sectors.
2. Placing onboard observers on the longliners, over 2 seasons. The targeted objective is to cover at least 5 % of the catches of the boats concerned (longline fishing).

The action here consists in presenting the actions of the pilot site "Mor Braz" included in this CARI3P programme.

Setting up procedures and programmes to characterise/quantify any bycatch of Balearic Shearwater in the following ways :

- questionnaires/interviews with fishers ;
- onboard observers.

The programmes will primarily target the period (May) August-October (November).

The types of fishing considered to pose an interaction risk within Mor Braz are :

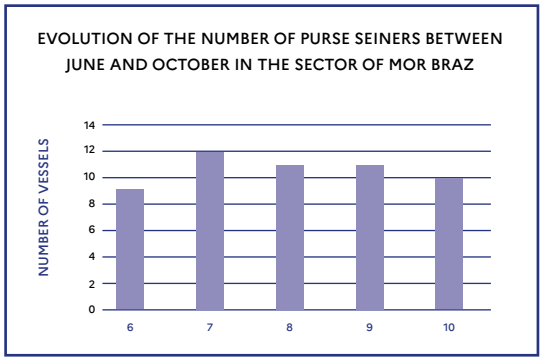
- **purse seiners ;**
- **netters ;**
- **longliners.**

SUMMARY DESCRIPTION OF FISHING PRACTICES IN THE PERIOD OF PRESENCE OF BALEARIC SHEARWATER IN THE SECTOR OF MOR BRAZ

1/ PURSE SEINERS (DATA VALPENA 2017 – RATE OF QUESTIONNAIRES/ INTERVIEWS 82% IN PAYS DE LOIRE / 80% IN MORBIHAN)

Between June and October 2017, 12 purse seiners declared activity in the study area. Over the period, the number of active vessels is stable over the period (between 9 and 12 vessels). (see graph).

Figure 47 : Evolution of the number of purse seiners in the sector of Mor Braz over the period June October 2017 (source Valpena)



Target species

Mainly small pelagic fish - sardines make up the vast majority of catches - but also anchovies and horse mackerel and more occasionally Black Seabream or Common Pandora.

Description of the practice

- Fishing at night (from nightfall to early morning).
- The species targeted being gregarious pelagic fish, the shoals are located and targeted by acoustic methods (sonar, echo-sounder) then the purse seine is cast in order to encircle the shoal or school. The purse seine is then hauled in and brought alongside the vessel.
- The catch is emptied from the purse net by means of a brail net (a sort of large dip net) then stored in refrigerated tanks.

Spatialisation of the activity

The frequentation of Mor Braz by purse seiners is, over the period considered, concentrated in the western part of the study sector. The greatest densities are situated in the grid squares which intersect the furthest limit of the study sector from the coast and the area between the islands of Houat-Hoëdic and Belle-Île.

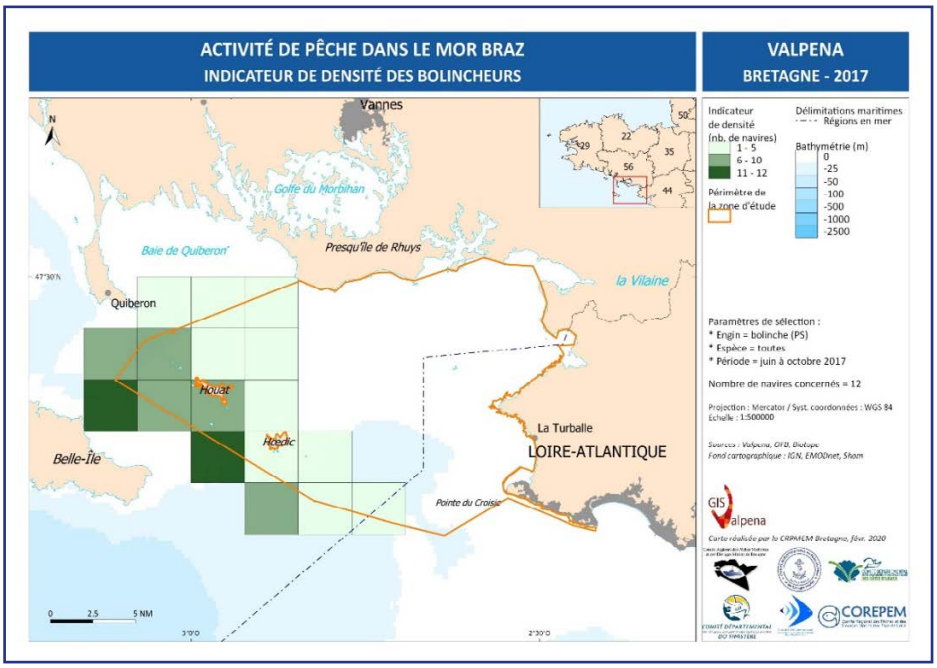


Figure 48 : Indicator of density of purse seiners in Mor Braz (total number of vessels per grid square) over the period June-October 2017 (source Valpena)

Most of the vessels represented here are from the ports of the Pays Bigouden (Saint-Guénolé and Le Guilvinec) and Concarneau. One vessel is based in Quiberon.

2/ LONGLINERS (DATA VALPENA 2017 – RATE OF QUESTIONNAIRES/INTERVIEWS 82% IN PAYS DE LOIRE / 80% IN MORBIHAN)

Between June and October 2017, 40 vessels declared longline activity in the study area. Both the bottom longline and floating longline (bao) are used. 20 vessels use exclusively the longline in the period whereas the other 20 practise a mixed activity. The number of active vessels is relatively stable over the period July-October (between 33 and 37 vessels). It is lower in June with 28 vessels (see graph).

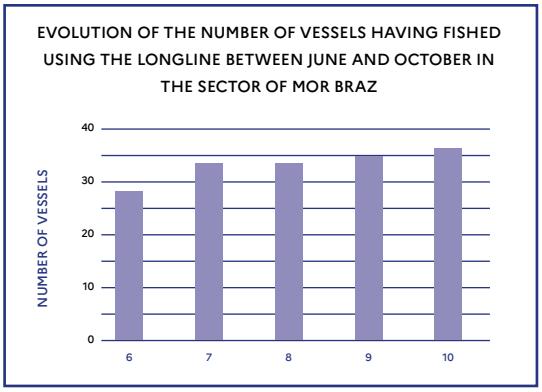


Figure 49 : Evolution of the number of vessels having fished using the longline in the sector of Mor Braz over the period June-October 2017 (source Valpena)

Target species

In the study period, activity targeting mainly Sea Bass, Pollack, Black Seabream and Conger.

Description of the practice

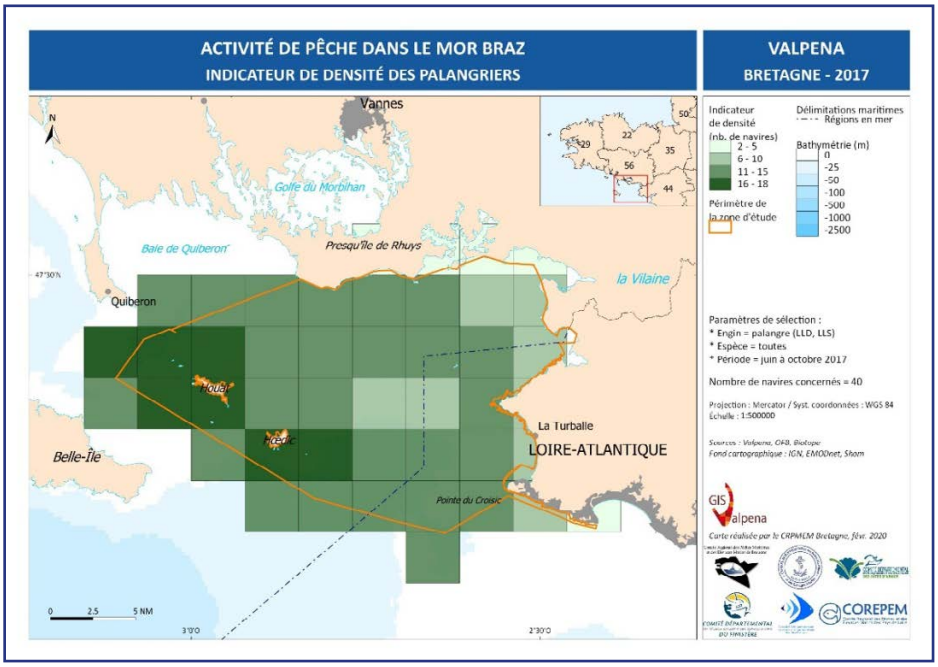
The longlines are cast in the morning for a few hours. They are baited as they are being cast with live or dead bait, preferentially sand eels when the target is Sea Bass. They can be held immobile on of loose seabeds or maintained between two tides by means of floaters fixed at regular intervals on the mother line (bao). Conger is only targeted with bottom longlines. These longlines are ballasted on the seabed with of weights positioned at regular intervals on the mother line, then at each extremity by an anchor. They are left in the water for about ten hours and hauled in once a day.

Spatialisation of the activity

The whole of the study sector is frequented by longliners with a higher density in the sector of the islands of Mor Braz and a lower density in the grid squares situated on the coast in the eastern part.

Figure 50 : Indicator of density of longliners in Mor Braz (total number of vessels per grid square) over the period June-October 2017 (source Valpena)

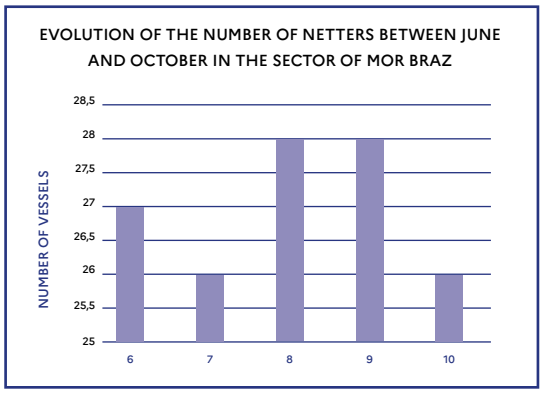
The vessels represented here are from the ports of Quiberon, the islands of Houat, Hoëdic, Belle-Île and Noirmoutier together with of La Turballe and Le Croisic. Less represented some vessels come from Lorient, La Trinité-sur-mer, Mesquer, Sarzeau and Locmariaquer.



3/ NETTERS (DATA VALPENA 2017 – RATE OF QUESTIONNAIRES/INTERVIEWS 82% IN PAYS DE LOIRE / 80% IN MORBIHAN)

Between June and October 2017, 37 netters declared activity in the study area. Net fishing is performed by means of trammels or gillnets. Activity is globally stable during the course of the study period, between 26 and 28 vessels (see graph).

Figure 51 : Evolution of the number of netters in the sector of Mor Braz over the period June-October 2017 (source Valpena)



Half of the fleet exclusively net-fished over the period whereas the other half practised a mixed activity (mainly net-pot or net-longline).

Target species

The most net-fished species (trammel and floating gillnet combined) are Red Mullet and Sea Bass, followed by Dover Sole, Gilthead Bream and Black Seabream and, to a lesser extent, Grey Mullet.

Description of the practice

- Net-fishing is practised all year in the sector, more in winter for the floating gillnet and more in summer for the trammel net.
- Depending on the species targeted, the gear is settled on loose or hard seabeds. The nets are hauled in every day. Sometimes they are cast and hauled in in the space of two hours for certain very fragile species. Activity is significantly lower in the neap tide period when the coefficient exceeds 85 and the current becomes too high, as well as in the case of gales and strong swells.

Spatialisation of the activity

The activity is performed on the whole of the study area, but with a significantly higher density of vessels off the Vilaine Estuary, south of the peninsula of Ruys and around the islands of Mor Braz. The observation or declaration procedures will primarily target the vessels which work significantly within the sectors dense in Balearic Shearwater (see map).

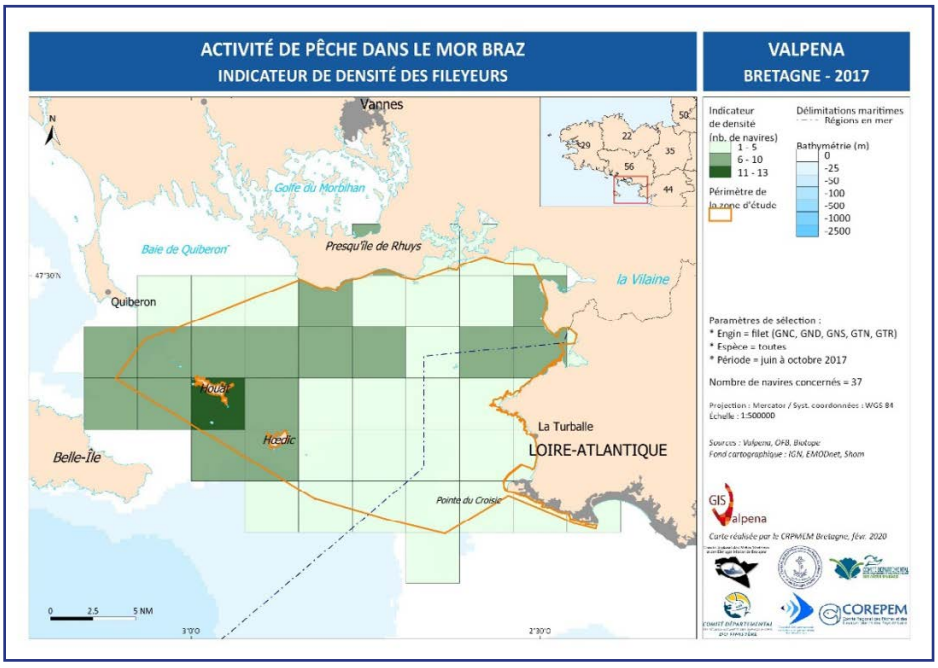


Figure 52 : Indicator of density of netters in Mor Braz (total number of vessels per grid square) over the period June-October 2017 (source Valpena)

The vessels represented here are mainly from the ports of the Morbihan (32 vessels out of 37): Quiberon, the islands of Houat, Hoëdic, Belle-Île and to a lesser extent the ports of Lorient, the Gulf of Morbihan, Pénestin, Billiers, Locmariaquer, La Turballe, Piriac-sur-mer or Le Pouliguen.

The programmes will primarily target the period (May) August-October (November), therefore netters working with the trammel net.

Questionnaires/interviews with fishers

The questionnaires/interviews will aim to characterise the interactions between the types of fishing used and the Balearic Shearwater, to evaluate the rate of bycatch by type of fishing gear and any avoidance strategies already used, while informing and raising the fishers' awareness about the issue.

For the questionnaires/interviews, 2 trained employees will be hired and hosted by AGLIA. They will work within the Mor Braz pilot site (and also the Île d'Yeu sector) right from the launching of the project, in collaboration with CRPMEM Bretagne and the COREPEM. The intended objective will be to achieve 30 % of vessels questioned out of those identified by pilot site and by target fleet (longliners, trammel netters and gillnetters, purse seiners).

CRPMEM Bretagne and COREPEM will provide technical and organisational support to the interviewers for the pilot sites of their area.

Objective: 30% of the 20 longliners (i.e., 7 vessels), of the 37 netters (i.e., 12 vessels) and of the 12 purse seiners (i.e., 4 vessels), mainly attached to the ports of Quiberon, the islands of Houat, Hoëdic, Belle-Île and Noirmoutier together with La Turballe and Le Croisic. Less nulerous, some vessels come from Lorient, La Trinité-sur-mer, Mesquer, Sarzeau and Locmariaquer.

Onboard observers

The aim will be to respond to the specific issues of the Balearic Shearwater by ensuring sufficient sampling pressure on the longliner fleet.

For the onboard observations, 2 trained employees will be hired and hosted by AGLIA for the pilot sites Mor Braz and Île d'Yeu. They will work right from the launching of the project, in collaboration with CRPMEM Bretagne and the COREPEM. Their objective will be the observation of 5% of the vessels identified for the longliner fleet, in the high-risk period adjusted for each pilot site.

CRPMEM Bretagne and the COREPEM will provide technical and organisational support for the observer.

Objective: 5% of the 2000 catches from June-October, i.e., 100 catches observed, for vessels mainly attached to the ports of Quiberon, the islands of Houat, Hoëdic, Belle-Île and Noirmoutier together with La Turballe and Le Croisic.

Gathering of data regarding fishing activity: measurement and description of the fishing effort, location of fishing grounds, description of the configuration and utilisation of the fishing gear (fish targeted, steps in fishing operations, types of baits, sea state, weather conditions, etc.)

Gathering of data regarding bycatch: counting of the birds observed (photos taken), description of the interactions observed, number of attacks on bait observed, distance of bait attacks from the vessel, catch details (species, location, fishing step – casting or hauling in – time of day, position of the hook on the captured bird, etc.).

GEOGRAPHICAL LOCATION

- Fishing ports of the boat registration districts of the vessels operating in Mor Braz : Quiberon, Houat, Hoëdic, Belle-Île and Noirmoutier, La Turballe, Le Croisic (+Lorient, La Trinité-sur-mer, Mesquer, Sarzeau and Locmariaquer...).
- Mor Braz : sector delimited by the peninsula of Quiberon to the west, by Carnac, the peninsula of Rhuys, Damgan and the Vilaine Estuary to the north and by Guérande to the east.

LINK WITH OTHER ACTIONS

- Other actions to characterise fishing interactions (Atlantic).
- Action files linked to the CARI3P programme.
- OBSenMER/ECHOSEA action file.

MONITORING AND ASSESSMENT INDICATORS

- Number of interviews or questionnaires and ports questioned, and %age attained.
- Number of onboard observation surveys.
- %age of onboard observation pressure (in %catches/fleet).
- Number of birds captured.
- Rate of bycatch and mortality rate.

DELIVERABLES EXPECTED (INCLUDING MAPS)

For the questionnaires/interviews :

- report presenting the various interviews carried out for the 3 types of fishing gear targeted (transmission of the completed questionnaires) ;
- assessment report on the interviews characterising interactions by pilot site (analysis of the responses derived from the interviews) ;
- recommendations on sampling by onboard observers.

For the onboard observers :

- a descriptive assessment of each of the onboard surveys by pilot site covering the expected information ;
- the data entered in OBSenMER ;
- the number of catches sampled and type of fishing ;
- number and nature of the bycatch identified ;
- an overall assessment of the 2 years of surveys, summarising the main data derived from the onboard observations, in terms of interaction with the Balearic Shearwater.

STAKEHOLDERS AND ORGANISATIONS MOBILISED

- Operator/Service provider: Aglia.
- Partners: CRPM Bretagne, COREPEM, CDPM 56, CDPM 44, DIRM NAMO, DREAL PDL, Natura 2000 managing authorities concerned, Parc du Banc de Guérande, Engie Green (EMYN).
- Associated partners: OFB, DREAL Bretagne.

ESTIMATED BUDGET AND FUNDING SOURCES AVAILABLE

EMFAF European Union Fund – CARI3P project (submitted in June 2020).

Overall budget of the programme (3 pilot sites): 352 k€.

PROVISIONAL SCHEDULE

	2021								2022										
	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N
Coordination and facilitation																			
Data gathering																			
Assessment of fleets and types of fishing carried out by the fishing committee																			
Questionnaires/interviews																			
Questionnaires/ interviews (30% fleets)																			
Onboard observations																			
Year 1 survey (5% longliner fleet)																			
Mor Braz Bay pilot site																			
Year 2 survey																			
Mor Braz Bay pilot site																			
Writing of summaries, formalisation of the results of the data acquisition campaigns																			
Summary report (questionnaires/ interviews and observations)																			
Formatting of databases																			
Recommendations for subsequent analysis of the data (analysis of data and testing of measures - not carried out in the framework of CARI 3P)																			

BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

Genovart et al., 2016, Cortes et al., 2017 and 2018, Boué et al., 2013, Boué et al., Oliveira et al., 2015, Summary of the Spanish CSWG 2017.

CHARACTERISATION OF INTERACTIONS WITH PROFESSIONAL FISHING SECTOR PAYS DE LOIRE - SPA ILE D'YEU

CODE 2.4 PRIORITY 1

GENERAL OBJECTIVES OF THE ACTION

Enhance knowledge about bycatch of Balearic Shearwater in French territorial Atlantic waters by professional fishing.

OPERATIONAL OBJECTIVES OF THE ACTION

Set up specific procedures aiming to characterise and quantify the rate of bycatch of Balearic Shearwater by potentially high-risk fisheries in the sector of the SPA "Ile d'Yeu" in Pays de Loire.

CONTEXT AND GENERAL DESCRIPTION OF THE ACTION

The Balearic Shearwater, whose total population is estimated at 25 000 individuals, is endangered with extinction and the latest demographic models tend to show that it will have effectively disappeared within 60 years. They also show que the rate of survival adult is excessively low, mainly explained by significant mortality due to bycatch from professional fishing. The current impact of bycatch on the species, accounting for at least 45% of the current adult mortality rate, is now considered as incompatible with its survival (Genovart et al., 2016). But it must be possible to inverse this trend by acting on the factors which lead to this bycatch.

The knowledge about bycatch regarding the Balearic Shearwater comes from Spain and Portugal, where characterisation studies and even tests of reduction measures with procedures specific were implemented. In the Atlantic, Portuguese studies showed that, in their waters, the most problematic fishing techniques for the Balearic Shearwater seem to be :

- **small coastal multi-purpose boats which fish using demersal longlines or nets (gillnet + trammel)**. Rate of Balearic Shearwaters killed/yr 1660 ;
- **purse seine** fishing, used to catch small pelagic fish such as the sardine. Rate of Balearic Shearwaters killed/yr 368.

The action developed here aims to implement procedures to characterise interactions (bycatch) with French Atlantic fisheries, within pilot sites selected with regard to the probability of presence of the species and the predominant fishing activities. The sector off the coast of the Vendée is known to be un sector historically frequented by the Balearic Shearwater, and especially the area of Ile d'Yeu and the Vendée Corniche, and some recent studies have confirmed that it is still significantly used by the species, especially in late summer. In the Atlantic, the species is mainly present as from the month of May and until the month of October.

Figure 34 : Details of the evolution of abundance in the Brittany sector between May and October

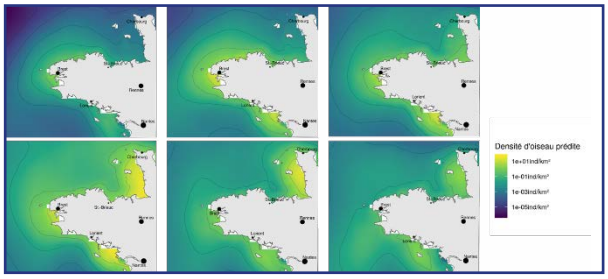


Figure 53 : Geostatistical representation of the densities of Balearic Shearwater in the sector of the Ile d'Yeu SPA in August 2016 (OFB / Biotope /HiDef; 2016)

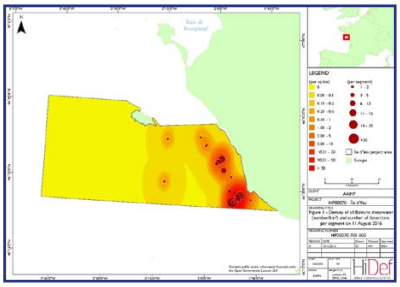
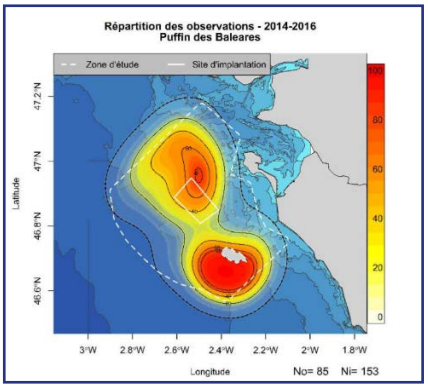


Figure 54 : Geostatistical representation of the densities of Balearic Shearwater in the sector Yeu-Noirmoutier over the period 2014-2016 (Eoliennes en mer, 2017)



In the framework of the NAP, the CARI3P project was submitted to the EMFAF for the funding of a programme covering 3 pilot sites: Mor Braz, the sector Île d'Yeu SPA, and the Gulf of Lion.

This project headed by AGLIA will be carried out in collaboration with the CRPMEM concerned by the 3 pilot sites, and the OFB as technical partner. It breaks down into two distinct actions which aim at precisely characterising interactions by means of 2 complementary methods :

1. Assessment of the fleets on each pilot site and development of questionnaires/ interviews for the fishers (nets, longlines and surrounding pelagic seines). The targeted objective is to cover 30 % of the vessels identified in the 3 study sectors.
2. Placing onboard observers on the longliners, over 2 seasons. The targeted objective is to cover at least 5 % of the catches of the boats concerned (longline fishing).

The action here consists in presenting the actions of the pilot site "Île d'Yeu SPA" included in this programme.

DETAILED DESCRIPTION OF THE ACTION AND THE OPERATIONS TO BE CARRIED OUT

Setting up procedures and programmes to characterise/quantify any bycatch of Balearic Shearwater in the following ways :

- onboard observers ;
- voluntary declarations of the fishers via the application OBSenMER developed by the CNPMEM and the GECC ;
- questionnaires/interviews with fishers ;

The programmes will target :

1/ LONGLINERS (DATA 2010-2011)

- 55 longliners currently work within the Ile d'Yeu SPA. The home ports of the vessels are: Le Croisic (2), Les Sables d'Olonne (10), L'Herbaudière (10), Port Joinville (16), Saint-Gilles-Croix-de-Vie (17).
- Longliners and other liners working in the study area also use pots (44% of them), nets (25%) and elver sieves 29%.

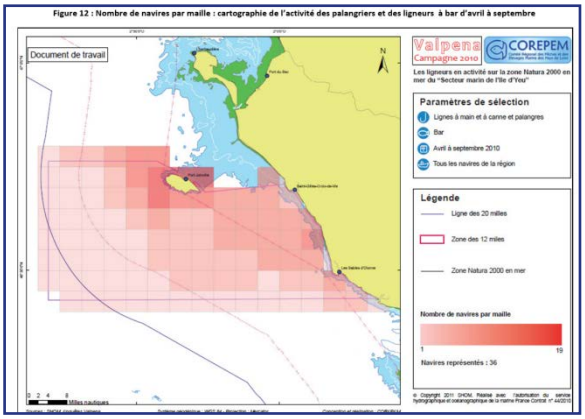


Figure 55 : Number of vessels per grid square - map of the activity of longliners and bass liners from April to September (source Valpena)

- The size of the vessels is <10m, with an average of 9.4m.
- The line and the longline are used mainly from May to September to target Sea Bass (and more infrequently Conger, Pollack and Whiting). The number of vessels fishing this species decreases significantly from December to April.
- During the course of 2010, longliners and other liners frequented on average 16 grid squares /95 of the study area per month. For the months of April to July, the average number of grid squares frequented by vessels is higher. At this period the vessels generally frequent larger fishing grounds and travel further to try to find fish.
- Longliners and other liners present in the study area use more extensive fishing grounds than the potters, working on rocky seabeds, along the edges of rocks and also to a considerable extent on the wrecks in the Natura 2000 area. It is important to note that the activity of more than the half of the vessels using these types of fishing gear in the study area never exceeds

50% of the total activity of these same vessels in the region. This can be explained by the fact that many longliners from Sables-d'Olonne also frequent areas situated in the south of the study area outside the Pertuis, and that longliners from Île d'Yeu frequent essentially the north of Île d'Yeu and the shelf of Rochebonne.

The programmes will primarily target the period (May) August-October (November).

2/ NETTERS (FLOATING GILLNETS AND TRAMMEL NETS) (DATA 2010-2011)

- 53 netters work currently within the Ile d'Yeu SPA. The home ports of the vessels are: The Sables-d'Olonne (13), L'Herbaudière (9), Port du Bec (5), Port Joinville (21), Saint-Gilles-Croix-de-Vie (5).

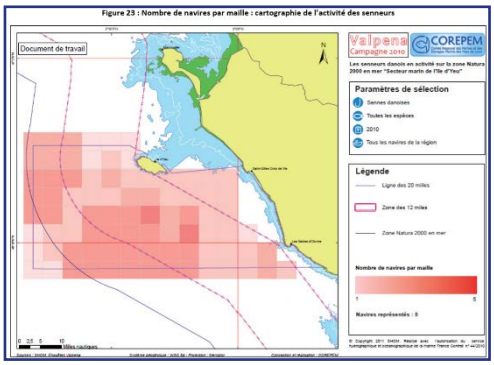


Figure 56 : Number of vessels per grid square - map of the activity of the seiners (source Valpena)

- The size of the vessels is variable, with an average ranging between 8.9m and 14.2m depending on the ports.
- Net-fishing is practised all year in the sector, more in winter for Dover Sole (January to March).
- The most species net-fished is Dover Sole.
- During the course of 2010, netters frequented on average 24 grid squares/ 95 of the study area per month. The graph indicates that for the months of November, December and January 2010, the average number of grid squares frequented by vessel is higher. These results can be explained notably by the fact that the zone is frequented during this period by all netters targeting Dover Sole on the sandy seabeds situated on the "off the coast" part of the study area, over a wide strip between 9 and 20 nautical miles from the Vendée coasts.

The observation or declaration procedures will primarily target the vessels which work significantly within the sectors dense in Balearic Shearwater (see maps above).

The programmes will primarily target the period (May) August-October (November), therefore netters working with the trammel net, and longliners.

Onboard observers

The aim will be to respond to the specific issues of the Balearic Shearwater on the longliner fleets.

For the onboard observations, 4 trained employees will be hired and hosted

by AGLIA for the pilot sites Mor Braz and Île d'Yeu. They will work right from the launching of the project, in collaboration with CRPMEM Bretagne and the COREPEM. Their objective will be the observation of 5% of the vessels identified for the longliner fleet, in the high-risk period adjusted for each pilot site.

CRPMEM Bretagne and the COREPEM will provide technical and organisational support for the observers.

Objective : 5% of the 2800 catches from June-October, i.e., 140 catches observed, for vessels mainly attached to the ports of Le Croisic, Les Sables d'Olonne, L'Herbaudière, Port Joinville, Saint-Gilles-Croix-de-Vie.

Gathering of data regarding fishing activity: measurement and description of the fishing effort, location of fishing grounds, description of the configuration and utilisation of the fishing gear (fish targeted, steps in fishing operations, types of baits, sea state, weather conditions, etc.)

Gathering of data regarding bycatch: counting of the birds observed (catch of photos), description of the interactions observed, number of attacks on bait observed, distance of bait attacks from the vessel, catch details (species, location, fishing step – casting or hauling in – time of day, position of the hook on the captured bird, etc.)

Questionnaires/interviews with fishers

The questionnaires/interviews will aim to characterise the interactions between the types of fishing used and the Balearic Shearwater, to evaluate the rate of bycatch by type of fishing gear and any avoidance strategies already used, while informing and raising the fishers' awareness about the issue.

For the questionnaires/interviews, 2 trained employees will be hired and hosted by AGLIA. They will work within the pilot site Île d'Yeu SPA (and also the sector Mor Braz) right from the launching of the project, in collaboration with CRPMEM Bretagne and the COREPEM. The intended objective will be to achieve 30 % of vessels questioned out of those identified by pilot site and by target fleet (longliners, trammel netters and gillnetters, purse seiners).

CRPMEM Bretagne and COREPEM will provide technical and organisational support to the interviewers for the pilot sites of their area.

Objectif : 30% of the 35 longliners (i.e., 12 vessels) and of the 24 netters (i.e., 8 vessels), mainly attached to the ports of Le Croisic, of the Sables-d'Olonne, L'Herbaudière, Port du Bec, Port Joinville, Saint-Gilles-Croix-de-Vie.

GEOGRAPHICAL LOCATION

- Fishing ports of the boat registration districts of the vessels operating within the Ile d'Yeu SPA: Le Croisic, Les Sables-d'Olonne, L'Herbaudière, Port du Bec, Port Joinville, Saint-Gilles-Croix-de-Vie ...
- Perimeter of the Ile d'Yeu SPA.

LINK WITH OTHER ACTIONS

- Other actions to characterise fishing interactions (Atlantic).
- Action files linked to the CARI3P programme.
- OBSenMER/ECHOSEA action file.

MONITORING AND ASSESSMENT INDICATORS

- Number of interviews or questionnaires and ports questioned, and %age attained.
- Number of onboard observation surveys.
- %age of onboard observation pressure (in %catches/fleet).
- Number of birds captured.
- Rate of bycatch and mortality rate.

DELIVERABLES EXPECTED (INCLUDING MAPS)

For the questionnaires/interviews :

- report presenting the various interviews carried out for the 3 types of fishing gear targeted (transmission of the completed questionnaires) ;
- assessment report on the interviews characterising interactions by pilot site (analysis of the responses derived from the interviews) ;
- recommendations on sampling by onboard observers.

For the onboard observers :

- a descriptive assessment of each of the onboard surveys by pilot site covering the expected information ;
- the data entered in OBSenMER ;
- the number of catches sampled and type of fishing ;
- number and nature of the bycatch identified ;
- an overall assessment of the 2 years of surveys, summarising the main data derived from the onboard observations, in terms of interaction with the Balearic Shearwater.

STAKEHOLDERS AND ORGANISATIONS MOBILISED

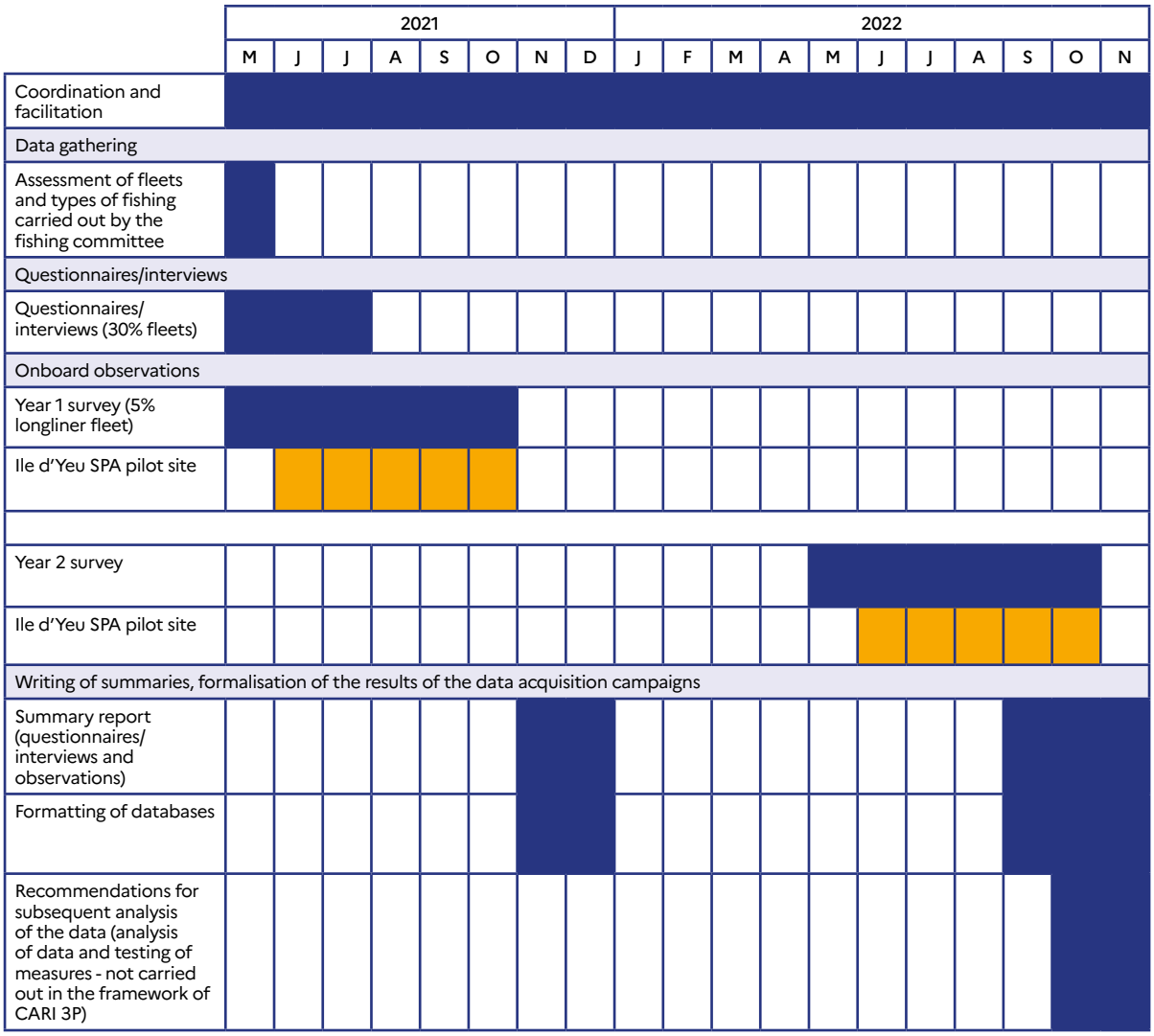
- Operator/Service provider: AGLIA.
- Partners: COREPEM, CDPM 44, DREAL PDL, Natura 2000 managing authorities concerned, Parc du Banc de Guérande, Engie Green (EMYN).
- Associated partners: OFB, DREAL Bretagne.

ESTIMATED BUDGET AND FUNDING SOURCES AVAILABLE

EMFAF European Union Fund – CARI3P project (submitted in June 2020).

Overall budget of the programme (3 pilot sites) : 352 k€.

PROVISIONAL SCHEDULE



BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

Genovart & al., 2016, Cortes & al., 2017 and 2018, Boué & al., 2013, Boué et al., Oliveira & al, 2015, Summary of the Spanish CSWG 2017.

CHARACTERISATION OF INTERACTIONS WITH PROFESSIONAL FISHING NOUVELLE AQUITAINE – SOUTHERN LANDES SHELF / GOUF DE CAPBRETON SECTOR

CODE 2.5 PRIORITY 1

GENERAL OBJECTIVES OF THE ACTION

Enhance knowledge about bycatch of Balearic Shearwater in French territorial Atlantic waters by professional fishing.

OPERATIONAL OBJECTIVES OF THE ACTION

Set up specific procedures aiming to characterise and quantify the rate of bycatch of Balearic Shearwater by potentially high-risk fisheries in the sector of the southern of the Landes Shelf / Gouf de Capbreton.

CONTEXT AND GENERAL DESCRIPTION OF THE ACTION

The Balearic Shearwater, whose total population is estimated at 25 000 individuals, is endangered with extinction and the latest demographic models tend to show that it will have effectively disappeared within 60 years. They also show that the adult survival rate is excessively low, mainly explained by significant mortality due to bycatch from professional fishing. the current impact of the fishing on this species, accounting for at least 45% of the current adult mortality rate, is now considered as incompatible with its survival (Genovart et al., 2016). But it must be possible to inverse this trend by acting on the factors which lead to this bycatch.

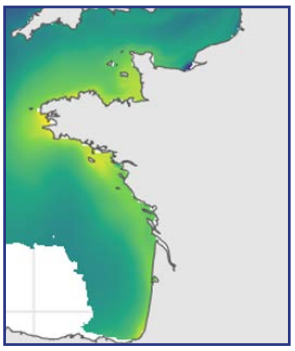
The knowledge about bycatch regarding the Balearic Shearwater comes from Spain and Portugal, where characterisation studies and even tests of reduction measures with procedures specific were implemented. In the Atlantic, Portuguese studies showed that, in their waters, the most problematic fishing techniques for the Balearic Shearwater seem to be :

- **small coastal multi-purpose boats which fish using demersal longlines or nets (gillnet + trammel)**. Rate of Balearic Shearwaters killed/yr 1660 ;
- **purse seine**, fishing, used to catch small pelagic fish such as the sardine. Rate of Balearic Shearwaters killed/yr 368.

The action developed here aims to implement procedures to characterise interactions (bycatch) with French Atlantic fisheries, within pilot sites selected with regard to the probability of presence of the species and the predominant fishing activities.

The monitoring operations and studies carried out in the Atlantic identified the hotspots of presence along the French coasts. In 2019, a habitat model was produced on the basis of protocol-based observations at sea compiled over the period 2002-2018.

Figure 33 : Mean annual of the density of shearwaters (2017). Logarithmic scale to assess the nuances of density over a broad range of magnitudes.



Hotspots of presence of the species in France

- Normandy-Brittany Gulf
- Northern Brittany coast
- Iroise Sea
- Mor Braz
- Vendée coast / Île d'Yeu
- **Southern Landes Shelf / Gouf de Capbreton**

In the Atlantic, the species is mainly present as from the month of May and until the month of October. On the southern Landes Shelf / Gouf de Capbreton sector, it seems that the months of September/October are significantly favoured by the species, during its return migration to the Mediterranean.

Figure 57 : Details of the evolution of abundance in the sector Bay of Biscay between May and October

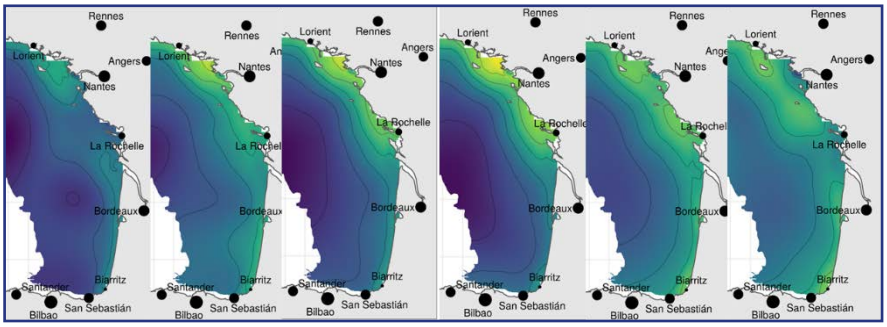
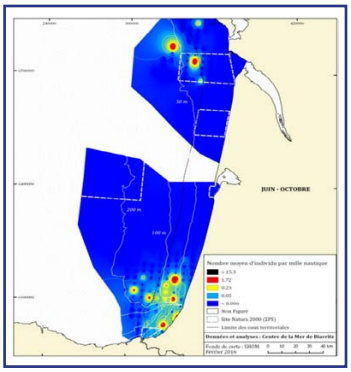


Figure 13 : Distribution of the Balearic Shearwater in the sector southern Gascony - Atlas published by the Centre de la Mer de Biarritz (period 2003-2015)



In the framework of the NAP, the CARI3P project was submitted to the EMFAF for the funding of a programme covering 3 pilot sites: Mor Braz, the Île d'Yeu sector and the Gulf of Lion.

This project will be carried out in collaboration with the CRPMEM concerned by the 3 pilot sites, and the OFB as technical partner. It breaks down into two distinct actions which aim at precisely characterising interactions by means of 2 complementary methods :

1. Assessment of the fleets on each pilot site and development of questionnaires/ interviews for the fishers (nets, longlines and surrounding pelagic seines). The targeted objective is to cover 30 % of the vessels identified in the 3 study sectors.
2. Placing onboard observers on the longliners, over 2 seasons. The targeted objective is to cover at least 5 % of the catches of the boats concerned (longline fishing).

The action here is aimed firstly at continuing the concertation with CRPMEM Nouvelle Aquitaine to finalise the appropriate method and schedule for adding the Gouf de Capbreton sector pilot site to this programme to characterise interactions, with terms and conditions which could be similar to the CARI3P project, by seeking further funding.

DETAILED DESCRIPTION OF THE ACTION AND THE OPERATIONS TO BE CARRIED OUT

Setting up procedures and programmes to characterise/quantify any bycatch of Balearic Shearwater in the following ways :

- onboard observers ;
- questionnaires/interviews with fishers.

The programmes will target :

1/ PURSE SEINERS (OR RING NETTERS)

- Live-bait fishing mainly in summer (anchovies, mackerel, sardines), and also from October to March for horse mackerel and mackerel.

The programmes will primarily target the fishers working within the southern Landes Shelf / Gouf de Capbreton sector.

The programmes will primarily target the period (May) July-October (November).

The main ports in Aquitaine where vessels practising this technique can be observed are Saint-Jean-de-Luz/Ciboure and Hendaye. This fleet includes both vessels of less than 12m and 12-25m vessels.

2/ LONGLINERS

- Targeting mainly Hake, sector of the trench of Capbreton, but also Sea Bass, Gilthead Seabream, Meagre, Sargo ...
- Using frozen sardines.
- Most vessels operating at night, some operating by day notably in the case of two successive castings.
- In September/October: very few longliners active (5 to 6 boats maximum), the fishers are concentrating on fishing seaweed, elvers or tuna.
- Most active period: April/May/June, with 15 to 20 boats.

The programmes will primarily target the fishers working in the southern Landes Shelf / Gouf de Capbreton sector.

The programmes will primarily target the period (May) July-October (November).

The main ports en Aquitaine where vessels practising this technique can be observed are Saint-Jean-de-Luz/Ciboure and Capbreton. This fleet includes mainly vessels of less than 12m.

3/ NETTERS

- Trammel nets and gillnets (or floating gillnets), fixed or drifting.
- Targeting mainly Sea Bass, Hake, Dover Sole, Red Mullet, Meagre.
- Multi-purpose boats, less than 14m, practising small-scale fishing close to the coasts with of the catches of less than 24 hours.

The programmes will primarily target the fishers practising small-scale fishing close to the coasts, in the southern Landes Shelf / Gouf de Capbreton sector.

The programmes will primarily target the period (May) July-October (November).

The main ports in Aquitaine where vessels practising this technique can be observed are Saint-Jean-de-Luz/Ciboure, Capbreton and Arcachon further north. This fleet includes mainly vessels of less than 12m.

Onboard observers

The aim will be to respond to the specific issues of the Balearic Shearwater by ensuring sufficient sampling pressure on the longliner fleet.

For the onboard observations, 1 trained employee will be hired and hosted by AGLIA for the pilot site Gouf de Capbreton. He/she will start work right from the launching of the project, in collaboration with CRPMEM Nouvelle-Aquitaine. His/her objective will be the observation of 5% of the vessels identified for the longliner fleet, in the high-risk period adjusted for each pilot site.

CRPMEM Nouvelle-Aquitaine will provide technical and organisational support for the observer.

Objective : 5% of the 430 catches on August-October, i.e., 21 catches observed, for vessels mainly attached to the ports of Capbreton, Saint Jean-de-Luz/Ciboure and Hendaye. Collecte des données relatives à l'activité de

Gathering of data regarding fishing activity: measurement and description of the fishing effort, location of fishing grounds, description of the configuration and utilisation of the fishing gear (fish targeted, steps in fishing operations, types of baits, sea state, weather conditions, etc.)

Gathering of data regarding bycatch: counting of the birds observed, description of the interactions observed, number of bait attacks observed, distance of bait attacks from the vessel, catch details (species, location, fishing step – casting or hauling in – time of day, position of the hook on the captured bird, photo of the bird, etc.).

Questionnaires/interviews with fishers

The questionnaires/interviews will aim to characterise the interactions between the types of fishing practised and the Balearic Shearwater, to evaluate the rate of bycatch by type of fishing gear and any avoidance strategies already used, while informing and raising the fishers' awareness about the issue.

For the questionnaires/interviews, 1 trained employee will be hired and hosted by AGLIA. He/she will start work within the pilot site Gouf de Capbreton right from the launching of the project, in collaboration with CRPMEM Nouvelle-Aquitaine.

The intended objective will be to achieve 30 % of vessels questioned out of those identified by pilot site and by target fleet (longliners, trammel netters and gillnetters, purse seiners).

Objective : 30% of the 25 longliners (i.e., 8 vessels), of the 31 netters (i.e., 10 vessels) and of the 5 purse seiners (i.e., 2 vessels), mainly attached to the ports of Capbreton, Saint-Jean-de-Luz/Ciboure and Bayonne.

GEOGRAPHICAL LOCATION

- Fishing ports of the boat registration districts of the vessels operating within the southern Landes Shelf / Gouf de Capbreton sector: Capbreton, St-Jean de-Luz/Ciboure and Hendaye.
- Southern sector of the Landes Shelf / Gouf de Capbreton.

LINK WITH OTHER ACTIONS

- Other actions to characterise fishing interactions (Atlantic).
- Action files linked to the CARI3P programme.
- OBSenMER/ECHOSEA action file.

MONITORING AND ASSESSMENT INDICATORS

- Number of interviews or questionnaires and ports questioned, and %age attained.
- Number of onboard observation surveys.
- %age of onboard observation pressure (in %catches/fleet).
- Number of birds captured.
- Rate of bycatch and mortality rate.

DELIVERABLES EXPECTED (INCLUDING MAPS)

For the questionnaires/interviews :

- report presenting the various interviews carried out for the 2 types of fishing gear targeted (transmission of the completed questionnaires) ;
- assessment report on the interviews characterising interactions by pilot site (analysis of the responses derived from the interviews) ;
- recommendations on sampling by onboard observers.

For the onboard observers :

- a descriptive assessment of each of the onboard surveys by pilot site covering the expected information ;
- the data entered in OBSenMER ;
- the number of catches sampled and type of fishing ;
- number and nature of the bycatch identified ;
- an overall assessment of the 2 years of surveys, summarising the main data derived from the onboard observations, in terms of interaction with the Balearic Shearwater.

STAKEHOLDERS AND ORGANISATIONS MOBILISED

- Operator/Service provider: to be defined.
- Partners: CRPMEM Nouvelle-Aquitaine, AZTI, DIRM SA, DREAL NA, Natura 2000 managing authorities concerned.
- Associated partners: OFB, DREAL Bretagne.

ESTIMATED BUDGET AND FUNDING SOURCES AVAILABLE

Intended option: Dedicated call for tender (OFB) – Estimated budget = 55 000 €.

Setting up a transboundary project with Spain (partner AZTI): Interreg ...

PROVISIONAL SCHEDULE

The priority objective will be to commit to this action as soon as all the conditions are satified between all the technical and financial partners.

BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

Genovart & al., 2016, Cortes & al., 2017 and 2018, Boué & al., 2013, Boué et al., Oliveira & al, 2015, Summary of the Spanish CSWG 2017.

CHARACTERISATION OF INTERACTIONS WITH PROFESSIONAL FISHING SECTOR GULF OF LION

CODE 2.6 PRIORITY 1

GENERAL OBJECTIVES OF THE ACTION

Enhance knowledge about bycatch of Balearic Shearwater in French Mediterranean territorial waters by professional fishing.

OPERATIONAL OBJECTIVES OF THE ACTION

Set up specific procedures aiming to characterise and quantify the rate of bycatch of Balearic Shearwater by potentially high-risk fisheries, in the Gulf of Lion in the Mediterranean.

CONTEXT AND GENERAL DESCRIPTION OF THE ACTION

The Balearic Shearwater, whose total population is estimated at 25 000 individuals, is endangered with extinction and the latest demographic models tend to show that it will have effectively disappeared within 60 years. They also show that the adult survival rate is excessively low, mainly explained by significant mortality due to bycatch, itself caused by fishing activity. The current impact of fishing on the species, accounting for at least 45% of the current adult mortality rate, is now considered as incompatible with its survival (Genovart et al., 2016). But it must be possible to inverse this trend by acting on the factors which lead to this bycatch.

The knowledge about bycatch regarding the Balearic Shearwater comes from Spain and Portugal, where characterisation studies and even tests of reduction measures with specific procedures have been implemented. In the Mediterranean Spanish studies showed that, in their waters, the principal fishing technique concerned is the demersal longline. A programme carried out in [2011-2015] on 220 observation campaigns highlighted the following rate of capture: 0.58 bird/1000 hooks, i.e., [2741-3198] birds captured annually, mainly the 3 species of shearwaters endemic to the Mediterranean including Balearic Shearwater. The bycatch of Balearic Shearwater seems common, but irregular and mainly occurring in irregular, occasional events affecting a large number of birds in one go during a given fishing expedition. This suggests that the estimations of rate of capture obtained based on a limited number of onboard observations could in reality be very largely underestimated, as tended to suggest a certain number direct (corpses of birds in ports) or indirect observations. Recent new onboard observations have confirmed the existence of occasional episodes of mass catches, with in particular 667 shearwaters (50% Balearic) reported by 13 vessels between April and June 2017 in Catalogne.

The main types of vessels concerned are small (coastal fishing) multi-purpose boats operating near the coasts, especially with sardines and anchovies as bait. The studies also suggest that the risk of bycatch increases in the absence of trawling activity (weekends, holidays and moratoria on trawling), with the casting by day or at sunrise of unballasted longlines. They seem to be at a maximum over the period April-June.

The action developed here aims to implement procedures to characterise interactions (bycatch) with the fisheries French of Mediterranean, within pilot sites selected with regard to the probability of presence of the species and the predominant fishing activities.

The studies carried out in the Mediterranean seem show that the species frequents the waters of the continental shelf (up to 200m of depth, but above all on depths of 40m to 80m) of the Gulf of Lion, from the Spanish border and as far as Aigues-Mortes. On the other hand, the species is very little present to the east of the Camargue, off the coast of the PACA region.

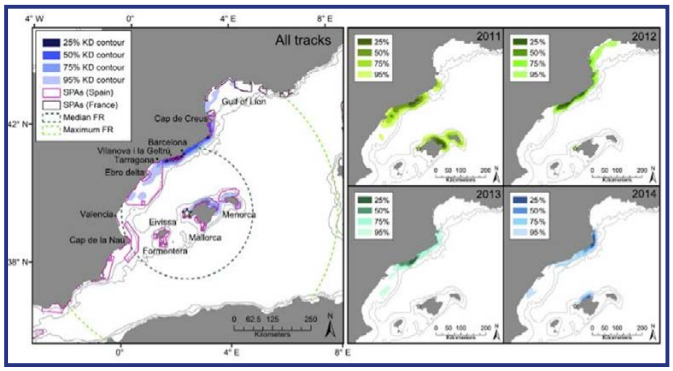


Figure 23 : Kernels of distribution of tagged Balearic Shearwaters in the breeding season (for feeding) from 2011 to 2014 (Meier et al., 2015)

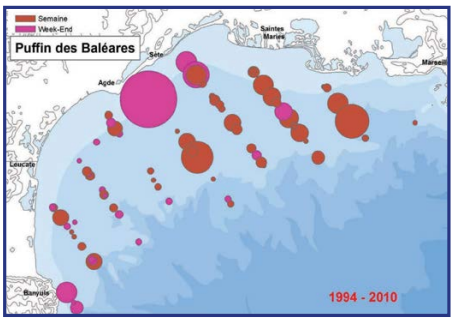


Figure 18 : Relative proportions of the numbers of Balearic Shearwaters seen in the week (brown) and at the weekend (cyclamen) during 84 of the trawls of the campaigns PELMED (1994-2010). Largest dot = 100 individuals.

In the Gulf of Lion, the species seems mainly present in spring and summer, in particular during the course of the months of April, May and June.

In the framework of the NAP, the CARI3P project was submitted to the EMFAF for the funding of a programme covering 3 pilot sites: Mor Braz, the Île d'Yeu SPA sector, and the Gulf of Lion.

This project headed by AGLIA will be carried out in collaboration with the CRPMEM concerned by the 3 pilot sites, and the OFB as technical partner. It breaks down into two distinct actions which aim at precisely characterising interactions by means of 2 complementary methods :

1. Assessment of the fleets on each pilot site and development of questionnaires/ interviews for the fishers (nets, longlines and surrounding pelagic seines). The targeted objective is to cover 30 % of the vessels identified in the 3 study sectors.
2. Placing onboard observers on the longliners, over 2 seasons. The targeted objective is to cover at least 5 % of the catches of the boats concerned (longline fishing).

The action here consists in presenting the actions of the Gulf of Lion pilot site included in this programme.

Less directly, but nevertheless important to underline, the actions undertaken in PACA in the framework of the programme LIFE + PanPuffinus aiming to limit the bycatch of Yelkouan Shearwater, are complementary to the action developed in this NAP. Exchanges between these two programmes will be sought to mutually benefit from ongoing advances and developments in these two neighbouring regions.

DETAILED DESCRIPTION OF THE ACTION AND THE OPERATIONS TO BE CARRIED OUT

Setting up procedures and programmes to characterise/quantify any bycatch of Balearic Shearwater in the following ways :

- onboard observers ;
- questionnaires/interviews with fishers.

The programmes will primarily target :

1/ PELAGIC LONGLINERS EXCLUSIVELY FOR BLUEFIN TUNA, CONFINED TO THE CONTINENTAL SHELF OF THE GULF OF LION

This fleet concerns approximately 87 vessels in the French Mediterranean, of 7 to 18m, which works 50 to 100d /yr.

The distribution of the sizes of the "small types of fishing" vessels that are members of the OP SATHOAN which has an EU fishing authorisation for longline Bluefin Tuna (n=39; i.e., 45% of the total fleet) is as follows: 13 vessels of 7-10m, 17 vessels of 11-12m, and 9 vessels of 13-18m (with room for 1 observer).

This fishing is done mainly at night in the week, approximately 10% being done at the weekend (outside the trawling season), by day. It covers most of the continental shelf of the Gulf of Lion.

2/ SMALL TYPES OF COASTAL FISHING: MULTI-PURPOSE VESSELS (NETS/POTS/ LONGLINES) OF 5 TO 12M WORKING IN COASTAL WATERS WITH REAL BAIT FOR THE LONGLINES

They form a disparate fleet characterised by its diversity with regard to both fishing gear (mainly passive, essentially simple gillnets, trammels, lines and traps) and techniques and target species. The boats used are generally between 9 and 12 m long and fish essentially in seabed depths between 0 and 200 m, in areas that can be reached in a few hours.

Concerning the types of fishing practised in 2012 in the maritime district of Port-Vendres (SIH, 2012), 57 % of professionals (including fishers of freshwater and saltwater lagoons and vessels other than small types of fishing boats) practised small-mesh net fishing, 18 % octopus pots, 17 % cephalopod nets, 14 % small-mesh net fishing for Dover Sole, 10 % handlines, 3 % longlines for seabream, etc.

The small types of fishing boats cast their nets for the night, often on the littoral fringe. Some have a mixed coastal and lagoon activity. Some rare small-scale fishers work off the coast and exploit fewer species (Hake and Sole) compared to more coastal small-scale fishers (Cuttlefish, Pandora, Seabream, Bonito, Red Mullet, Spiny Lobster, etc.).

3/ LAMPAROS (SEINERS FOR SMALL PELAGIC FISH)

Two types of vessels use surrounding purse seine nets characterised by the use of a purse-line in the lower part of the net: "lamparos" and vessels using "tchares" (small surrounding purse seines, generally less than 300 m long). The purse-line "purses" the net and thus retains all the fish. Lamparos, approximately 12 to 20 m in length, are essentially for catching small pelagic "blue" fish: mainly Sardine together Anchovy and Mackerel. This fishing takes place at night using one or two lamp boats, aiming to attract the fish. Once the shoal of fish has been detected by sonar and attracted by the light, it is rapidly encircled by the net and hauled in by the mother-vessel. The vessels using the tchare are smaller than the lamparos. Traditionally tchares were used rather to catch white "demersal"* fish: Seabream, Seabass, Grey Mullet, Striped Seabream, for example.

The purse seine fishing of small pelagic fish (lamparos) is characterised by very marked seasonality, centred round the period from March to September. The purse seine fishing of demersal fish (Tchares) takes place all year, but maximum activity is in the months of September to December.

Currently 23 licences are attributed to lamparos. 6 are above all based in Port-Vendres, Le Barcarès and Port la Nouvelle and fish all or some of the waters of the Gulf of Lion Marine Natural Park. During the season summer, approximately 3 to 4 seiners from Sète and 3 to 4 seiners from Marseille also come inside the Park.

The programmes will primarily target the vessels working over the continental shelf (in particular on depths from 20 to 80m), in the Gulf of Lion, prioritarily in the sectors SW of the Gulf (Port-Vendres, Le Barcarès, Leucate).

The programmes will primarily target the period (February) April-June (September).

Onboard observers

The aim will be to respond to the specific issues of the Balearic Shearwater by ensuring sufficient sampling pressure on the longliner fleet.

For the onboard observations, 1 trained employee will be hired and hosted by the CRPMEM Occitanie for the Gulf of Lion pilot site. He/she will start work right from the launching of the project, in collaboration with AGLIA and the other CRPM Atlantic involved in CARI3P. His/her objective will be the observation of 5% of the vessels identified for the longliner fleet, in the high-risk period adjusted for each pilot site.

Objective : 5% of the 700 catches on April-June, i.e., 35 catches observed, for vessels mainly attached to the ports of the Grau du Roi, Palavas, Sète, Agde, Port la Nouvelle, Leucate, Le Barcarès, Saint-Cyprien, Port-Vendres.

Gathering of data regarding fishing activity: measurement and description of the fishing effort, location of fishing grounds, description of the configuration and utilisation of the fishing gear (fish targeted, steps in fishing operations, types of baits, sea state, weather conditions, etc.)

Gathering of data regarding bycatch: counting of the birds observed (photos taken), description of the interactions observed, number of bait attacks observed, distance of bait attacks from the vessel, catch details (species, location, fishing step – casting or hauling in – time of day, position of the hook on the captured bird, etc.).

Questionnaires/interviews with fishers

The questionnaires/interviews will aim to characterise the interactions between the types of fishing practised and the Balearic Shearwater, to evaluate the rate of bycatch by type of fishing gear and any avoidance strategies already used, while informing and raising the fishers' awareness about the issue.

For the questionnaires/interviews, 1 trained employee will be hired and hosted by the CRPMEM Occitanie. He/she will start work within the Gulf of Lion pilot site right from the launching of the project, in collaboration with AGLIA, CRPMEM Bretagne and the COREPEM. The intended objective will be to achieve 30 % of vessels questioned out of those identified by pilot site and by target fleet (longliners, trammel netters and gillnetters, purse seiners).

Objective: 30% of the 85 longliners (i.e., 28 vessels), of the 400 netters/ multi-purpose boats (i.e., 130 vessels) and of the 40 seiners (i.e., 13 vessels), mainly attached to the ports of the Grau du Roi, Palavas, Sète, Agde, Port la Nouvelle, Leucate, Le Barcarès, Saint-Cyprien, Port-Vendres.

GEOGRAPHICAL LOCATION

- Fishing ports of the Gulf of Lion: Grau du Roi, Palavas, Sète, Agde, Port la Nouvelle, Leucate, Le Barcarès, Saint-Cyprien, Port-Vendres. Prioritise the ports of the SW (GdL MNP sector).
- Gulf of Lion Marine Natural Park (GdL MNP).

LINK WITH OTHER ACTIONS

- Other actions to characterise fishing interactions (Atlantic).
- Action files linked to the CARI3P programme.
- OBSenMER/ECHOSEA action file.

MONITORING AND ASSESSMENT INDICATORS

- Number of interviews or questionnaires and ports questioned, and %age attained.
- Number of onboard observation surveys.
- %age of onboard observation pressure (in %catches/fleet).
- Number of birds captured.
- Rate of bycatch and mortality rate.

DELIVERABLES EXPECTED (INCLUDING MAPS)

For the questionnaires/interviews :

- report presenting the various interviews carried out for the 3 types of fishing gear targeted (transmission of the completed questionnaires) ;
- assessment report on the interviews characterising interactions by pilot site (analysis of the responses derived from the interviews) ;
- recommendations on sampling by onboard observers.

For the onboard observers :

- a descriptive assessment of each of the onboard surveys by pilot site covering the expected information ;
- the data entered in OBSenMER ;
- the number of catches sampled and type of fishing ;
- number and nature of the bycatch identified ;
- an overall assessment of the 2 years of surveys, summarising the main data derived from the onboard observations, in terms of interaction with the Balearic Shearwater ;

STAKEHOLDERS AND ORGANISATIONS MOBILISED

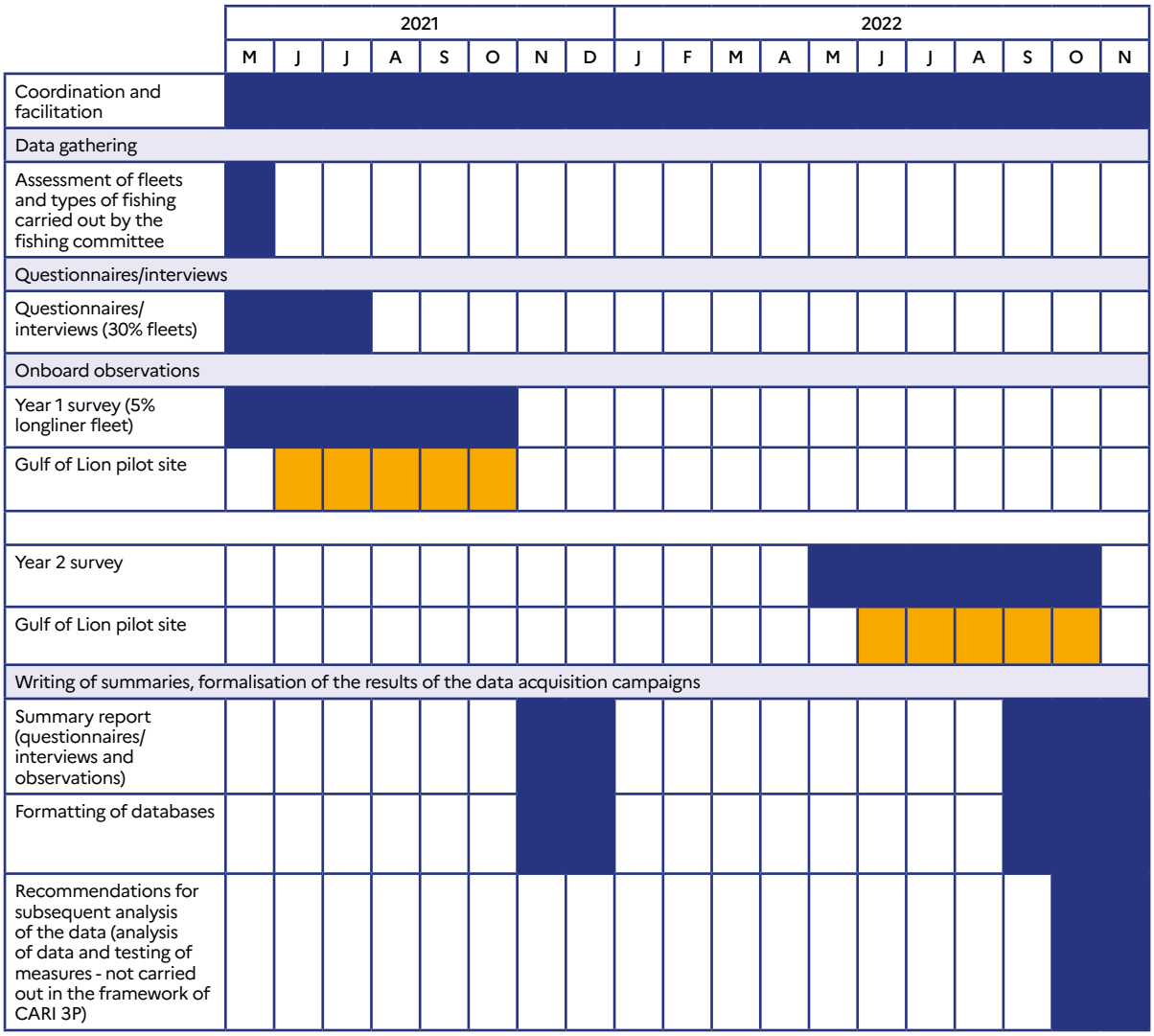
- Operator/Service provider: RPM Occitanie, AGLIA.
- Partners: OP SATHOAN, OP Sud, Gulf of Lion MNP.
- Project supervision: OFB, DREAL Bretagne.
- Associated partners: DIRM Med, DREAL Occitanie, Park of Bank of Guérande, Engie Green (EMYN), LPO, BirdLife.

ESTIMATED BUDGET AND FUNDING SOURCES AVAILABLE

EMFAF European Union Fund – CARI3P project (submitted in June 2020).

Overall budget of the programme (3 pilot sites): 352 k€.

PROVISIONAL SCHEDULE



BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

Genovart & al., 2016, Cortes & al., 2017 and 2018, Boué & al., 2013, Boué et al., Oliveira & al, 2015, Summary of the Spanish CSWG 2017.

CHARACTERISATION OF INTERACTIONS WITH PROFESSIONAL FISHING VOLUNTARY DECLARATION – DEVELOPMENT AND MOBILISATION OF THE APPLICATIONS AND PROGRAMMES DEDICATED: OBSENMER (OBSENPECHE PROGRAMME) AND ECHOSEA

CODE 2.7 PRIORITY 1

GENERAL OBJECTIVES OF THE ACTION

Enhance knowledge about bycatch of Balearic Shearwater in French territorial Atlantic waters by professional fishing (and even angling).

OPERATIONAL OBJECTIVES OF THE ACTION

Mobilise and improve procedures of voluntary specific declaration (smartphone applications) aiming to characterise/better understand interactions with and bycatch of Balearic Shearwater by potentially high-risk fisheries on the Atlantic and Mediterranean seaboards.

CONTEXT AND GENERAL DESCRIPTION OF THE ACTION

The Balearic Shearwater, whose total population is estimated at 25 000 individuals, is endangered with extinction and the latest demographic models tend to show that it will have effectively disappeared within 60 years. They also show that the adult survival rate is excessively low, mainly explained by significant mortality due to bycatch from professional fishing. the current impact of the fishing on this species, accounting for at least 45% of the current adult mortality rate, is now considered as incompatible with its survival (Genovart et al., 2016). But it must be possible to inverse this trend by acting on the factors which lead to this bycatch.

The knowledge about bycatch regarding the Balearic Shearwater comes from Spain and Portugal, where characterisation studies and even tests of reduction measures with procedures specific were implemented.

In the Atlantic, Portuguese studies showed that, in their waters, the types of fishing the most problematic for the Balearic Shearwater seem to be :

- **small coastal multi-purpose boats which fish using demersal longlines or nets (gillnet + trammel).** Rate of Balearic Shearwaters killed/yr 1660 ;
- **purse seine** fishing, used to catch small pelagic fish such as the sardine. Rate of Balearic Shearwaters killed/yr 368.

In the Mediterranean the studies Spanish showed that, in their waters, the principal fishing gear concerned is the demersal longline. The main types of vessels concerned are small (coastal fishing), multi-purpose boats operating near the coasts, especially with sardines and anchovies as bait.

The action developed here aims to implement procedures to characterise interactions (bycatch) with French Atlantic and Mediterranean fisheries, within pilot sites selected with regard to the probability of presence of the species and the predominant fishing activities.

The monitoring operations and studies carried out in the Atlantic identified the hotspots of presence along the French coasts. In 2019, a habitat model was produced on the basis of protocol-based observations at sea compiled over the period 2002-2018.

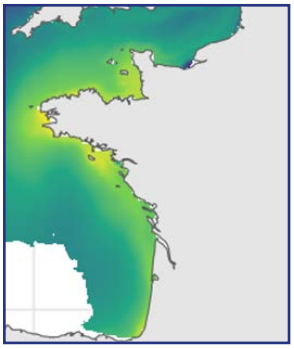


Figure 33 : Mean annual of the density of shearwaters (2017). Logarithmic scale to assess the nuances of density over a broad range of magnitudes.

Hotspots of presence of the species in France :

- Normandy-Brittany Gulf
- Northern Brittany coast
- Iroise Sea
- Mor Braz
- Southern Landes Shelf / Gouf de Capbreton
- Gulf of Lion

In the Atlantic, the species is mainly present from May to October.

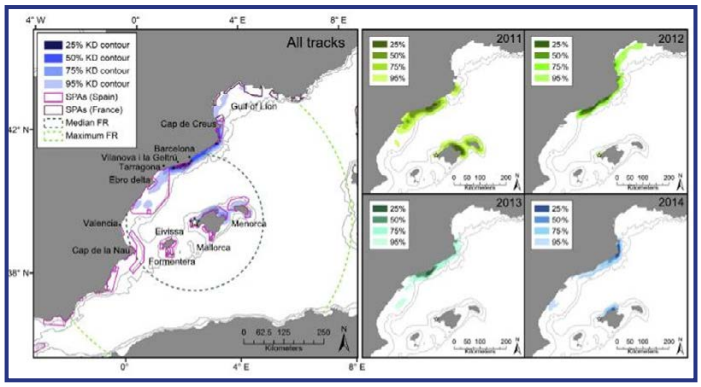


Figure 23 : Kernels of distribution of the Balearic Shearwaters tagged in the breeding season (for feeding) from 2011 to 2014 (Meier et al., 2015)

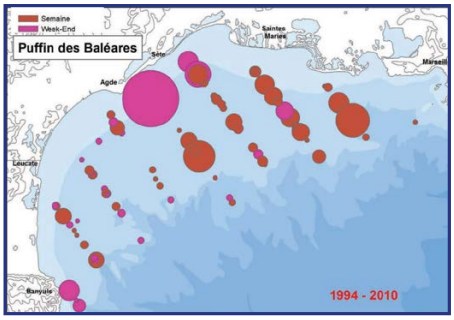


Figure 18 : Relative proportions of the numbers of Balearic Shearwaters seen in the week (brown) and at the weekend (cyclamen) during 84 of the trawls of the campaigns PELMED (1994-2010). Largest dot = 100 individuals.

In the Gulf of Lion, the species seems mainly present in spring and in summer, in particular during the course of the months of April, May and June.

In the framework of the actions of the NAP, a programme to characterise interactions by questionnaires/interviews and onboard observations is planned (CARI3P project financed by the EMFAF). This programme will include the setting up of procedures of the characterisation / quantification of any bycatch of Balearic Shearwater on 3 pilot sites (Gulf of Lion, Île d'Yeu, Mor Braz) in the following ways :

- questionnaires/interviews with fishers (longliner fleets, netters and purse seiners) ;

- onboard observers on the longliner fleet (2 years of campaigns, 5% of the catches covered).

The programmes will primarily target the period (May) June-October (November) in the Atlantic, and the period April-June for the Gulf of Lion.

The action developed here consists in consolidating the gathering of data on interactions by means of a third process: voluntary declaration via existing dedicated applications, OBSenMER (and its specific programme OBSenPECHE) and ECHOSEA.

The OBSenMER programme

OBSenMER is a collaborative platform which facilitates the entering and analysis of sightings at sea. It concerns all types of sightings: marine mammals, sea turtles, fish, birds, and also the human activities, such as pleasure boating, fishing, pollution, etc. This platform is intended both for the general public and for professional naturalist organisations, and collects both participative science data and data derived from an expert protocol. It is also a network of gatherers and users of data at sea who share the tools: a mobile application, a web platform, a database and a photo-identification tool. OBSenMER is structured by geographical zones and now extends to the Mediterranean, the Channel, the Atlantic, French Guiana and the French West Indies. The GECC (Cotentin Cetaceans Study Group) is the general administrator of OBSenMER and is in charge of the development of new features, and moderating and managing the tools available on the platform.

Figure 58 : Logo of the OBSenMER programme

The OBSenPECHE programme

In the context the of current recrudescence in the bycatch of marine mammals in the Bay of Biscay, the CNPMEM, in partnership with the OFB (French Biodiversity Agency, ex AFB) and the GECC, launched the experimental project OBSenPECHE. This project is complementary to the LICADO programme, carried out in parallel, which is devoted to developing technological procedures to limit the bycatch of marine mammals: innovative pingers, nets with passive reflectors, etc. Financed by the OFB for the adapting the OBSenMER tool and by France Filière Pêche for facilitating the system, the present project consists in developing a network of sentinel fishers. The volunteer professionals can enter (1st experimentation in 2020), via their smartphones or tablets, various types of information on marine mammals by means of the ObsenMer application. This application is developed by the GECC in collaboration with the OFB.

This tool enables users both to declare sightings of the presence of marine mammals and therefore contribute to knowledge of the distribution of these species, together with precisely declaring catches of marine mammals and documenting the circumstances of the catch. The action here consists in extending the applications to include the declaration of bycatch of birds, particularly the Balearic Shearwater, as from summer 2021, based especially on

the assessment of the "marine mammals" test carried out in the framework of the 2020 OBSenPECHE programme :

- adaptation of the forms, development of the smartphone application to enable the entry of Balearic Shearwater bycatch, and enrichment of the document base (species recognition file, photo bank) ;
- deployment of the system with facilitation time and data processing time ;
- coordination with the in-field questionnaires/interviews deployed in the framework of the CARI3P programme, in order to inform professional fishers about the tool.

Figure 59 : Logo of the OBSenPECHE programme

The ECHOSEA programme

In the framework of the project SELPAL, the AMOP in partnership with IFREMER initiated the development of a smartphone application for declaring the bycatch of protected species in order for Mediterranean professionals to adapt their fishing strategies in function and avoid areas of interactions.

Figure 60 : Logo of the ECHOSEA programme

This application functions even without a GSM network, using the GPS of the telephone.

It combines 2 features :

1/ FOR PROFESSIONAL FISHERS (PARTICULARLY LONGLINERS TARGETING BLUEFIN TUNA BY LINE AND INVOLVED IN A LABELLING PROCESS)

ECHOSEA is used to :

- record and localise the presence and bycatch of marine animals such as rays and sharks ;
- access distribution maps of fragile species, in order to minimise the risk of bycatch ;
- join a network of "fisher-observers" of the marine environment, and enhance knowledge about these fragile species ;
- access satellite maps of oceanographic data (temperatures, currents, plankton...).

2/ FOR NATURALISTS

For all observers of the marine environment, general public and scientists, ECHOSEA is used to :

- record and localise sightings of the emblematic marine animals of the Mediterranean: sea turtles, whales, dolphins, and seabirds ;
- access distribution maps of these species in the Mediterranean in real time, to observe them better ;
- contribute to the acquisition of knowledge on these species, according to the principle of participative sciences.

This application is developed by the Mediterranean Association of Producer Organisations (AMOP) in partnership with the IFREMER, thanks to support from France Filière Pêche and the Occitanie Region.

DETAILED DESCRIPTION OF THE ACTION AND THE OPERATIONS TO BE CARRIED OUT

Voluntary declarations by fishers via OBSenMER (fishing programme)

1/ EXTENSION OF THE OBSENMER PROGRAMME TO BIRDS, INCLUDING THE BALEARIC SHEARWATER

- Adaptation of the forms and development of the smartphone application to enable the entering of Balearic Shearwater bycatch (already almost operational).

(Information to be completed: characteristics of the vessel and equipment / fishing gear used; Information to be completed for each trip: weather, fishing technique used, type of bait used, fish targeted, times, seabird bycatch)

2/ AWARENESS-RAISING/PROMOTION/COMMUNICATION CAMPAIGN TO ASSIST THE ROLLOUT OF THE TOOL

- Support of the NAP facilitator for awareness-raising and information actions promoting the utilisation of OBSenMer for seabirds (CRPMEM /CDPM/PNMI/ OFB). Mutualisation with the CARI3P questionnaires/interviews with fishers on the sites Mor Braz and Île d'Yeu.

For information, the facilitation of OBSenPêche (marine mammals) required approximately ½ workday per week during the experimentation phase for about 20 vessels involved.

Voluntary declarations by fishers via the ECHOSEA tool

1/ DEVELOPMENT OF THE ECHOSEA APPLICATION FOR BIRDS INCLUDING THE BALEARIC SHEARWATER, TO ENABLE THE ENTERING OF BYCATCH

- Adaptation of the forms and development of the smartphone application to enable the entering of Balearic Shearwater bycatch + adding the "take photo" feature.

(Information to be completed: characteristics of the vessel and equipment / fishing gear used; Information to be completed for each trip: weather, fishing technique used, type of bait used, fish targeted, times, seabird bycatch)

2/ SUPPORT OF THE NAP FACILITATOR FOR AWARENESS-RAISING/PROMOTION/ COMMUNICATION ACTIONS TO ASSIST THE ROLLOUT OF THE TOOL (AMOP, OP SATHOAN, CRPM OCCITANIE/PNMGDL)

GEOGRAPHICAL LOCATION

French territorial waters (Atlantic and Mediterranean coverage).

FRENCH TERRITORIAL WATERS (ATLANTIC AND MEDITERRANEAN COVERAGE)

Actions of the CARI3P programme (EMFAF).

LINK WITH OTHER ACTIONS

- Number of OBSenMER forms filled in and number of associated catches.
- Number of ECHOSEA forms filled in and number of associated catches.
- Number of birds captured.
- Rate of bycatch and mortality rate.

DELIVERABLES EXPECTED (INCLUDING MAPS)

- Files of voluntary declarations / OBSenMER and data banked in ECHOSEA.
- Annual summary report on bycatch / Statistical results on the rate of capture and mortality.

STAKEHOLDERS AND ORGANISATIONS MOBILISED

- Operator/Service provider: GECC, OP SATHOAN.
- Partners: CRPMEM, OFB.
- Project supervision: OFB, DREAL Bretagne.
- Associated partners: DIRM Med, DREAL Occitanie.

ESTIMATED BUDGET AND FUNDING SOURCES AVAILABLE

OFB funds + remainder EMFAF European Union Fund + FFP.

Adaptation forms/development of OBSenPECHE (OBSenMER tool) = 3 000 € ->GECC.

Functional update (repairing bugs detected during utilisation): 4000€/yr.

Development of the photo option in the event of bird capture for Photo-ID = 10 000 €.

PROVISIONAL SCHEDULE

2020	2021	2022	2023
Development of the OBSenMER and ECHOSEA applications for seabird feature + communication plan (2nd half of the year)	Development of the OBSenMER and ECHOSEA applications for seabird feature + communication plan (1st half of the year). Rollout of OBSenPECHE and ECHOSEA for the entering of seabird bycatch: summer 2021	Rollout of OBSenPECHE and ECHOSEA for the entering of seabird bycatch: summer 2022	Analysis of the results

BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

Genovart & al., 2016, Cortes & al., 2017 and 2018, Boué & al., 2013, Boué et al., Oliveira & al, 2015, Summary of the Spanish CSWG 2017.

LIMIT THE PRESSURES CAUSED BY NAUTICAL LEISURE ACTIVITIES (PWC, SAILING, KITE BOARDING) AND RECREATIONAL FISHING

CODE 2.8 PRIORITY 2

GENERAL OBJECTIVES OF THE ACTION

Improve the taking into consideration of the conservation issues as regards to Balearic Shearwater within their preferential occupation sectors areas (feeding, rest, moult), by reducing pressures caused by nautical leisure activities (PWC, sailing, kite birding and recreational fishing.

OPERATIONAL OBJECTIVES OF THE ACTION

Organise information sharing (bottom-up and top-down) and improve the practices of the users by working with the socio-professional representatives of nautical leisure activity and recreational fishing practitioners on a regional/ national scale, and also with clubs and the users themselves on a local scale.

CONTEXT AND GENERAL DESCRIPTION OF THE ACTION

Personal Watercraft (PWC)

These mostly coastal activities are practised by a limited number of people from marinas or yacht harbours. This activity is essentially practised in the summer, but also on weekends from spring to autumn.

According to the assessment of the 2016 protocol-based monitoring (GEOCA & Bretagne-Vivante, 2016), it seems that disturbance to groups of Balearic Shearwaters is limited in terms of frequency, given the relatively small numbers of users in the coastal waters frequented by the species. **However, the intensity of the disturbance when it occurs is probably very high. Serious disturbance of a group of more than 300 Balearic Shearwaters by 10 PWC was well documented in Mor Braz (Bretagne vivante/GEOCA, 2016).**

Figure 61 : A group of Balearic Shearwaters disturbed by PWC on a Mor Braz stopover site (© Franck Latraube)

Recreational fishing

This is the leisure activity whose interactions with the Balearic Shearwater are best documented, especially in Saint Brieuc, Mont Saint Michel and Lannion Bays off the northern Brittany coast. The protocol of the 2016 national monitoring campaign systematically included this type of interaction in the censuses. (GEOCA & Bretagne-Vivante, 2016).

2 types of interactions are documented :

- disturbance of groups of Shearwaters gathered in feeding rafts, with the recreational fishers using the location of these rafts as indicators of the presence of fish ;
- bycatch of shearwaters by line fishers.

Figure 62 : Observation of Balearic Shearwater bycatch in Lannion Bay in August 2011 (© L. Thébault in GEOCA & Bretagne-Vivante, 2016)

Non-motorised nautical leisure activities: sailing, kayaking, nature sports

The interactions of this type of activity with Balearic Shearwater are not documented in the literature but are likely to exist. It includes the following activities: sailing, kite boarding, sea kayaking, paddle boarding, sea wading, etc.

These sports and activities are practised throughout the year in function of the weather conditions, but the number of users is higher in the summer period and at the weekend in from spring to autumn. Several tens to hundreds of leisure boats can thus frequent the coastal waters of sites with a significant presence of Balearic Shearwater (stopover and transit).

It therefore seems opportune to work with the representatives and users of these activities in order to share as much information as possible, better characterise the interactions between these activities and the Balearic Shearwater, and also to improve the practices and thus avoid/limit the disturbance impact on the principal, highly coastal stopover sites of the species in French waters, during the significant periods of presence of the species between June and October. In particular, this covers the following areas :

- Mont Saint Michel Bay and Les Havres coast ;
- Saint Brieuc Bay ;
- Iroise Sea / Douarnenez Bay ;
- Mor Braz ;
- Vendée coast / Île d'Yeu ;
- Southern Landes Shelf / Gouf de Capbreton.

DETAILED DESCRIPTION OF THE ACTION AND THE OPERATIONS TO BE CARRIED OUT

Action, piloted and coordinated by the NAP facilitator, involving :

National/regional scale

1/ Supporting the national representation organisations of the activities listed here in organising an internal survey firstly to raise members' awareness of the issues facing the Balearic Shearwater and secondly to provide feedback on information to better characterise (quantification, spatialisation) the interactions between these various activities and the Balearic Shearwater.

Targeted federations: Confédération du Nautisme, Fédération Française Motonautique (FFM), Fédération Française de Voile (FFV), Fédération Nationale de la Pêche Plaisance (FNPP).

2/ Supporting the national representation organisations of the activities listed here in implementing information and awareness-raising actions on the issues facing the Balearic Shearwater, via the publication of a dedicated article disseminated in periodical reviews published by these organisations, and by the dissemination of a leaflet to clubs and particularly to members of these organisations.

Targeted federations: Confédération du Nautisme, Fédération Française Motonautique (FFM), Fédération Française de Voile (FFV), Fédération Nationale de la Pêche Plaisance (FNPP).

Local scale

1/ Systematising contact with the NAP facilitator on the part of the managing authorities/facilitators of marine Natura 2000 sites (and the Natural Heritage project managers of the PNMs concerned) during the supervising of assessment files of Natura 2000 incidences or during local work with the stakeholders and socio-professional partners connected with these activities ;

2/ Supporting the managing authorities/facilitators of the marine Natura 2000 sites (SPAs) concerned by the issues facing the Balearic Shearwater in the writing of a Natura 2000 charter aimed at PWC service companies, nautical leisure activity clubs (sailing, surf boarding, sea kayaking, paddle boarding, sea wading), and recreational fishing clubs to raise awareness on the issues facing the Balearic Shearwater.

3/Supporting the managing authorities/facilitators of marine Natura 2000 sites (and the Natural Heritage project managers of the PNMs concerned) in the implementation of information and **awareness-raising actions** about the issues facing the Balearic Shearwater, through the publication of specific articles disseminated in the ways planned in the framework of the Management Plan, and by the dissemination of a leaflet to clubs and particularly to members of these organisations.

List of the marine Natura 2000 sites (SPAs) to be contacted directly by the NAP facilitator (from south to north, **in bold** the sites presumably the most concerned by the stopovers of Balearic Shearwater) :

- **FR7212013 Estuary of the Bidassoa and Fontarabie Bay**
- **FR5212015 Sector of Île d'Yeu**
- **FR5212014 Loire Estuary - Bourgneuf Bay**

- **FR5212013 Mor Braz**
- **FR5310074 Vilaine Bay**
- **FR5312011 Houat-Hoëdic islands**
- FR5312010 Dunes and coasts of Trévignon
- FR5310057 Archipelago of Glénan
- FR5312009 Rocks of Penmarc'h
- **FR5310072 Ouessant-Molène**
- FR5310073 Morlaix Bay
- FR5310011 Granit Rose-Sept Iles coast
- FR5310070 Tregor Goëlo
- **FR5310050 Saint Brieuc Bay – East**
- FR5310095 Cap d'Erquy-Cap Fréhel
- **FR2510048 Mont Saint Michel Bay**
- FR2510037 Chausey
- FR2512003 Havre de la Sienne

Among the PNMs, Iroise PNM is the one which is the most concerned by the issues of the species.

In each of the scenarios, recommendations will be adapted on a case-by-case basis.

Nevertheless, these recommendations will be adjusted around the following objectives and guidelines.

Objectives

- Prevent the risk of disturbance by the various nautical and leisure activities in the sectors most frequented by significant stopovers of feeding rafts of Balearic Shearwater, in the peak period for presence of the species.
- Prevent the risk of disturbance by the various nautical and leisure activities in the sectors most frequented by significant stopovers of feeding rafts of Balearic Shearwater, around the peak period for presence of the species.

Recommendations (indicative list, to be precisely spatialised and adapted on a case-by-case basis)

- Temporary suspension of PWC activities during the peak period of the presence of feeding rafts of Balearic Shearwater.
  For example, Mont Saint Michel and Saint Brieuc Bays: 1 month to position between mid-July and mid-September / Iroise Sea: 1 month to position between early and late June even between early September and late September / Mor Braz and Vendée coast: 1 month to position between early August and mid-October.
- Limitation of PWC activities (number of trips / day) and limitation of during periods of presence of rafts, but outside the peak period of presence of the species.
  For example, Mont Saint Michel and Saint Brieuc Bays: from early June to mid-July then from mid-September to late October/ Iroise Sea: in May then from late September to late October / Mor Braz and Vendée coast: from

early June to early August then from mid-October to mid-November.
For example, limitation of the number of PWC/day per company (to be defined on a case-by-case basis) / Speed limit of 5 knots close to feeding rafts of Balearic Shearwater and a minimum distance of 300m when approaching any gathering of seabirds.

- Comply with approach distances for kayaks/paddle boards/kite boards during peak periods of presence of the species: minimum distance of 300m when approaching any gathering of seabirds.
  For example, Mont Saint Michel and Saint Brieuc Bays: from mid-July to mid-September / Iroise Sea: from early to late June then from early September to late September / Mor Braz: from early August to mid-October.
- Limitation (even suspension) of certain recreational fishing gear during peak periods of presence of the species and presence of feeding rafts of Shearwaters :
  For example, longlines with live bait (such as sand eels, sardines or anchovies) for the following periods: Mont Saint Michel and Saint Brieuc Bays: from mid-July to mid-September / Iroise Sea: from early to late June then from early September to late September / Mor Braz: from early August to mid-October.
- Adaptation of practices for certain recreational fishing gear during peak periods of presence of the species :
  For example, for lines/longlines with live bait (such as sand eels, sardines or anchovies: casting at night, ballasting of the lines, use of non-living bait, etc.)

Actions to be carried out

This participation will be formalised by the proactive involvement of the NAP facilitator who will contact all the Marine Natura 2000 facilitators/managing authorities of the sites listed above, and of the Marine Natural Parks concerned by the issues facing the Balearic Shearwater, in order to share the state of knowledge and issues in their respective areas of responsibility, and in view of implementing the actions listed here.

At the same time, the NAP facilitator will be clearly identified by these various contacts and will propose his/her technical support on any issues concerning the Balearic Shearwater.

GEOGRAPHICAL LOCATION

Channel, Atlantic and Mediterranean seaboards.

LINK WITH OTHER ACTIONS

- Facilitation of the NAP.
- NAP communication plan.

MONITORING AND ASSESSMENT INDICATORS

- Number of times the facilitator participates in work meetings (in person or remote) with all the stakeholders above listed (facilitators/ N2000managing authorities, representatives of socio-professional organisations for nautical and sea leisure activities.
- Number of Natura 2000 charters signed on the issue.
- Number of requests for the NAP facilitator by the N2000 and MNP facilitators to provide technical support for designing and/or implementing measures targeting nautical and sea leisure activities.

DELIVERABLES EXPECTED (INCLUDING MAPS)

- Minutes of meetings.
- Activity reports of the NAP facilitator.

STAKEHOLDERS AND ORGANISATIONS MOBILISED

- Operator/Service provider: NAP Facilitator (OFB).
- Partners: DDTM concerned, Marine Natura 2000 facilitatord/managing authorities (Atlantic and Channel sites), Confédération du Nautisme, Fédération Française Motonautique (FFM), Fédération Française de Voile (FFV), Fédération Nationale de la Pêche Plaisance (FNPP), UFOLEP, Ministry of Sports, Nautical and sea leisure activity clubs on the principal bird stopover sites listed above.
- Project supervision: OFB, DREAL Bretagne.

ESTIMATED BUDGET AND FUNDING SOURCES AVAILABLE

Included in NAP steering and facilitation.

PROVISIONAL SCHEDULE

Process to be carried out during the 3 first years of implementation of the NAP (Cycle 1).

BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

GEOCA & Bretagne-Vivante (2016), Thébault & Yesou (2012), Yésou & Thébault (2011), Boué et al. (2013).

INTERACTIONS WITH OFFSHORE WIND FARMS: CHARACTERISATION OF IMPACTS AND IMPLEMENTATION OF ARC MEASURES

CODE 2.9 PRIORITY 1

GENERAL OBJECTIVES OF THE ACTION

Enhance knowledge on the interactions between the Balearic Shearwater and offshore wind farms, improve the consistency of impact monitoring measures, and implement impact mitigation measures where appropriate.

OPERATIONAL OBJECTIVES OF THE ACTION

Pool and build upon intended measures in the framework of the construction of offshore wind farms off Metropolitan France.

CONTEXT AND GENERAL DESCRIPTION OF THE ACTION

A specific workgroup on offshore wind farm projects was created during the writing of the NAP. A workshop was held to share the various ARC measures, monitoring and support measures and R&D programmes planned by each developer. The aim is to pool, harmonise and coordinate about the specific issue of the Balearic Shearwater during the implementation of the measures of the various projects whose construction/operation schedules are not concomitant.

The NAP facilitator will continue leading the workgroup in order to optimise the characterisation of interactions between ARC measures and the Balearic Shearwater, and to allow for the correct implementation of the ARC measures required to maintain the conservation status of the species.

DETAILED DESCRIPTION OF THE ACTION AND THE OPERATIONS TO BE CARRIED OUT

The action here consists in facilitating the ARC workgroup made up of French offshore wind project developers. The NAP facilitator will be responsible for the following tasks :

- propose ways of harmonising some of the planned ARC measures (limiting light pollution, reducing disturbance of rafts by works and maintenance vessels, reducing disturbance by helicopters, etc.) ;
- propose ways of pooling and harmonising some of the planned monitoring measures (digital aerial monitoring, telemetric monitoring) ;
- propose the updating of monitoring protocols according to the latest scientific and technological advances (automation of the processing of data acquired by digital aerial monitoring, improvement of radar technology (3D in particular), monitoring by camera (day + night), camera/radar coupling, etc.) ;

- propose the refining and/or adaptation of certain measures (ARC, monitoring operations) according to the first results obtained on operating wind farms ;
- participate in the Scientific and Management Committee meetings of the various wind farms, as well as the SIGs set up within the framework of some of these wind farms, in order to ensure that the issues related to the Balearic shearwater are correctly taken into account ;
- ensure the reporting and banking of data and results from the monitoring of planned measures specific to the Balearic Shearwater within the framework of the various projects: characterisation of interactions, ARC measure effectiveness ;
- ensure the summarising and sharing of feedback obtained through the various experimental/R&D measures carried out by the different developers ;
- ensure the summarising and sharing of feedback from the various ARC measures carried out by the different developers ;
- propose corrective or additional actions according to the results from the initial monitoring carried out by the various developers (reallocation of monitoring measures that would allow better risk assessment) ;
- propose corrective or additional actions according to the results from the first ARC measures implemented (redefinition of ARC measures that would better reduce the risks) ;
- ensure that the monitoring planned by each of the wind farms is integrated into the monitoring strategy implemented within the framework of the NPA for the Balearic Shearwater: potential adaptation of the monitoring protocols for optimal integration into the strategy, agreements for the provision of data, data recovery, communication work with data producers, etc. ;
- aim to harmonise protocols and monitoring measures in the development of new offshore wind farms.

It will also involve ensuring the coordination and structuring of the different phases of the Balearic shearwater monitoring programme by telemetry (GPS bio-logging). Indeed, even if the first phase of the programme (over 2 years) will be financed through the AMOPUFOM project, financed by the EMFAF and the OFB from 2021, the rest of the programme will be financed through the monitoring measures planned by the Saint-Nazaire (EDFRe) and Noirmoutier-Yeu (Engie Green) offshore wind farms from 2023 or 2024. The objective here will be to ensure coherence and continuity between these different programme phases, while allowing for building on feedback from the first phases (marine data capture techniques, GPS tagging, techniques for attaching GPS tags to birds, etc.). **An action file dedicated to the bio-logging monitoring programme is also formalised in this NAP.**

The NAP facilitator will also be responsible for the administrative work behind the contracting and agreements with the various wind farm developers within the framework of this action: drafting and setting up agreements for data provision and result sharing, etc. Finally, he/she will be responsible for reporting on the actions carried out in the framework of offshore wind projects, and for the annual summary of these actions for presentation to the steering committee monitoring the NAP.

GEOGRAPHICAL LOCATION

Atlantic and Mediterranean seaboards.

LINK WITH OTHER ACTIONS

- Actions related to the implementation of the monitoring strategy.
- Facilitation/steering of the NAP.

MONITORING AND ASSESSMENT INDICATORS

- Number of meetings of the MRE workgroup.
- Number of harmonised protocols as a result of experience/information sharing.
- Number of measures shared between different wind farms for better measure efficiency.
- Number of measures (ARC, monitoring, support) that have been refined or modified following proposals by the facilitator.
- Number of additional or corrective actions implemented.

EXPECTED DELIVERABLES (INCLUDING MAPS)

- Minutes from the MRE workgroup's internal meetings and exchanges.
- Activity report on NAP facilitation.

STAKEHOLDERS AND ORGANISATIONS MOBILISED

- Operator/Service provider: NAP facilitator (OFB).
- Partners: EDF-RE, ENGIE Green, Ailes Marine, Eolfi, Quadran, France Energie Marine, WPD Offshore, Fortum.
- Project supervision: OFB, DREAL Bretagne.

ESTIMATED BUDGET AND FUNDING SOURCES

- Included in NAP facilitation and steering.

PROVISIONAL SCHEDULE

Continuously throughout the various NAP implementation cycles. At least one MRE workgroup meeting/year.

BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

List of ARC measures in Annexe 1.

3.3.3 OBJECTIVE 3: REDUCE THE THREATS IDENTIFIED AT SEA AND IN COASTAL WATERS

INTERACTIONS WITH SOCIO-PROFESSIONAL ACTIVITIES

TESTING OF RISK REDUCTION MEASURES FOR BYCATCH BY PROFESSIONAL FISHERIES IN THE CASE OF PROVEN AND CHARACTERISED BYCATCH RISK (CARI3P)

CODE 3.1 PRIORITY 1

GENERAL OBJECTIVES OF THE ACTION

Reduce the risks of Balearic Shearwater bycatch by professional fishing in French Atlantic territorial waters in identified bycatch risk scenarios through dedicated actions to characterise the interaction (the CARI3P programme in particular).

OPERATIONAL OBJECTIVES OF THE ACTION

Implement dedicated testing schemes aimed at reducing the rate of Balearic Shearwater bycatch by fisheries potentially at risk, in particular demersal longlines, which will be evaluated through the CARI3P programme (onboard observations and surveys with fishers), and also nets and purse seines which may also be the subject of characterisation measures during the NAP.

CONTEXT AND GENERAL DESCRIPTION OF THE ACTION

The Balearic Shearwater, whose total population is estimated at 25,000 individuals, is threatened with extinction and the latest demographic models tend to show that it will have effectively disappeared within 60 years. They also show that the adult survival rate is excessively low, mainly due to significant mortality caused by bycatch from professional fishing. The current impact of bycatch on this species, which accounts for at least 45% of the current adult mortality rate, is now considered incompatible with its survival (Genovart et al., 2016). However, it should be possible to reverse this trend by acting on the factors that lead to this bycatch.

The knowledge about Balearic Shearwater bycatch comes from Spain and Portugal, where characterisation studies and even tests of mitigation measures with dedicated devices have been implemented.

In the Atlantic, Portuguese studies have shown that the most problematic fishing techniques in their waters for the Balearic Shearwater seem to be :

- **small coastal multi-purpose boats** which fish using **demersal longlines or nets (gillnet + trammel)**. Rate of 1660 Balearic Shearwaters killed/year ;
- **purse seine** fishing, used to catch small pelagic fish such as the sardine. Rate of 368 Balearic Shearwaters killed/year.

In the Mediterranean, Spanish studies have shown in their waters that the main fishing technique used is the demersal longline.

In the NAP framework, the CARI3P project was submitted to the EMFAF for the financing of a programme covering 3 pilot sites: Mor Braz, the Ile d'Yeu SPA sector, and the Gulf of Lion.

This project headed by AGLIA will be carried out in collaboration with the CPMEMs concerned by the 3 pilot sites, and the OFB as a technical partner. It is divided into two distinct actions that aim to characterise the interactions using two complementary methods :

1. Assessment of the fleets on each pilot site and development of surveys among fishers (nets, longlines and pelagic purse seines). The objective is to cover 30% of the vessels identified in the 3 study sectors.
2. Placing on-board observers on longline vessels over 2 seasons. The objective is to cover a minimum of 5% of the tides of the vessels concerned (longline fishing).

At the end of these two years of surveys, in 2021 and 2022, we will have contextualised information and quantified data on the rate of bycatch by longline fishing. In the event that a potentially damaging catch risk for the Balearic Shearwater population is identified, the action developed here will consist of testing bycatch risk reduction measures in pilot sites concerned by this risk.

DETAILED DESCRIPTION OF THE ACTION AND THE OPERATIONS TO BE CARRIED OUT

Depending on the contextualised characterisation of interactions assessed through the CARI3P programme and any other characterisation programmes that are launched, the NAP facilitator will consider which reduction measures are relevant and appropriate **through a workgroup** bringing together representatives of professional fishers already involved in interaction characterisation programmes (CNPMEM, CRPM, CDPM, POs), the Steering Committee's associated experts, the Spanish and Portuguese partners (SEO, SPEA, AZTI) in order to benefit from their feedback on the subject, as well as scientific and associative partners (GISOM, LPO BirdLife, IFREMER). This collective mobilisation will be used to design a testing programme for one or more risk reduction devices.

The device testing programme will mobilise the groups of measures already tested in Spain and Portugal to reduce the risk of longline, net and purse seine fishing seabird bycatch (Lambrechts A. & Entraygues M., 2019. État des connaissances relatives aux captures accidentelles de Puffin des Baléares par la pêche professionnelle. 26p.). These measures will be adapted to the specific context of each targeted fishery described during the phase of characterising interactions and quantifying the risk of capture. They may combine several measures together in order to improve their effectiveness, as recommended by the Spanish and Portuguese partners who have already tested such measures.

Methods to discourage birds from accessing hooks/bait or other fishing gear :

- streamer lines (or tori lines, or scaring lines) ;
- olfactory or acoustic bird deterrents ;
- deterrent kites ;
- rotating signs.

Ways of limiting access to baited hooks by increasing longline lowering speed or other methods :

- weighted lines ;

- the Chilean system ;
- bait defrosting ;
- vertical longlining ;
- NISURI FastSet system.

Methods of avoidance for times and areas that maximise the probability of presence and interaction with birds :

- casting at night ;
- seasonal and/or localised closures.

Methods for reducing the risk of capture by gillnets and seines :

- deterrent kites (already tested on longliners, nets, seines) ;
- deterrent rotating signs (tested on gillnets).

GEOGRAPHICAL LOCATION

- «Fishing interactions» pilot sites mobilised by the CARI3P programme: Mor Braz, Ile d'Yeu, Gulf of Lion.
- Pilot sites potentially added to CARI3P: Saint-Brieuc Bay, Iroise Sea, Gouf de Capbreton.
- Other pilot sites that have been the subject of interaction characterisation programmes.

ASSOCIATION WITH OTHER ACTIONS

- Actions to characterise fishing interactions (Atlantic).
- Action files related to the CARI3P programme.
- OBSenMER/ECHOSEA action file.

MONITORING AND ASSESSMENT INDICATORS

- Number of « programme for testing reduction measures" workgroup meetings.
- Number of measure testing campaigns.
- Number of pilot sites mobilised for the phase of testing reduction measure.
- Bycatch rate and mortality rate with/without the implementation of reduction measures.
- Produce an efficiency indicator (cost/benefit) for the planned reduction measures.

EXPECTED DELIVERABLES (INCLUDING MAPS)

- Minutes from the workgroup meetings.
- Summaries of the measure testing campaigns/Reports concluding the campaigns on the testing of reduction measures.

STAKEHOLDERS AND ORGANISATIONS MOBILISED

- Operator/Service provider: AGLIA or OFB.
- Partners: CNPMEM, CRPM Bretagne, COREPEM, CRPM Occitanie, OP Sathoan, OP Sud, CDPM 56, CDPM 44, SEO, SPEA, AZTI, DIRM NAMO, DIRM SA, DIRM Med, IFREMER.
- Project supervision: OFB, DREAL Bretagne.
- Associated partner: LPO (LIFE+ PanPuffinus), GISOM.

ESTIMATED BUDGET

- European Union EMFAF Fund + France Filière fisheries fund.
- BirdLife, foundations (MAVA, Biotope, Albert II of Monaco).
- Offshore wind farm developers.
- Budget to be defined at the end of the characterisation phase and by specific workgroups dedicated to the design of the testing programme for reduction measures.

PROVISIONAL SCHEDULE

2022-2023	2024	2025
Analysis of the CARI3P programme results and of the actions characterising interactions with professional fishing. Meetings of the «testing of reduction measures» workgroup and design of the programme of measures Submission of a draft measure testing proposal to the identified funding bodies (EMFAF, FFP)	Implementation of tests of reduction measures at identified pilot sites Testing campaigns at sea	Analysis of the results and production of the associated deliverables: campaign reports, result summary report

Estimations for longline interactions. This will depend on the progress of the characterisation programme for other fishing gear.

BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

Genovart & al., 2016, Cortes & al., 2017 and 2018, Boué & al., 2013, Boué et al., Oliveira & al, 2015, Summary of the spanish CSWG 2017, Lambrechts & Entraygues, 2019, Oliveira & al., 2015, Brothers & al., 2014, Cortes & al., 2018, Cortes & al., 2017, Tarzia & al., 2017, Belda & al., 2001.

ORGANISATION OF EXPERIENCE SHARING BETWEEN PROFESSIONAL PORTUGUESE AND FRENCH FISHERS

CODE 3.2 PRIORITY 1

GENERAL OBJECTIVES OF THE ACTION

Enhance knowledge about bycatch of Balearic Shearwater in French territorial Atlantic waters and improve practices for better taking into consideration of the issues of conserving this species by professional fishing.

OPERATIONAL OBJECTIVES OF THE ACTION

Take advantage of the knowledge and experience already acquired by Portuguese fishers to enable a better appropriation and involvement of French fishers in the implementation of this type of actions, regarding the acquisition of knowledge on the nature of the interactions of fishing gear with the Balearic Shearwater, the risk of bycatch, and the testing of procedures for reducing this risk of bycatch.

CONTEXT AND GENERAL DESCRIPTION OF THE ACTION

The Balearic Shearwater, whose total population is estimated at 25 000 individuals, is endangered with extinction and the latest demographic models tend to show that it will have effectively disappeared within 60 years. They also show that the adult survival rate is excessively low, mainly explained by significant mortality due to bycatch from professional fishing. The impact of bycatch on this species, accounting for at least 45% of the current adult mortality rate, is now considered as incompatible with its survival (Genovart et al., 2016). But it must be possible to inverse this trend by acting on the factors which lead to this bycatch.

The knowledge about bycatch regarding the Balearic Shearwater comes from Spain and Portugal, where characterisation studies and even tests of reduction measures with specific procedures were implemented.

In the Atlantic, Portuguese studies showed that, in their waters, the most problematic fishing gear for the Balearic Shearwater seem to be :

- **small coastal multi-purpose boats which fish using demersal longlines or nets (gillnet + trammel)**. Rate of Balearic Shearwaters killed/yr 1660 ;
- **purse seine** fishing, used to catch small pelagic fish such as sardines. Rate of Balearic Shearwaters killed/yr 368.

In the Mediterranean, Spanish studies showed that, in their waters, the principal fishing technique concerned is the **demersal longline**. The main types of vessels concerned are small (coastal fishing), multi-purpose boats, operating near the coasts, especially with sardines and anchovies as bait.

The action developed here aims to have professional Portuguese fishers involved in these programmes in Portugal to encounter French volunteer professional fishers in the field, on 3 pilot sites identified in France, to become involved in these types of actions (assessment and reduction of bycatch).

In the event of the successful outcome of this interprofessional encounter, the action could be reconducted with other French fishers, on other sites, possibly with other fishing gear (net, purse seine): in the Mediterranean, or other Atlantic sectors (northern coast of Brittany, Gouf de Capbreton ...).

DETAILED DESCRIPTION OF THE ACTION AND THE OPERATIONS TO BE CARRIED OUT

The pilot sites selected (in function of the probability of presence of the Balearic Shearwater and of similar fishing practices) are as follows :

- the Ile d'Yeu sector, sailing out of the port of Sables-d'Olonne or Saint-Gilles Croix-de-Vie ;
- the Mor Braz sector, sailing out of the port of La Turballe or Le Croisic ;
- the Iroise Sea sector, sailing out of the port of Douarnenez.

The 2 Portuguese fishers will be accompanied by Nuno Oliveira, representative of the SPEA (BirdLife International partner NGO with whom they work in Portugal) for 3 days of meetings. Contact has already been made with Nuno Oliveira, who has given his agreement in principle. The SPEA has already mobilised 2 professional fishers (demersal longliners) involved and interested in the approach and ready to participate in this "bus tour».

During these 3 days (carried out on board a minibus) there will be exchanges, discussions and experience-sharing with the French volunteer fishers identified on the 3 pilot sites.

With the help of the CRPMs involved (COREPEM and CRPM Bretagne), which have already expressed their interest in this approach and have given their agreement in principle to participate, the French fishers will be selected from each of the 3 pilot sites based on the following criteria :

- volunteer fishers interested in the approach (assessment of bycatch rate, testing reduction measures) ;
- fishers from the small-scale, multi-purpose fleet using the demersal longline, and also nets (gillnets, trammels).

The «bus tour» will be organised with the presence of a professional translator to simplify exchanges and discussions and an expert facilitator.

The funding of this action includes :

- booking airplane tickets for 3 people coming from Portugal (flight from Lisbon to Nantes or Bordeaux) ;
- rental of a minibus from Nantes for 4 days ;
- hiring a professional Portuguese/French translator for 3 days ;
- booking hotel accommodation and meals for the duration of the «bus tour».

The «bus tour» is planned as follows :

Day 1: Nantes → Sables-d'Olonne or St-Gilles-Croix-de-Vie

- Greet Portuguese participants and translator at Nantes airport.
- Pick up rental minibus in Nantes.
- Journey by minibus to Sables-d'Olonne or St-Gilles-Croix-de-Vie.
- Lunch (10 persons).
- Meetings, exchanges with the French fishers.
- Evening meal (5 persons) and hotel at Sables-d'Olonne or St-Gilles-Croix-de-Vie (5 persons).

Day 2: Sables-d'Olonne → La Turballe or Le Croisic

- Departure from hotel and journey by minibus to La Turballe / Le Croisic.
- Lunch (10 persons).
- Meetings, exchanges with French fishers.
- Evening meal (5 persons) + hotel at La Turballe (or nearby) (5 persons).

Day 3: La Turballe → Douarnenez

- Departure from hotel and journey by minibus to Douarnenez.
- Lunch (10 persons).
- Meetings, exchanges with French fishers.
- Evening meal (5 persons) + hotel at La Turballe (or nearby) (5 persons).

Day 4 Douarnenez → Nantes

- Departure from hotel and return to Nantes (airport).
- Lunch (5 persons).

GEOGRAPHICAL LOCATION

Vendée – Ile d'Yeu, Mor Braz and Iroise Sea.

LINK WITH OTHER ACTIONS

Actions of the CARI3P programme (EMFAF).

MONITORING AND ASSESSMENT INDICATORS

- Completion of «bus tour».
- French fishers' satisfaction questionnaire.

DELIVERABLES EXPECTED (INCLUDING MAPS)

- Report of the «bus tour» (Service provider + OFB).

STAKEHOLDERS AND ORGANISATIONS MOBILISED

- Operator/Service provider: Specialist service provider (consultancy, communications agency…).
- Partners: CRPM Bretagne, COREPEM, CDPM 29, CDPM 56 and 44, Iroise MNP, SPEA.
- Project supervision: OFB, DREAL Bretagne.

ESTIMATED BUDGET AND FUNDING SOURCES AVAILABLE

[15 000 € - 17 000 € TTC].
OFB funding - Secured for this action.

PROVISIONAL SCHEDULE

- To be carried out in 2021, at a favourable time (possibly in spring) to ensure maximum availability of the French and Portuguese fishers mobilised.
- An action to anticipate as much as possible with the fishers to foster maximum participation.

BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

Genovart & al., 2016, Cortes & al., 2017 and 2018, Boué & al., 2013, Boué et al., Oliveira & al, 2015, Summary of the Spanish CSWG 2017.

REDUCE IDENTIFIED THREATS

CONFIRM, REFINE AND SHARE THE ISSUES REGARDING THE BALEARIC SHEARWATER WITHIN THE SECTOR WESTERN COTENTIN LITTORAL OF THE LES HAVRES COAST, FROM BLAINVILLE TO SURTAINVILLE BEACH (TIDAL FRONT OF LES CASQUETS)

CODE 3.3 PRIORITY 2

GENERAL OBJECTIVES OF THE ACTION

Enhance knowledge of the preferential functional areas used by the Balearic Shearwater (feeding and/or rest) and, if necessary, consider their coverage by marine protected areas or regulated zones.

OPERATIONAL OBJECTIVES OF THE ACTION

Take into consideration current and future knowledge (monitoring strategy) regarding the utilisation of the northeast of the Normandy-Brittany Gulf by the Balearic Shearwater and prolong the discussion about the interest of this area with institutional and socio-professional stakeholders and environmental NGOs, in order to confirm its importance, assess possible pressures and lay the foundations of a future regulated zone, if necessary.

CONTEXT AND GENERAL DESCRIPTION OF THE ACTION

While the stopover sectors of Mont Saint Michel Bay, known as one of the major hotspots of the species in northern Brittany /Channel, are bien covered by the boundaries of the Chausey and Mont Saint Michel Bay Natura 2000 sites (Bretagne-Vivante & GEOCA, 2016), the same cannot be said of the coastal sectors of the western Cotentin coast. Yet this sector further northeast in the Normandy-Brittany Gulf, corresponding to the tidal front of Les Casquets in the north of the Cotentin, seems to be a preferential area for high concentrations of the species, probably under-assessed until now. The habitat model produced in 2019 on the basis of protocol-based data between 2004 and 2018 clearly highlights this sector, especially in August and September.

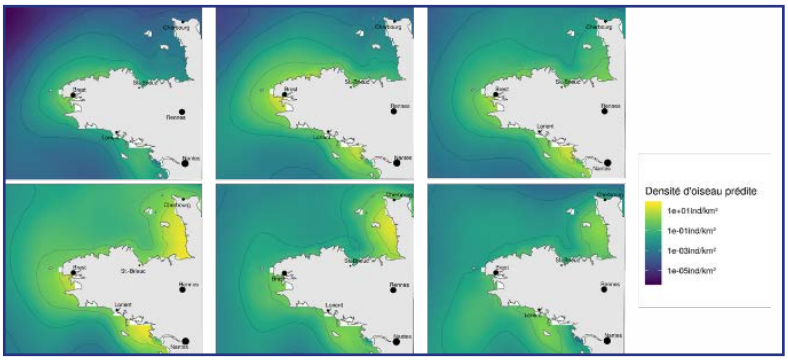


Figure 34 : Details of the evolution of abundance in the Brittany sector between May and October.

Density predicted for 2017. Le Bras Y et al., 2019. Méta-analyse des données disponibles dans la ZEE française entre 2004 et 2018. 72p.

This hypothesis of the possible importance of the Les Casquets sector for marine avifauna in general had been made for the first time in the ornithological literature on the occasion of the establishment of the initial inventory of the MSFD (Yesou et al., 2012). This hypothesis was backed up during the gathering of enhanced data by Jones et al. (2014) by the production of maps of the densities observed at sea, with correction of the sampling effort, where we once again observe the importance of this sector.

Figure 63 : Relative density of Balearic Shearwaters with sampling effort taken into account, from protocol-based observations by boat in the Channel in 2007-2010 (Jones et al., 2014)

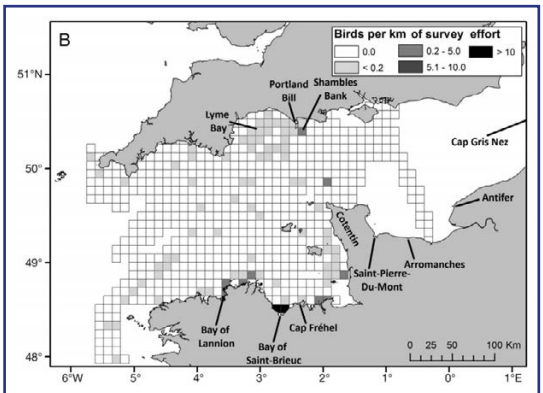


Fig. 4. MARINElife boat-based visual survey data from the Western Channel (2007–2010), gridded at 10 × 10 km resolution. All cells were surveyed; unfilled cells show absence of sightings. (A) Survey effort (km of trackline). (B) Relative density of Balearic shearwaters (number counted per km of survey effort)

Since then, other protocol-based studies and also opportunistic data gathered at sea and from the coast, in the framework of a MRE project in the sector of Pirou, tend to confirm this hypothesis. From 2008 to 2010, the studies carried out in the framework of this project highlighted large coastal stopovers, including a group of 1100 individuals in October 2008 (comm. pers in Galliin 2009). In addition to the contacts made in the transects, sightings of gatherings of Shearwaters were made outside the transects, mainly after finalisation of the surveys. These numerous contacts (more than 950 individuals during a boat trip and more than 550 by plane) were observed between August and October, mainly opposite the Les Havres coast, between the Havre de Lessay and Le Sénéquet. With regard to these numerous sightings, the Les Havres coast is presented as a permanent summering site for estimated numbers of at least 500 individuals, mainly gathered to the north of Le Sénéquet, approximately 3 km off the coasts.

The area of interest appears to be delimited to the west by the -30m isobath, to the south by the northern boundary of the SPA of Chausey (sector of Coutainville/ Blainville-sur-Mer), and in the north by Surtainville beach/cap of Flamanville, not far from the known stopover site further north of the sites monitored during the study of 2016 (Baubigny/Cap de Carteret). On this sector, the areas of high concentrations concerned are listed as SACs (FR250008 Western Cotentin coast from Saint Germain-sur-Ay to Le Rozel and FR2502018 Bank and reefs of Surtainville), but not as SPAs. The coastal sectors of the Les Havres coast are relatively well covered by SACs, but the marine sectors, even close to the coast, are not included (heavy presence of shellfish farming).

Figure 64 : Current coverage of the Les Havres coast by the Natura 2000 network (www.geoportail.gouv.fr)

This site satisfies certain eligibility criteria that could justify the proposition of creating or extending marine protected areas or regulated zones dedicated to the Balearic Shearwater, criteria presented and validated in the NAP. However, the nature and level of the possible negative pressures on the species (fishing, activities at sea), etc.) have not been clearly characterised at present.

	MINIMUM ELIGIBILITY THRESHOLDS (NAP)	CASE OF THE SECTOR OF THE COAST OF LES HÂVRES
NUMBERS/DENSITY	Regular presence of concentration(s) of more than 500 birds (2% of the population worldwide)	Regular presence of groups of more than 500 individuals in the sector of the Les Havres coast Interannual recurrence to be specified/confirmed
INTERANNUAL RECURRENCE/ANNUAL OCCURRENCE	More than 7d/yr and ≥ 3 years per 5- year cycle	
FUNCTIONALITY	Proven presence of rafts (stopover groups) of birds feeding and/or resting	Feeding, rest
PRESSURES	Presence over the high-risk period (June-October) of one or more of the following activities: professional fishing (longline, trammel nets/gillnet, ring net or purse seine), motorised nautical activities (personal watercraft, pleasure boating)	Pressures still to be assessed and quantified

The aim here is to prolong the discussion about the interest of this area with institutional and socio-professional stakeholders and environmental NGOs, in order to confirm its importance, assess possible pressures and lay the foundations of a future regulated zone or MPA, if necessary.

DETAILED DESCRIPTION OF THE ACTION AND THE OPERATIONS TO BE CARRIED OUT

L'action consiste ici à prolonger le travail d'acquisition de connaissances relatives aux enjeux liés à la conservation du Puffin des Baléares (collecte de données de présence de l'espèce sur le secteur identifié, caractérisation et quantification des pressions et menaces) et à initier des discussions autour d'une possible création de zone réglementée ou d'AMP le cas échéant.

The action here consists in prolonging the work of acquiring knowledge regarding the issues linked to the conservation of the Balearic Shearwater (gathering of data of presence of the species in the sector identified, characterisation and quantification of the pressures and threats) and initiating discussions about the possible creation of a regulated zone or MPA, if necessary.

The NAP facilitator will contact the relevant administrative authorities which could mobilise their services (DREAL Normandie, DDTM/DML 50, OFB), socio-professional organisations (CRPMEM, representatives of marine sports and leisure activities, etc) and NGOs (GONm, LPO Normandie, etc) in order to :

- organise the transmission of information and data gathered at sea or from the coast that could interest the NAP: observations of Balearic Shearwater, types of activities at sea that could lead to pressures on the species ;
- initiate an information and concertation process, prior to any creation of a regulated zone or MPA, with all of these stakeholders, in function of the exact nature of the pressures exerted in the sector.

This mobilisation of stakeholders will be formalised by the sharing of information ensured by the facilitator of the NAP (telephone conversations, video conferences, exchanges of digital documents), and by the organisation of a specific meeting, held in Normandy with the support of DREAL Normandie.

GEOGRAPHICAL LOCATION

Les Havres coast.

LINK WITH OTHER ACTIONS

- Other actions to revise/create regulated zones/MPAs for the Balearic Shearwater.
- Facilitation of the NAP.

MONITORING AND ASSESSMENT INDICATORS

- Number of meetings (by telephone, physical) organised specifically on this subject.
- Amount of data regarding the species and potentially high-risk activities gathered in the sector during the first cycle of the NAP and fed into open databases.
- Adoption/creation of an appropriate instrument for taking into consideration Balearic Shearwater issues (SPA, APPB, ZPF).

DELIVERABLES EXPECTED (INCLUDING MAPS)

- Minutes of meetings.
- Activity reports of the NAP facilitator.
- Financial assessment.

STAKEHOLDERS AND ORGANISATIONS MOBILISED

Operator/Service provider: Facilitator of the NAP (OFB).

Partners: DREAL Normandie, OFB (Channel North Sea Seaboard Delegation, DDTM/DML 50, Maritime Prefecture, NGOs such as GONm and the LPO Normandie, CRPMEM Normandie, Birds on the Edge National Trust for Jersey, Société Jersiaise.

Project supervision: OFB, DREAL Normandie.

ESTIMATED BUDGET AND FUNDING SOURCES AVAILABLE

Included in the facilitation of the NAP.

PROVISIONAL SCHEDULE

Process to be carried out during the first 3 years of implementation of the NAP (Cycle 1).

BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

GEOCA & Bretagne-Vivante (2016), Boué et al. (2013), Jones et al. (2014), NEOEN/ Biotope (2010), Yesou et al. (2012).

REDUCE IDENTIFIED THREATS

TAKING INTO CONSIDERATION OF THE ISSUES REGARDING THE BALEARIC SHEARWATER IN DOUARNENEZ BAY

CODE 3.4 PRIORITY 2

GENERAL OBJECTIVES OF THE ACTION

Enhance knowledge of the preferential functional areas used by the Balearic Shearwater (feeding, rest, moult) and consider their protection with regard to the pressures exerted.

OPERATIONAL OBJECTIVES OF THE ACTION

Take into consideration the knowledge current regarding the utilisation of Douarnenez Bay by the Balearic Shearwater, assess the potential pressures and study the best tools available for tackling these issues. Launch a concertation process to consider the protection of this important sector for the species.

CONTEXT AND GENERAL DESCRIPTION OF THE ACTION

Douarnenez Bay is a known stopover site for Balearic Shearwater, mainly in summer (with peaks in June and September), but also in winter with the exceptional presence of large groups during winter 2012-2013 (Iroise MNP, Pianalto et al. 2013, GEOCA & Bretagne-Vivante, 2016). In 2020, there was the early and prolonged (several days) presence of several thousand individuals: 2400 individuals observed and counted at sea by the teams of the Iroise Marine Natural Park on 18/5 in the bay head with several rafts, present for several days with at least 1500 individuals still present on 24/5 and more than 2300 individuals on 15/7 (fauna-bretagne.org).

The stopovers take place in various parts of the bay head, and also often on the edges of the Iroise Marine Natural Park, near Cap Sizun.

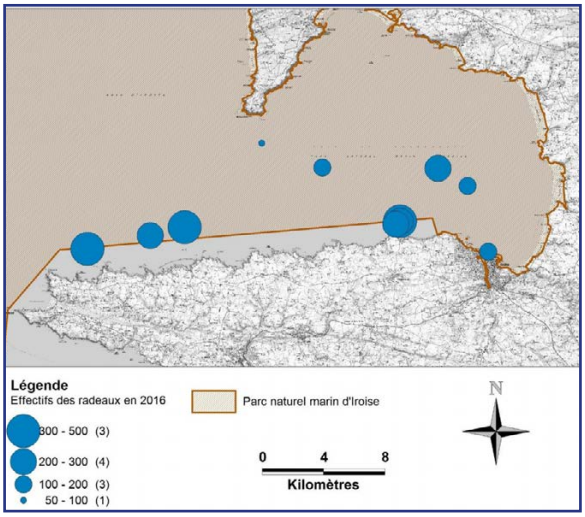


Figure 65 : Distribution of the rafts observed in Douarnenez Bay in 2016 (GEOCA & Bretagne-Vivante, 2016)

This site satisfies the eligibility criteria for commencing discussions on its protection or conservation, criteria presented and validated in the NAP :

	MINIMUM ELIGIBILITY THRESHOLDS (NAP)	CASE OF DOUARNENEZ BAY
NUMBERS/DENSITY	Regular presence of concentration(s) of more than 500 birds (2% of the worldwide population)	2020 : 2400 individuals counted 18/5 in the bay (info Iroise MNP), present for several days with at least 1500 individuals still present 24/5 (fauna-bretagne.org) 2016 : Presence of birds at the start of the season (especially June) with 500 birds regularly in rafts over several weeks (GEOCA & Bretagne Vivante, 2016) Winter 2012-2013 : some thousand individuals in early October, 1500 individuals 30/11, between 500 and 800 individuals between December and February 2012-2013 (Pianalto et al., 2013)
INTERANNUAL RECURRENCE/ANNUAL OCCURRENCE	More than 7d/yr and ≥ 3 years per 5- year cycle	
FUNCTIONALITY	Proven presence of rafts (stopover groups) of birds feeding and/or resting. Important for food with abundant potential prey	Groups observed actively fishing during the 2012-2013 season (Pianalto et al., 2013) Several thousand individuals actively fishing in May 2020
POTENTIAL PRESSURES	Presence (including level of pressure to assess) over the high-risk period (June-October) of one or more of the following activities: professional fishing (longline, trammel nets/gillnet, ring net or purse seine), motorised nautical activities (personal watercraft, pleasure boating)	Professional fishing: ring net, longline, nets Nautical activities

The sector of Douarnenez Bay largely falls within the Iroise Marine Natural Park (MNP), except for the coastal fringe of the northern littoral of Cap Sizun. The latter is covered by a Special Area of Conservation (Natura 2000, Habitats Directive) and by a Special Protection Area (Natura 2000, Birds Directive) on the historical site of breeding seabird colonies on the cliffs of the village of Goulien. Finally, there are also 2 SACs in the north of the bay, connected with the presence natural habitats of community interest and Habitats Directive species (other than birds).

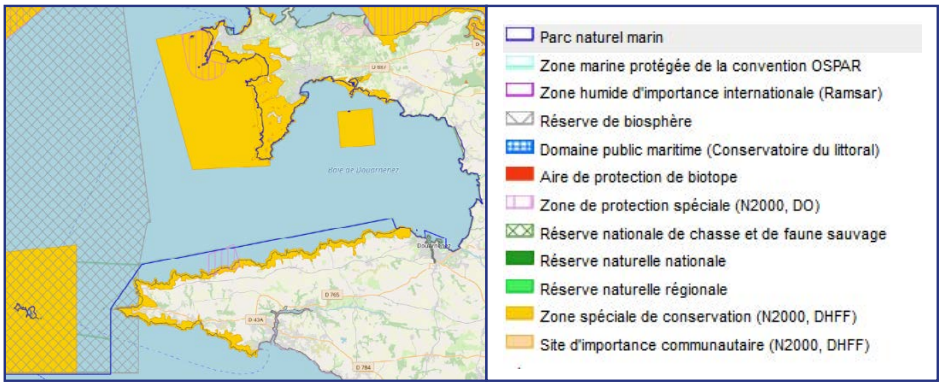


Figure 66 : Marine protected areas in the sector of Douarnenez Bay (http://carto.maianetwork.org)

It should be noted that DREAL Bretagne has committed as from 2020 to works intended to modify the boundary of the SPA to better take into consideration trends in the distribution of the Birds Directive species of Cap Sizun.

DETAILED DESCRIPTION OF THE ACTION AND THE OPERATIONS TO BE CARRIED OUT

The action consists in :

- sharing knowledge regarding the species ;
- continuing the work of acquiring knowledge regarding issues linked to the conservation of the Balearic Shearwater (gathering of presence data for the species in the identified sector, characterisation and quantification of pressures and threats) ;
- studying the different scenarios for protecting the species likely to reduce the identified pressures ;

The facilitator of the NAP will support :

- Iroise MNP ;
- the Cap Sizun local authority grouping ;
- decentralised State services (DREAL/DDTM).

This participation will be formalised by the sharing of information (telephone conversations, video conferences, exchanges of digital documents) and by participation in the workgroups organised in the framework of these considerations.

GEOGRAPHICAL LOCATION

Douarnenez Bay.

LINK WITH OTHER ACTIONS

- Other actions to revise/create regulated zones/MPAs for the Balearic Shearwater.
- Facilitation of the NAP.

MONITORING AND ASSESSMENT INDICATORS

- Number of times the facilitator attends meetings of the steering committee or workgroups (remotely or in person) organised for the implementation of this action.
- Amount of data regarding the species and potentially high-risk activities gathered in the Douarnenez Bay sector during the first cycle of the NAP.
- Adoption/creation of an appropriate instrument for taking into consideration Balearic Shearwater issues (SPA, APPB, ZPF).

DELIVERABLES EXPECTED (INCLUDING MAPS)

- Minutes of meetings.
- Activity reports of the NAP facilitator.
- Note to the management council of the Iroise MNP, study of the distribution of shearwaters in the Iroise MNP by flyover.

STAKEHOLDERS AND ORGANISATIONS MOBILISED

- Operator/Service provider: Facilitator of the NAP (OFB), Iroise MNP (OFB).
- Partners: Steering Committee of the Cap Sizun Natura 2000 site, CC Cap Sizun, DREAL Bretagne, Maritime Prefecture, Prefecture of Finistère, DDTM 29, Bretagne Vivante, other NGOs.
- Project supervision: OFB (Iroise MNP, Seaboard Delegation), DREAL Bretagne/DDTM.

ESTIMATED BUDGET AND FUNDING SOURCES AVAILABLE

Included in the steering and facilitation of the NAP.

(Note the 220 K€ of funding by the Iroise MNP for carrying out flyovers around the Park including Douarnenez Bay, which will refine the information available on the distribution of the species).

PROVISIONAL SCHEDULE

Process to be carried out during the first 3 years of implementation of the NAP (cycle 1).

BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

GEOCA & Bretagne-Vivante (2016), Thébault & Yesou (2012), Yésou & Thébault (2011), Iroise MNP Pianalto et al. (2013), Boué et al. (2013).

REDUCE IDENTIFIED THREATS

TAKING INTO CONSIDERATION ISSUES REGARDING THE BALEARIC SHEARWATER IN THE SPA SAINT BRIEUC BAY - EAST

CODE 3.5 PRIORITY 2

GENERAL OBJECTIVES OF THE ACTION

Enhance knowledge of the preferential functional areas used by the Balearic Shearwater (feeding and/or rest) and consider their coverage by marine protected areas or regulated zones.

OPERATIONAL OBJECTIVES OF THE ACTION

Take into consideration current knowledge regarding the use of Saint Brieuc Bay by the Balearic Shearwater, by further discussing the interest of this area with institutional and socio-professional stakeholders and environmental NGOs, in order to confirm its importance, to assess possible pressures and review the best tools for integrating these issues (extension of the SPA « St Brieuc Bay - East «, regulated zoning approach, ...).

CONTEXT AND GENERAL DESCRIPTION OF THE ACTION

Saint Brieuc Bay is a historical stopover site of Balearic Shearwater, in June and in October (GEOCA & Bretagne-Vivante, 2016, Boué et al., 2013, Février et al. 2011, Février et al. 2012, Yesou and Thébault, 2012).

The stopovers are often situated outside the Special Protection Area (Roselier Point, Martin-Plage, Rocks of Saint-Quay), especially since monitoring from the coast carried out in 2011 2012, 2013 and 2016 does not take into account censuses carried out in the west of the bay, which certainly reveal a higher frequency of the species outside the SPA (Boué et al., 2013, February et al., 2011; February et al., 2012; Bretagne-Vivante & GEOCA, 2016).

This had already been highlighted during the FAME coastal monitoring programme (Boué et al., 2013) and seems be confirmed by the distribution maps of Balearic Shearwater stopovers produced in the framework of the initial state assessment of the marine wind power project of Saint Brieuc Bay. The largest gatherings take place in the south of Saint Brieuc Bay: shallow sectors situated near the Rocks of Saint-Quay-Portrieux and of the Rocks d'Erquy (In Vivo, 2013).

Figure 67 : Comparison of the distribution of feeding rafts of Balearic Shearwaters observed in the head of Saint Brieuc Bay in 2015 and during previous monitoring operations (cumul 2011, 2012, 2013) (Bretagne Vivante & GEOCA, 2016)

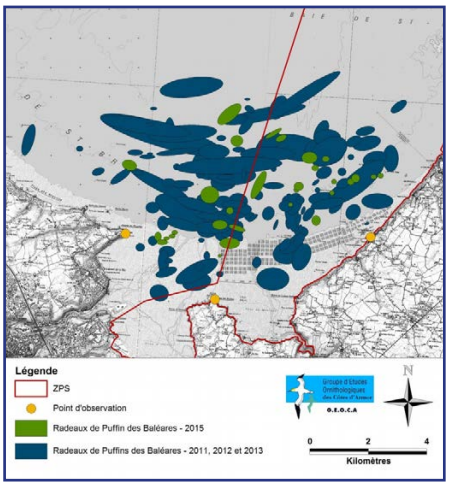


Figure 68 : Sightings of Balearic Shearwaters in 2012 and the SPA in Saint Brieuc Bay (FAME Programme, Boué et al.

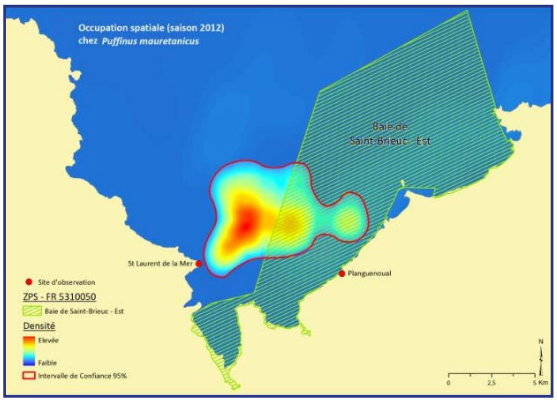


Figure 35 : Distribution and numbers of shearwaters (Balearic in black) within the study area covered by flyovers – Marine wind power project of Saint Brieuc Bay - Campaigns by plane 2013/2014 (IN VIVO)

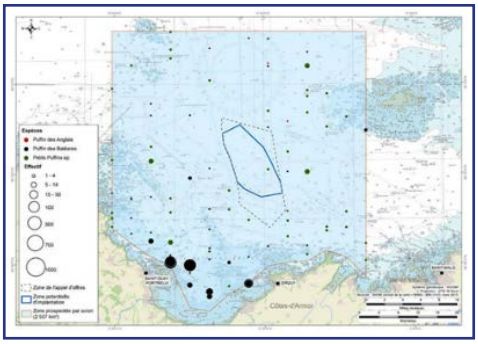


Figure 69 : Marine protected areas in the sector of Saint Brieuc Bay (http://carto.maia-network.org)

The eastern half of the Saint Brieuc Bay sector is covered by aa Special Area of Conservation (Natura 2000, Habitats Directive) and the other half by a Special Protection Area (Natura 2000, Birds Directive). The bay head is also classified as a National Natural Reserve. The functional sectors for the Balearic Shearwater situated to the west of the bay are not covered by MPAs or regulated zones.

This site satisfies the eligibility criteria that could justify the proposition of creating or extending regulated zones, or even marine protected areas specifically for the Balearic Shearwater, criteria presented and validated in the NAP.

	MINIMUM ELIGIBILITY THRESHOLDS (NAP)	CASE OF SAINT BRIEUC BAY
NUMBERS/DENSITY	Regular presence of concentration(s) of more than 500 birds (2% of the worldwide population)	Groups of 500 to more than 3000 individuals present over several consecutive weeks, in summer 2011, 2012, 2015 and 2016, at least (GEOCA & Bretagne-Vivante, 2016, February et al. 2011, February et al. 2012, Yesou and Thébault, 2012)
INTERANNUAL RECURRENCE/ANNUAL OCCURRENCE	More than 7d/yr and ≥ 3 years per 5-year cycle	
FUNCTIONALITY	Proven presence of feeding rafts (stopover groups), birds feeding and/or resting	Feeding, resting
PRESSURES	Presence over the high-risk period (June-October) of one or more of the following activities: professional fishing (longline, trammel nets/gillnet, ring net or purse seine), motorised nautical activities (personal watercraft, pleasure boating)	Professional fishing: longline, nets Motorised nautical activities, recreational fishing

DETAILED DESCRIPTION OF THE ACTION AND THE OPERATIONS TO BE CARRIED OUT

The action here consists in participating in discussions held in the framework of writing the Management Plan (underway during the first cycle of implementation of the NAP), in order to include conservation issues regarding the Balearic Shearwater.

The NAP facilitator will inform, and if necessary, collaborate with the steering committee of the Natura 2000 site, the OFB, the operator of the Natura 2000 site in charge of the writing the Management Plan, and also with all of the stakeholders involved in the writing of this Management Plan (DREAL Bretagne, DDTM/DML 22, Maritime Prefecture, RNN Saint Brieuc Bay, Pays of Saint Brieuc, NGOs such as Bretagne Vivante and the GEOCA, etc) in order to ensure the proper taking into consideration of issues regarding the conservation of the Balearic Shearwater :

- share knowledge about the species ;
- consider integrating the functional areas for the Balearic Shearwater in a proposed revision of the SPA boundaries (with appropriate measures +an ad hoc Natura 2000 charter) or propose a spatio-temporal approach with a protection zone, in function of the exact nature of the pressures exerted in the sector: Strong Protection Zone (ZPF), Biotope Protection Decree (APPB), etc.

This participation will be formalised by the sharing of information ensured by the NAP facilitator (telephone conversations, video conferences, exchanges of digital documents), and by attending one or more steering committees and workgroups organised in the framework of the writing of the Management Plan.

Également, l'action consiste à prolonger le travail d'acquisition de connaissances relatives aux enjeux liés à la conservation du Puffin des Baléares (collecte de données de présence de l'espèce sur le secteur identifié, caractérisation et quantification des pressions et menaces), afin d'alimenter les discussions autour d'une éventuelle révision de périmètre d'AMP ou de création de zone réglementée.

GEOGRAPHICAL LOCATION

Saint Brieuc Bay.

LINK WITH OTHER ACTIONS

- Other actions to revise/create regulated zones (ZPF notably)/MPAs for the Balearic Shearwater.
- NAP Facilitation.

MONITORING AND ASSESSMENT INDICATORS

- Number of participations of the facilitator in steering committee meetings or workgroups (by telephone, physical) organised in the framework of drafting the «Saint Brieuc Bay» Management Plan.
- Progress made in discussions on this area of interest.
- Amount of data regarding the species and potentially high-risk activities gathered in the «Saint Brieuc Bay - East sector» during the first cycle of the NAP.
- Adoption/creation of an instrument appropriate for taking into consideration Balearic Shearwater issues (SPA, APPB, ZPF).

DELIVERABLES EXPECTED (INCLUDING MAPS)

- Minutes of meetings.
- Activity reports of the NAP facilitator.

STAKEHOLDERS AND ORGANISATIONS MOBILISED

- Operator/Service provider: NAP facilitator (OFB).
- Partners: Steering Committee of the Natura 2000 site «Saint Brieuc Bay – East», DREAL Bretagne, DDTM/DML 22, Maritime Prefecture, RNN Saint Brieuc Bay, Pays de Saint Brieuc, Bretagne Vivante, GEOCA.
- Project supervision: OFB, DREAL Bretagne.

ESTIMATED BUDGET AND FUNDING SOURCES AVAILABLE

Included in the facilitation of the NAP.

PROVISIONAL SCHEDULE

In function of the schedule of drafting the «Saint Brieuc Bay - East» management Plan Process to be carried out during the first 3 years of implementation of the NAP (cycle 1).

BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

GEOCA & Bretagne-Vivante (2016), Thébault & Yesou (2012), Yésou & Thébault (2011), Février et al. (2011), Février et al. (2012), Boué et al. (2013), Plestan et al. (2009); February et al.2011a-2011b; Yésou & Thébault, 2013.

CONFIRM, REFINE AND SHARE ISSUES REGARDING THE BALEARIC SHEARWATER IN THE SECTOR OF THE GOUF DE CAPBRETON

CODE 3.6 PRIORITY 2

GENERAL OBJECTIVES OF THE ACTION

Enhance knowledge of the preferential functional areas used by the Balearic Shearwater (feeding and/or rest) and consider, if necessary, their coverage by marine protected areas or regulated zones.

OPERATIONAL OBJECTIVES OF THE ACTION

Take into consideration current and future knowledge (monitoring strategy) regarding the utilisation of the sector of the Gouf de Capbreton / south of the Landes Shelf by the Balearic Shearwater and prolong the discussion about the interest of this area with institutional and socio-professional stakeholders and environmental NGOs, in order to confirm its importance, assess possible pressures and lay the foundations of a future regulated zone, if necessary.

CONTEXT AND GENERAL DESCRIPTION OF THE ACTION

The habitat model produced in 2019 on the basis of protocol-based data between 2004 and 2018 highlights the importance of the sector of the Gouf de Capbreton off the Landes coasts, especially in September and October. This result is also highlighted by the maps of the new atlas published late 2018 by the Centre of the Sea of Centre de la Mer de Biarritz, based on the data of the Ermma programme over the period 2003-2015. This sector was not mapped in the previous atlas, covering the period 1976-2002Les suivis à la côte coordonnés lors du programme FAME de 2010 à 2012 avait également mis en évidence l'importance du secteur lors du passage « retour » des oiseaux en route vers la Méditerranée, à l'automne.

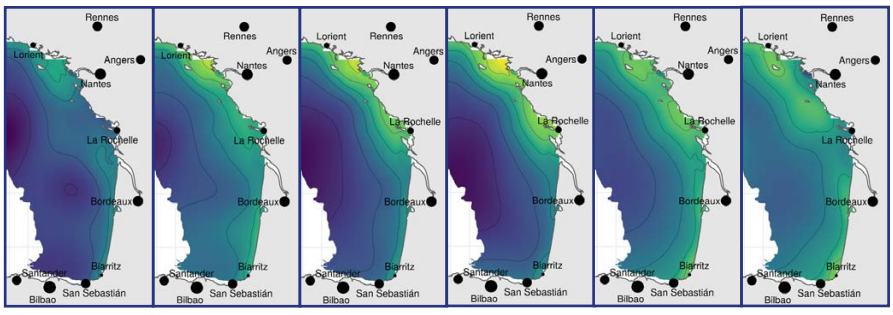


Figure 57 : Details of the evolution of abundance in the Southern Bay of Biscay sector between May and October. Density predicted for 2017. Le Bras Y et al., 2019. Métaanalyse des données disponibles dans la ZEE française entre 2004 et 2018. 72p.

The monitoring operations on the coast coordinated during the FAME programme from 2010 to 2012 also highlighted the importance of the sector during the «return migration « of the birds towards the Mediterranean in the autumn.

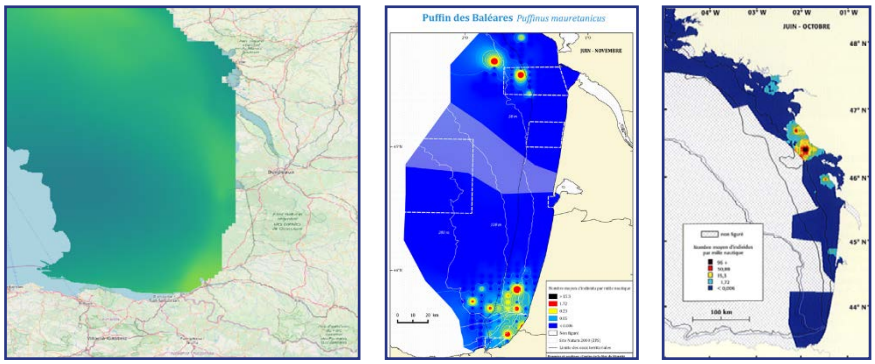


Figure 70 : Zoom on the southern-Bay of Biscay sector: concordance of results of the model with the atlas of the Centre de la Mer de Biarritz (period 2003-2015) and new sectors occupied (compared to 1980s and 90s) identified in the sector off the coast of Capbreton

The interest of the area could be explained by the presence of the thermal front of the upwellings of the Gouf de Capbreton.

The quantitative data is not currently sufficient to decide on the significant nature of the eligibility criteria that could justify the proposition of creating or extending marine protected areas or regulated zones dedicated to the Balearic Shearwater, criteria presented and validated in the NAP. However, the nature and level of the possible negative pressures on the species (fishing, nautical activities), etc.) have not been clearly characterised at present. Dedicated, protocol-based surveys are planned in the framework of the first implementation cycle of the NAP, which will refine the knowledge about this sector.

With regard to the data presented above, it seems nevertheless important to continue discussions about the interest of this area with institutional and socio-professional stakeholders and environmental NGOs, in order to confirm its importance, assess possible pressures and lay the foundations of a future regulated zone or MPA, if necessary.

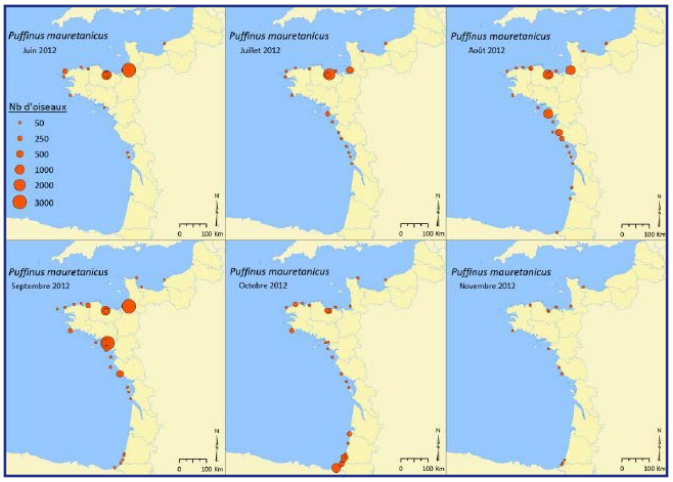


Figure 71 : Évolution spatio-temporelle des effectifs observés de Puffin des Baléares dans le cadre du programme FAME, de 2010 à 2012

DETAILED DESCRIPTION OF THE ACTION AND THE OPERATIONS TO BE CARRIED OUT

The action here consists in continuing the work of acquiring knowledge regarding the issues linked to the conservation of the Balearic Shearwater (gathering of data on presence of the species in the sector identified, characterisation and quantification of pressures and threats) and initiating discussions about the possible creation of a regulated zone or MPA, if necessary.

The NAP facilitator will contact the relevant administrative authorities which could mobilise their services (DREAL Nouvelle Aquitaine, DDTM/DML 64, OFB), socio-professional organisations (CRPMEM, representatives of marine sports and leisure activities, etc) and NGOs (LPO Aquitaine, etc) in order to :

- organise the transmission of information and data gathered at sea or from the coast that could interest the NAP: observations of Balearic Shearwater, types of activities at sea that could lead to pressures on the species;
- initiate an information and concertation process, prior to any creation of a regulated zone or MPA, with all of these stakeholders, in function of the exact nature of the pressures exerted in the sector.

This mobilisation of stakeholders will be formalised by the sharing of information ensured by the facilitator of the NAP (telephone conversations, video conferences, exchanges of digital documents), and by the organisation of a specific meeting, held in Nouvelle-Aquitaine with the support of the DREAL.

GEOGRAPHICAL LOCATION

Gouf de Capbreton sector.

LINK WITH OTHER ACTIONS

- Data acquisition action by protocol-based campaigns at sea : Action 4.3.
- Other actions to revise/create regulated zones/MPAs for the Balearic Shearwater.
- Facilitation of the NAP.

MONITORING AND ASSESSMENT INDICATORS

- Number of meetings (by telephone, physical) organised specifically on this subject.
- Amount of data regarding the species and potentially high-risk activities gathered in the sector during the first cycle of the NAP and fed into open databases.
- Adoption/creation of an appropriate tool for taking into consideration Balearic Shearwater issues (SPA, APPB, ZPF).

DELIVERABLES EXPECTED (INCLUDING MAPS)

- Minutes of meetings.
- Activity reports of the NAP facilitator.
- Financial assessment.

STAKEHOLDERS AND ORGANISATIONS MOBILISED

- Operator/Service provider: Facilitator of the NAP (OFB).
- Partners: DREAL Nouvelle-Aquitaine, OFB (Seaboard Delegation Atlantic, DDTM/DML 64, Maritime Prefecture, NGOs such as LPO Aquitaine, CRPMEM Nouvelle-Aquitaine.
- Project supervision: OFB, DREAL Nouvelle-Aquitaine.

ESTIMATED BUDGET AND FUNDING SOURCES AVAILABLE

Included in the facilitation of the NAP.

PROVISIONAL SCHEDULE

Process to be carried out during the first 3 years of implementation of the NAP (Cycle 1).

BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

GEOCA & Bretagne-Vivante (2016), Boué et al. (2013), Jones et al. (2014), NEOEN/ Biotope (2010), Yesou et al. (2012).

3.3.4 OBJECTIVE 4: ENHANCING KNOWLEDGE OF THE SPECIES

ENHANCING KNOWLEDGE

SETTING UP A WORKGROUP DEDICATED TO THE LONG-TERM MONITORING OF FOOD COMPETITION AND FOOD AVAILABILITY ISSUES

CODE 4.1 PRIORITY 3

GENERAL OBJECTIVES OF THE ACTION

Improve the long-term conservation status of Balearic Shearwater populations by conducting scientific monitoring of food competition and food availability issues, a long-term conservation issue for the species.

OPERATIONAL OBJECTIVES OF THE ACTION

Set up a scientific workgroup dedicated to the long-term monitoring of this issue, bringing together specialists in the evaluation of fish stocks (particularly small pelagic fish) and population biologists working on the demographic model of seabirds.

CONTEXT AND GENERAL DESCRIPTION OF THE ACTION

The impact of certain fisheries on marine ecosystems around the world is now considered a major threat to many species, impacting our food security and many species dependent on marine resources. Overfishing has endangered many fish stocks since the late 1980s and the advent of industrial fishing has extended the areas and depths that can be fished (Pauly et al., 1998, Pauly et al., 2005).

A more recent study (Grémillet et al., 2018) shows that competition between seabirds and fisheries was a worldwide stress factor over the period 1970-2010 for a global seabird community that has declined by 70% since 1950 (Paleczny et al., 2015).

Combined with the other well-described threats to seabirds (adult mortality from bycatch by professional fishing, destruction of breeding habitats and their colonisation by invasive alien species and pathogens, climate change), food competition with fisheries is significant and persistent and should therefore be considered as one of the many stressors affecting the health of various seabirds (Grémillet et al., 2016), and ultimately their populations trends (Krüger et al., 2018).

The action developed here aims to set up a workgroup to ensure the long-term monitoring of this issue by comparing data from the Balearic Shearwater monitoring strategy (spatio-temporal use of French waters, demographic trends) with data on fish stock changes, especially small pelagic fish which are the Balearic Shearwater's favourite natural prey.

DETAILED DESCRIPTION OF THE ACTION AND THE OPERATIONS TO BE CARRIED OUT

The action consists in setting up a dedicated scientific workgroup which will ensure an active monitoring of the data concerning this issue, as well as putting these data into perspective with the results of the monitoring of Balearic Shearwater populations.

To do this, the NAP facilitator will mobilise :

- the various institutions involved in monitoring fish stocks, particularly anchovies and sardines: CIEN's WHAGANSA working group (small pelagic stocks), IFREMER, PELAGIS Observatory, AgroCampus Rennes ;
- laboratories and scientific institutes specialised in population biology, issues accessing resources and demographic models for marine birds: CNRS-Cebc, CNRS-Cefe.

Results related to the monitoring of fish stocks (distribution, density, trends) will be compared with population/phenological trends, as well as with the spatio-temporal use of the Bay of Biscay, the Channel and the Mediterranean, as highlighted by the Balearic Shearwater monitoring strategy, in order to highlight possible correlations and ways of performing specific analyses.

The workgroup, set up in the first year of NAP implementation, will meet every two years during the various facilitation cycles. It will produce a report every two years summarising its discussions and any proposals for specific studies to be carried out.

GEOGRAPHICAL LOCATION

- Bay of Biscay, western Channel.
- Gulf of Lion/Mediterranean.

LINK WITH OTHER ACTIONS

- Action files related to the Balearic Shearwater monitoring strategy.
- Action file related to the trophic level survey programme for the species.

MONITORING AND ASSESSMENT INDICATORS

- Number of meetings of the «Food competition and food availability» workgroup.
- Change in indicators related to food competition and food availability issues.
- Production of regular summaries.

DELIVERABLES EXPECTED (INCLUDING MAPS)

Minutes of workgroup meetings.

STAKEHOLDERS AND ORGANISATIONS MOBILISED

- Operator/Service provider: NAP facilitator.
- Partners: CIEN (WHAGANSA workgroup), IFREMER, PELAGIS, AgroCAmpus Rennes, CNRS (Cebc + Cefe), GISOM, Socios-pro.
- Project supervision: OFB, DREAL Bretagne.

ESTIMATED BUDGET AND FUNDING SOURCES AVAILABLE

- Expenses of institutions participating in the bi-annual meetings, if organised face-to-face.
- 1200 €/workgroup meeting -> 2400 € over the first NAP cycle.

PROVISIONAL SCHEDULE

2020	2021	2022	2023	2024
Setting up workgroup		Workgroup meeting Summary report		Workgroup meeting Summary report

BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

Pauly et al., 1998, Pauly et al., 2005, Cury et al., 2011, Grémillet et al., 2018, Paleczny et al., 2015, Karpouzi et al., 2007, Sydeman et al., 2017, Grémillet et al., 2016, Krüger et al., 2018, Doray et al., 2018, Certain et al., 2011, Lambert et al., 2018.

ENHANCING KNOWLEDGE

STUDY OF TROPHIC LEVEL AND MONITORING OF CONTAMINANTS

CODE 4.2 PRIORITY 1

MAIN TYPES OF OBJECTIVES

This action aims to respond to one of the 4 components of the monitoring strategy of the species :

~~Abundance/Distribution/Phenology~~/**Behaviour**

GENERAL OBJECTIVES OF THE ACTION

Better understanding of trophic level in our waters.

Evaluation of the contamination rate in the Balearic Shearwater.

OPERATIONAL OBJECTIVES OF THE ACTION

Enhance knowledge regarding the food ecology of the Balearic Shearwater in French Atlantic waters, establish an initial status of levels of contamination by POPs (persistent organic pollutants) and MTEs (metallic trace elements) of this species when it occupies the coastal waters of the sector Mor Braz, assess the degree of interaction of the birds with professional fishing.

CONTEXT AND GENERAL DESCRIPTION OF THE ACTION

The action developed here aims to implement a scientific programme whose objectives are 1) to enhance knowledge of the ecology of this species when it is present in French territorial waters, and 2) to assess its local exposure to human disturbance (chemical contamination, interaction with fisheries).

This action will take the form of a programme of sampling of tissue for isotopic and contaminant analysis from birds captured in French territorial waters. It will complement another action of this NAP in order to optimise the amount of handling in the field, because another action of the NAP will involve the capture and GPS tagging of individuals for telemetric monitoring. The tissue samples will be taken from these birds captured at sea for this biologging monitoring.

Finally, the action is developed in a particularly sensitive water quality context. Indeed, Mor Braz is a relatively confined bay, receiving considerable flows of nutritive salts provided by the Loire and the Vilaine coming from their catchments. It is one of the sites in France most sensitive to the effects of the accumulation of these nutriments and to eutrophication, which regularly leads to hypoxic crises and phytoplankton blooms.

Also, the presence of contaminants chemical is proven, notably heavy metals and TBT via the (very industrialised) lower Loire river basin and pesticides via the Vilaine river basin (ELV/Le Gouvelo, 2011). Studying the contamination of the Balearic Shearwater when it occupies this region will therefore also provide an indirect assessment of the state of local environmental contamination (bio-indicator).

DETAILED DESCRIPTION OF THE ACTION AND THE OPERATIONS TO BE CARRIED OUT

Uncertainties and knowledge gaps remain in terms of the precise spatio-temporal utilisation of the sectors preferential occupied by the Balearic Shearwater, and in terms of food ecology: rhythm of activity, trophic level, proportion of natural prey/fishery discards, etc.

That is why a biologging monitoring programme (by GPS-GSM) will be carried out in the framework of the actions of this NAP, involving notably a first 2-year phase during the course of which 15 + 15 individuals will be captured and tagged in the sector of Mor Braz, which is one of the species' preferential stopover sectors.

The exposure of marine avifauna to environmental pollution is a major conservation issue in a context of profound environmental modifications connected with climate change, and by cumulated effect with other pressures in the marine environment. As for all higher predators, seabirds are among the most exposed to this environmental contamination due to their position at the top of the food chain leading to bioaccumulation of these elements in the organism.

Even though pollutants and contaminants are not considered as a direct cause of mortality in seabirds, they are at the origin of chronic effects such as hormonal, immunodepression or neurotoxic malfunctions which can directly impact their health condition and therefore amplify their sensitivity to other environmental stress factors.

Therefore, a relatively important issue may be to assess and understand the contamination of higher predators by pollutants at very large spatial scale and the risks linked to this contamination for these vulnerable species.

This is all the more true for a species such as the Balearic Shearwater, which is critically endangered and for which we have no local data on this level of contamination apart from a single study carried out in 2016 (Costa et al., 2016).

Samples could be collected from birds that are victims of bycatch so as to increase the number of individuals assessed, provided the protocols allow it.

In this context and in order to complete this work of acquiring knowledge so as to improve the conservation measures which will be implemented through this NAP, the project here will consist in taking advantage of/optimising the capturing of some thirty birds over 2 years to take tissue samples in order to carry out :

- isotopic analyses of carbon and nitrogen which will firstly provide precise information about the trophic level of the Balearic Shearwater in French its inter-nuptial range, and secondly assess the importance of fishery discards in their diet ;
- analyses of contaminants, persistent organic pollutants (POPs) and metallic trace elements (MTEs) together with microplastics, so as to provide an initial status of this possible contamination of the birds with a view to longer-term monitoring. These analyses will also provide information on the state of environmental contamination at local scale.

Finally, aside from the Balearic Shearwater, seabirds are considered to be powerful bioindicators of the state of their environment. Therefore, studying the contamination of the birds occupying the sector of Mor Braz could provide more broad-scale information on the contamination of the whole marine environment of this region. These results could therefore support the implementation of

actions that are complementary to those already set up by public policies (DCE, SDAGE, SAGE) aiming for example to reduce pollution of industrial origin (Loire river basin and estuary, St Nazaire etc.) or of agricultural origin (pesticides) (Vilaine river basin).

SAMPLING PLAN

The project here will consist in taking advantage of/optimising the capturing of some thirty birds over 2 years in Mor Braz (GPS biologging monitoring programme) to take the tissue samples necessary for analysis.

LINK WITH OTHER ACTIONS

This action is directly dependent on Phase 1 the action concerning GPS biologging monitoring.

INDICATORS AND METHODS OF STATISTICAL ANALYSIS

The isotopic ratios and levels of the various contaminants will be determined based on biological blood samples. The blood will be centrifuged to separate the plasma from the blood cells.

In plasma, isotopes reflect recent feeding, during the few days before sampling. In blood cells, they reflect a longer time, a few weeks, due to the turnover of red blood cells. The blood therefore gives short- and medium-term temporal information on the trophic level and feeding habitat of the birds, therefore enabling the food ecology of the Balearic Shearwaters to be inferred for the 2 month and the week preceding their capture (Carbon is used to determine whether they consume fishery discards, with a 13C signature in benthic fish, while nitrogen is used via 15N to determine the trophic level). The birds' potential prey species will be also gathered in order to perform these same isotopic analyses. All the information obtained will be very useful for determining whether the birds feed on natural prey or fishery discards. The utilisation of one or other of these resources of contrasting nutritional quality could have a significant impact on the condition and survival of the birds. These data will therefore complete the information provided by telemetry. Comparison of the isotopic signatures derived from the plasma (very short term – when the birds are present in the sector of Mor Braz) and from the blood cells (medium term) will also validate whether the sampled birds have actually occupied the sector for a few weeks and whether the contaminants measured (see below) are really the result of local contamination of the birds.

The MTEs will be measured in the blood cells, with which they are mainly associated. On the one hand, the non-essential elements analysed will be Ag, Cd, Hg and Pb due to their high toxicity at low concentrations. On the other hand, Cu, Fe and Zn will also be determined due to their essential character for the health of the birds, and also Se which has a protective role against the toxicity of Hg. The organic contaminants will be analysed in the plasma where they tend to concentrate. The molecules investigated belong to the families of organochlorine pesticides such as the DDT, polychlorobiphenyls (PCBs) and per- and polyfluoroalkyl substances (PFASs). The concentrations of MTEs and POPs will be compared to the toxicity thresholds available in the literature, determined experimentally and used to assess the toxicological risk for the birds.

Faeces will be gathered opportunistically from the handled birds to analyse for the presence (abundance, sizes...) of microplastics. The nature of the plastics

found will then be determined (polyethylene, polypropylene, polyesters …). These analyses will provide information on the Balearic Shearwaters' degree of exposure to microplastics during the course of the previous days/weeks and will be related to the spatial distribution of the birds together with the prey consumed (utilisation of fishery discards or natural prey).

DELIVERABLES EXPECTED (INCLUDING MAPS)

- Assignment report at the end of the 2 sampling campaigns over 2 years.
- Analysis and summary report after analysis of the data gathered.

STAKEHOLDERS AND ORGANISATIONS MOBILISED

- Operator/Service provider: LIttoral ENvironnement et Sociétés (LIENSs) - UMR 7266.
- Partners: OFB + CEBC-CNRS for preparing the field assignments and handling/capture/tagging the birds, logistical support, Water Agency.
- Project supervision: OFB -DREAL Bretagne.

ESTIMATED BUDGET

- Analysis of Hg by AMA: 30 X 10€ = 300€.
- Analysis of MTEs by ICP: 30 X 25€ = 750€.
- Analysis of POPs by chromatography = 30 X 180€ = 5400€.
- Analysis of C and N isotopes by IRMS = 30 X 10€ X 2 = 600€.
- Analysis of microplastics by FTIR = 30 X 15€ = 450€.
- Preparation of samples (lyophilisation, mineralisation, extraction, identification) = 2600€.
- Funding of a Master II intern for the study of the contamination of Balearic Shearwaters in the sector of Mor Braz = 3550€.

Total 13 650€

Project submitted to the call for initiatives (AAI) "Marine Biodiversity 2020" of the Loire-Brittany Water Agency.

PROVISIONAL SCHEDULE

	2020				2021				2022				2023			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
PRÉPARATION				■	■											
CAPTURE/SAMPLING							■				■					
ANALYSES								■	■			■	■			
DELIVERABLES														■		

BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

Costa et al., 2016, Le Bot et al., 2019, ELV/Le Gouvelo, 2011.

ENHANCING KNOWLEDGE

USE OF PROTOCOL-BASED DATA ACQUIRED AT SEA – ABSOLUTE ABUNDANCE ASSESSMENT AND HABITAT MODELLING APPROACH (DISTANCE SAMPLING OR STRIP-TRANSECT)

CODE 4.3 PRIORITY 2

MAIN TYPES OF OBJECTIVES

This action aims to address 3 of the 4 components of the monitoring strategy of the species :

Abundance/Distribution/Phenology/~~Behaviour~~

GENERAL OBJECTIVES

- Spatio-temporal changes in relative abundance (numbers/distribution) in the medium and long term.
- Estimation of absolute abundance (by sector and if high spatio-temporal sampling homogeneity).
- Arrival and presence phenology.
- Identification and characterisation of high-risk areas the species: areas of significant presence at worldwide scale.

OPERATIONAL OBJECTIVES

- Monitor the population trend of the species (in France) via relative and absolute abundance indices.
- Update knowledge on the emergence and presence phenology of the species in order to adapt management measures in time.
- Identify and characterise the areas at stake for the species: areas with significant presence on a global scale, during the different life-cycle stages (transit, feeding, resting, moulting).

GENERAL DESCRIPTION OF THE MONITORING

The aim is to compile and analyse data acquired at sea as part of various monitoring and protocol programmes, by boat or by aircraft: Megascope platform (IFREMER fish stock surveys), MRE project monitoring, MPA monitoring.

These protocol-based surveys, when they include sampling effort measurement with the correction of abundances by estimating the probability of detection for each protocol, allow for the modelling of absolute abundance (density).

This second level of statistical analysis, which is more advanced than the IKA approach, makes it possible to model abundance (density) based on environmental variables (bathymetry, primary productivity, etc.) and time (year effect, month effect, etc.). This habitat model can be used to make predictions of species density.

METHODS OF STATISTICAL ANALYSIS

Data assembly: strip transect + line transect with calculation of the probability of detection by Distance Sampling (see detailed method in the dedicated OFB/ Biotope 2019 report).

Note: The relationship between detection distance and detection probability will be modelled using the method by Virgili et al (2019), taking into account the potential effects of sea state and observation height.

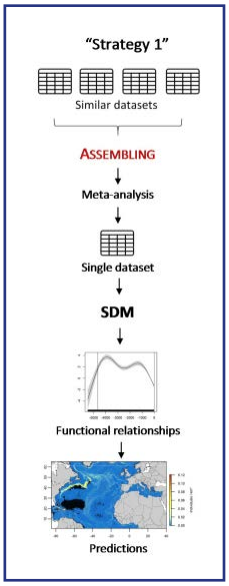
Habitat modelling: to determine on one hand the functional relationships between environmental variables (explanatory variables) and on the other hand Balearic Shearwater abundance (response variable).

Combinations of environmental variables to be tested + tests of some effects likely to be useful for conservation of the species :

1. Year effect. The aim is to evaluate the demographic trajectory of the species over the time period covered by the data.
2. "Phenology / migration" effect, i.e., the interaction between the latitude and the months of the year. The aim is to describe the phenology of the species, taking into account the latitude of sightings because it is a migratory species.
3. "Climate warming" effect, i.e., the interaction between the "phenology / migration" effect and the year. In fact, it is the triple interaction between the latitude, month of the year and the year. It is a question of verifying whether the phenology is a stable phenomenon over time or, on the contrary, if we observe spatial or temporal changes. For example, the shifting of the species' distribution towards the north at a given date or a shift in the year of migration periods at a given latitude.

Habitat model

There are different strategies for compiling information with a view to predicting the distribution of a species. Recent works (notably Waggit et al. 2019) propose methodologies for agglomerating data from different protocols (boat and plane).



In the work carried out by Le Bras et al., 2019, the selected chain of analysis is derived from the work of Virgili, 2018 which enables :

- coherent analysis of all the data ;
- sharing information in space and time between datasets ;
- propagating uncertainties until the final result.

Several steps are required :

1. Delimiting a study area and dividing it into a grid which will subsequently be used as a medium for spatially predicting the abundance of the species.
2. Assembling the various datasets with abundance and sampling effort associated to a geographical sector. Since the aim is to assemble datasets from diverse protocols this step needs to involve the estimation of the

detection probability associated with each protocol -> modelling of detection probability in function of distance ("Distance sampling"). Except for strip-transect data, e.g., digital monitoring operations = the detection probability is assumed to be perfect (100%).

3. Modelling the abundance (density) in function of environmental variables (bathymetry, primary production, etc.) and of time (year effect, month effect, etc.). This habitat model can produce predictions of the density of the species. The area over which these predictions can realistically be made (by environmental interpolation) is determined by gap analysis: this involves locating all pixels in the study area where the important environmental conditions for the species correspond to the species' known preferences (i.e., which have been sampled and therefore included in the production of the habitat model).

Demographic trend

Given the potential lack of balance in the sampling, the analysis of the population trend will be performed on a subset of the dataset in which the spatio-temporal coverage of the observation is relatively homogenous from one year to the next: we will use the habitat model to correct sampling bias. In this approach, the aim is to enhance the habitat model to take into consideration the fact that sampling is not the same depending on the year. the advantage is que the differences observed in terms of distance from the coast are taken into account. The formula for the model is* :

Where Y is the number of individuals observed in the pixel, α_{year} represents

$$Y \ NB(\mu,\theta)$$
$$\ln(\mu) = \ln(P_{\text{-}year}) + \alpha_{year}$$

the effect of the year on abundance and $P_{\text{-}year}$ represents the mean abundance predicted by the habitat model in this pixel irrespective of the year. Indeed, given that we want to estimate the year effect and that this factor was already present in the habitat model, $P_{\text{-}year}$ is the prediction taking into account all the explicative variables except the year.

As before, we obtain an estimation of total abundance by adding together the abundance predictions of this model for each pixel in the study area. They are obtained by multiplying the numbers predicted by the habitat model (without year effect) by the transformed coefficients.

The details of the methodology and statistical que analysis are presented in the study to define the monitoring strategy (OFB/Biotope, 2019).

** In R, the syntax of this model is: "size~ offset(log_pred_yearless) + year_fac - 1». As before, -1 signifies that we do not want the model to introduce a parameter for the ordinate at the origin*

SAMPLING PLAN

In function of the monitoring operations & programmes carried out annually by the various organisations running them.

Particular case - Funding of dedicated campaigns in the sector Gouf de Capbreton

In the framework of the Balearic Shearwater NAP, a monitoring strategy for the species in French waters was drawn up that is based on the implementation of complementary procedures. Among them, protocol-based monitoring operations by plane/boat campaigns are planned, benefiting notably from the monitoring operations planned by offshore wind farm projects, marine Natura 2000 sites and PNMs. In Nouvelle Aquitaine, the sector of the Gouf de Capbreton and the southern Landes coast was identified as important for the Balearic Shearwater, in particular during the return migration of the species from September to November. But this sector has neither a Natura 2000 site nor an offshore wind farm project, and is therefore not currently covered by dedicated, protocol-based monitoring of seabirds.

The Centre de la Mer de Biarritz has knowhow and experience in the monitoring of marine megafauna by boat, through monitoring operations carried out in the framework of the ERMMA programme. The monitoring programme will be completed with dedicated surveys (distance sampling protocol) during the period of presence of the species.

FREQUENCY AND DURATION OF THE MONITORING

- In function of the monitoring operations & programmes carried out annually by the various organisations running them.
- Monthly to bi-monthly, even biannual on 1 to 12 months of the year depending on the MRE project schedule and MPA management plans.
- 1 month / yr depending on the survey (Megascope).
- Surveys carried out annually, but analysis every 3 years for the duration of the NAP and renewable.
- Sector Gouf de Capbreton: 4 campaigns/yr between August and November over 3 years (Centre de la Mer de Biarritz / DREAL Nouvelle Aquitaine).

INDICATORS

Habitat model: predicted density (by pixel).

Population trend (=extrapolated absolute numbers).

DELIVERABLES EXPECTED (INCLUDING MAPS)

Single database unique compiling the data gathered.

Drawing up of maps in the framework of the Habitat model :

- Gap Analysis Map: raster of the regions of environmental interpolation indicating which pixels are propitious for the application of the predictions of the habitat model ;
- maps of raw sightings (relative abundances in the form of KIAs) by year with the sampling effort shown and on a bathymetric base ;
- maps of abundance predictions, by month and by year on fond a bathymetric base.

Population trend: calculated numbers and graph of temporal evolution

Summary annual report presenting the method (gathering of data, statistical analysis) and the results obtained in the form of tables, graphs, maps, written summaries.

Putting the results obtained into perspective year after year: description of evolutive demographic and phonological trends, description of the spatial evolution of the sectors used and of the absolute and relative abundances.

STAKEHOLDERS AND ORGANISATIONS MOBILISED

- Operator/Service provider: Monitoring operations: operators of the various monitoring operations & programmes mobilised; Coordination / Facilitation / Analysis / Summary: association, specialist service provider or in-house.
- Partners (contracted): Centre de la Mer de Biarritz, IFREMER/Observatoire Pélagis, MRE developers, MPA managing bodies, DREAL Aquitaine.
- Project supervision: OFB.

POSSIBLE MUTUALISATION WITH EXISTING PROGRAMMES

- Platform Megascope - IFREMER/PELAGIS.
- Marine megafauna Monitomring by plane or boat for MRE projects.
- Boat/plane monitoring carried out within MPAs (MNPs, marine SPAs).

ESTIMATED BUDGET

[20 000€ - 30 000€] / year of analysis.

Sector Gouf de Capbreton: 4800 €/yr over 3 years. 4 targeted annual campaigns in the key period (September to November), with complementary self-financing to which the Centre de la Mer de Biarritz has committed.

PROVISIONAL SCHEDULE

2021 : gathering of the data acquired by the various programmes and monitoring operations since 2018. First analysis of data and modelling of habitats: 2022.

BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

Virgili et al. (2019), Virgili (2018), Le Bras, Lambrechts & Entraygues (2018), Waggit et al., 2019.

ANNUAL ANALYSIS OF OPPORTUNISTIC SIGHTINGS (AT SEA AND FROM THE COAST)

CODE 4.4 PRIORITY 2

MAIN TYPES OF OBJECTIVES

This action aims to respond to 1 of the 4 components of the monitoring strategy of the species :

~~Abundance/Distribution/~~**Phénologie**~~/Behaviour~~

GENERAL OBJECTIVES

Overall monitoring of presence phenology in the medium and long-term.

OPERATIONAL OBJECTIVES

Monitor the presence phenology of the species in France.

Detect marginal or exceptional events and phenomena (stopovers, flows), seek "record" arrival and departure dates.

"Watch over" the species in a context of global change and evolution of its range and inter-nuptial migration pattern.

GENERAL DESCRIPTION OF THE MONITORING

This monitoring will be based on the analysis of existing databases enabling the entering of data concerning the presence (location, date) and abundance (numbers) of the species in France, without associated protocol and sampling effort.

All available databases will be used: collaborative databases such as Biolovision/ Visionature (faune-france.org), Trektellen, Migraction, associative databases, e-bird, databases of MNPs, OBSenMER, ECHOSEA, sightings from ferry lines, cruises and nature expeditions (e.g., Faune Océan) etc.

Also, the data gathered in the framework of the actions to characterise interactions with professional fishing (onboard observers/bycatch) will be compiled and banked.

Making the data gathering procedures viable requires dedicated facilitation time (processing, validation of the data, dynamization, dissemination ...).

DETAILED PROTOCOL

Gathering of raw data on Balearic Shearwater sightings extracted from the various databases used.

Centralisation of the data in a single database (birds-marins.org), if necessary.

Fields to fill in: location (X,Y coordinates), date (DD/MM/AAAA), numbers, comments (possible complementary information: associated behaviour, associated weather, age/sex of individuals), etc.).

Search for exceptional or significant data in terms of numbers, location, dates of presence, flows.

Referencing of record arrival/departure dates for species by department/region.

SAMPLING PLAN

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FREQUENCY AND DURATION OF THE MONITORING

Annual gathering and analysis of opportunistic data.

For the 5-year duration of the NAP, renewable.

Indicators and methods of statistical analysis.

No statistical analysis of the raw data.

Expert qualitative analysis of the data extracted for the species.

DELIVERABLES EXPECTED (INCLUDING MAPS)

A single database compiling the opportunistic data gathered.

Annual summary of the information gathered (geographical and temporal analysis).

Monitoring table updated annually combining the record dates (first and last appearance) by department, maximum numbers by department.

Conclusion on possible hypotheses about any detected or suspected phenomenon.

STAKEHOLDERS AND ORGANISATIONS MOBILISED

- Operator/Service provider: in-house, or specialised association or company.
- Partners: Faune-France steering committee, LPO France (faune-aquitaine, faunecharente-maritime.org, migraction.org), Collectif Faune-Bretagne, LPO Vendée (faune-vendée.org), LPO 44 (faune-44.org), Picardie Nature (ClicNat database), LPO PACA (fauna-paca.org), Collectif Meridionalis (fauna-lr), Trektellen administrator, Alderney Wildlife, Alderney Bird Observatory (ABO), GON, GONm, GISOM.
- Project supervision: OFB.

ESTIMATED BUDGET

If in-house: 1000 €/yr.

If outsourced:

- Contracting with the partner organisations 3d (year 1).
- Gathering and formatting of the data in a single database 3d/yr.
- Data analysis and production of deliverables 2d/yr.
- Purchase of data (Trektellen) 1000 €/yr.
- Budget: [3000€ - 5000€] / an.

PROVISIONAL SCHEDULE

As from the first year of implementation of the NAP (late 2021).

ENHANCING KNOWLEDGE

SIGHTINGS FROM THE COAST – MONITORING OF STOPOVERS

CODE 4.5 PRIORITY 1

MAIN TYPES OF OBJECTIVES

This action aims to respond aux 4 components of the monitoring strategy of the species :

Abundance/Distribution/Phenology/Behaviour

GENERAL OBJECTIVES

- Spatio-temporal trends in relative abundance (numbers/distribution) in the medium and long-term.
- Phenology of arrival and presence at the scale of the sites.
- Detailed distribution - area of presence at infra- scale.

OPERATIONAL OBJECTIVES

- Monitor population trends of the species (on French territory) via indicators of relative abundance, in order to assess the status of the populations, to complement the other monitoring operations carried out at sea.
- Update knowledge on the phenology of arrival and presence of the species, in order to temporally adapt management measures.
- Identify and characterise the sectors used at detailed scale, during the course of the different steps in the life cycle (transit, feeding, rest, moult) and highlight the interactions observed.
- Update knowledge on the distribution of the species, in order spatially adapt management measures: calibration of conservation actions on the most important and confirmed sites, fine-adjustment of the boundaries of marine protected areas.
- Enhance knowledge regarding the behaviour and ecology of the species on these internuptial stopover sites.
- Monitor disturbance and behaviour in the various stopover areas.

GENERAL DESCRIPTION OF THE MONITORING

The aim will be to carry out censuses to quantify and spatialise the main (in terms of numbers and regularity) known stopovers of Balearic Shearwater in France. This monitoring will be based on a lasting network of observers and coastal monitoring sites, selected for their pertinence regarding the observation of the stopovers of the Balearic Shearwater on all French seaboards. Protocol-based, simultaneous and coordinated censuses will be able to obtain reliable data for calculating relative abundance indices that are robust and comparable year after year. Information on the behaviours of individuals and interactions with human activities will be also noted.

The results of these monitoring operations will also enable interannual analysis of the presence phenology of the species on the monitored sites, and statistically

supported analysis of spatio-temporal trends in the abundance of the species. The network of stopover monitoring sites, and also the experience acquired during the FAME 2010-2012 campaigns and OFB monitoring in 2016 will be put to good use for effective implementation of this monitoring.

Particular effort will be made to ensure the best possible homogenisation of the protocols (taking into account the necessary adaptation to local conditions) and rigour in the definition of parameters and gathering of data in the field, and their coding into a single database.

Moreover, these monitoring operations will be implemented on a regular basis: annual monitoring during the duration of the NAP (renewable, identical frequencies, same period covered.

It would be interesting to set up a simultaneous census with the sites monitored in Spain and Portugal, on one or more selected dates during the period.

Statistical analysis after 5 years will take the time necessary to put the results into perspective with those obtained by the telemetric monitoring operations and protocol-based monitoring operations at sea (MRE), notably concerning the spatio-temporal distribution of the numbers of birds between the coastal areas (visible from the coast) and the areas further from the coast (not visible from the coast): proportion of individuals on the coast/off the coast, proportion of time spent on the coast/off the coast.

This will also the trends in relative abundance observed via the stopover sites to be compared with the trends in relative abundance based on the results of the habitat model approach.

Finally, during the NAP, we will seek to coordinate the monitoring with foreign partners (Spanish and Portuguese) in the framework of the international action plan so as to have simultaneous censuses over a large part of the area species' range, and the analysis after 5 years will endeavour to take into consideration/ compare the changes in relative abundance trends in those 2 countries.

On the basis of this statistical analysis of the results carried out at the end of the first 5- year cycle of the NAP, an evolution/adaptation of the monitoring strategy will be proposed for the following cycle, notably in terms of protocol, the frequency of operations carried out from the coast to monitor stopovers, and the number of sites monitored.

DETAILED PROTOCOL

The proposed protocol is based on the one which was set up during the monitoring in 2016 (launched by the OFB and coordinated by Geoca/BV), itself having mis benefited from the experience acquired during the 2010-2012 FAME programme.

The "stopover" sampling protocol is carried out from several fixed points situated on the coast, by at least 3 observers equipped with an ornithological telescope (minimum magnification x20 or x30). These points must imperatively be the same for each census in order to conserve identical observation parameters and avoid any variability in detectability (height, angle of the field of view). The monitoring is carried out in the morning, 30 minutes to an hour after sunrise, in order to benefit from favourable light, preferably at high tide for better detectability of the birds. The duration of the census is between 1 and 2 hours. The observers spread to at least 3 points in order to be able to triangulate the positions of the rafts using bearing compasses. Successive scans of the water surface are made to

detect the birds, which are then localised on a precise map (SHOM topographic base) of the area, with the angle (measured using a bearing compass) and the estimated distance. The numbers and behaviour of the rafts (at rest, actively fishing), together with associated species, are also entered. Precise descriptions of and information about human interactions must imperatively be given: attraction by a fishing boat, flying around a transport vessel, disturbance by an amateur fishing boat, etc. Standardising the duration also facilitates the comparison of data, notably if sites wish to increase the daily duration of monitoring operations.

Frequency

1 census every 10 days from early June to late October.

The frequency and observation effort must remain identical, homogeneous and stable between the sites and during the course of the years of monitoring. The monitoring operations need to last a long time for them to be interpreted in terms of evolutive trends.

The raw data gathered must be homogeneous and rigorously entered in the field, then databanked: compliance with the terms used to designate the monitoring sites (without mentioning the "subsites" historically used depending on the weather conditions), strict compliance with the coding of the sea state, meteorological parameters, the protocols, the number of observers, the observation time, the duration of the sessions, the distinction between birds fishing/at rest, the way to proceed if several observers present, etc.

Particular attention will be paid by the NAP facilitator to the completeness of the files, in order to eliminate missing or incorrectly entered data.

SAMPLING PLAN

- Network of stopover monitoring sites from north to south.
- Channel: NW Cotentin (Baubigny), Mont Saint Michel Bay, Saint Brieuc Bay.
- Atlantic: Douarnenez Bay, Mor Braz sector (Le Croisic), Vendée littoral (Sables-d'Olonne).

FREQUENCY AND DURATION OF THE MONITORING

- 1 census every 10 days from early June to late October every year.
- For the duration of 5 years of the NAP, renewable.

INDICATORS AND METHODS OF STATISTICAL ANALYSIS

Calculation of a relative abundance indicator (number of birds / sector) in order to propose: demographic trend, phenological trend.

Taking into consideration parameters influencing ant detectability in order to correct the abundance indicator: visibility, sea state, direction/strength of the wind, etc.

Influence of environmental parameters on the formation of rafts.

Establishment of maps to spatialise the main rafts of shearwaters, by week and by month, and linked with observed disturbance.

Drawing up maps to spatialise the main movements of shearwaters, within each monitoring sector.

DELIVERABLES EXPECTED (INCLUDING MAPS)

A single database compiling the gathered data.

Annual or interannual summary report presenting the method (data gathering, statistical analysis) and the results obtained in the form of tables, graphs, maps, written summaries.

Putting the results obtained into perspective year after year: description of evolutive demographic and phonological trends, description of the spatial evolution of stopovers, description of the notable behaviours observed (food ecology, phases of activity, daily movements between sites, etc).

STAKEHOLDERS AND ORGANISATIONS MOBILISED

- Operator/Service provider: Monitoring operations: employees of the associations concerned by the monitoring sites, Coordination / facilitation / summary: association, specialist service provider or in-house.
- Partners: GONm, LPO Normandie, Geoca, Bretagne Vivante, LPO 44, LPO 85, LPO France, GISOM.
- Project supervision: OFB.

POSSIBLE MUTUALISATION WITH EXISTING PROGRAMMES

/

ESTIMATED BUDGET

[20 000€ - 30 000€] / yr i.e., (100 000€ - 150 000€) over the duration of the NAP.

PROVISIONAL SCHEDULE

5 years, depending on the schedule of the MRE projects: the first 3 years of monitoring will be organised when as much monitoring of offshore wind farms as possible and when the GPS biologging monitoring programme has been launched. Probable schedule: launch as from 2021.

BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

GEOCA & Bretagne-Vivante (2016), Boué et al. (2013), Jaffré, M. (2012), Jaffré & Luczak, 2011.

TELEMETRIC MONITORING: SETTING UP AND COORDINATING A GPS BIOLOGGING PROGRAMME

CODE 4.6 PRIORITY 1

MAIN TYPES OF OBJECTIVES

This action aims to respond to the 4 components of the monitoring strategy of the species :

~~Abundance~~**/Distribution/**~~Phenology~~**/Behaviour**

OPERATIONAL OBJECTIVES

- Enhance knowledge regarding the ecology of the species: diet and feeding behaviour, movements and daily activities, flight altitude.
- Enhance knowledge regarding the distribution of the species: hotspots of presence, duration of stopovers / activity.
- Refine and calibrate as best as possible the management/conservation in function of measures the precise behaviour of the species.

GENERAL DESCRIPTION OF THE MONITORING

The specific work which has been carried out since 2018 on setting up a monitoring strategy for the species has identified the importance of telemetric monitoring for the acquisition of knowledge, still incomplete, on the spatiotemporal utilisation of French waters (in both the Atlantic and the Mediterranean) by the Balearic Shearwater, connected with its food ecology.

This monitoring will respond to the orientations of the NAP, and also the Birds Directive and MSFD.

The aim here is to fit Balearic Shearwater individuals captured at sea with GPS-GSM type geolocation tags, in sectors of French waters identified as high-priority (significant and prolonged gatherings, proximity of offshore wind farms), in order to refine the description of the spatio-temporal utilisation of French waters in the non-breeding season.

The programme is planned globally, with implementation over the 5 years of the NAP, and is based on 2 distinct phases:

- A first 2-year phase, launched as from the summer 2021, in order to test/adapt the methods of capturing and tagging the birds at sea, and to obtain data before the setting up of the offshore wind farms, with the tagging of about thirty individuals over 2 years. **A funding request for this first phase of the programme has been submitted to the 2020 EMFAF (AMOPUFOM project).**

- Une second phase launched during and/or after the work of setting up of the offshore wind farms of St Nazaire (SNA), Yeu Noirmoutier (NOY) and the Gulf of Lion (EFGL), in order to assess the effect of wind farms on the spatio-temporal utilisation. **This phase will be financed by developers of marine wind**

power projects in the framework of the monitoring measures stipulated in the authorisation-to-operate decrees: wind farms of SNA, NOY and EFGL.

The programme will target Atlantic sectors, but also the Mediterranean (via the monitoring measures planned in the framework of the marine wind power project of the Gulf of Lion).

DETAILED PROTOCOL

For the **first phase of the programme**, the selected sectors are :

- Year 1 (summer/autumn 2021) : Mor Braz SPA for the testing and possible adaptation of the technique for capturing and tagging the birds at sea ;
- Year 2 (summer 2022): St Brieuc Bay SPA, Île d'Yeu SPA and Mor Braz SPA : these 3 SPAs regularly harbour a large number of shearwaters.

It is intended to tag some thirty individuals during the course of this first 2-year phase so as to obtain exploitable robust and data.

These SPAs will be the places where handling takes place in the field, but the tagged individuals will continue their movements, potentially towards the north (Normandy-Brittany Gulf for example).

The areas concerned by the movements of the tagged individuals are: the French Atlantic seaboard, but also Portugal and Spain (telemetry enables the monitoring of tagged individuals for several weeks/months. The shearwaters, as from the months of September/October return to their nesting site in the Balearic Islands flying along the French, Portuguese then Spanish coasts.)

Protocol proposed for telemetric monitoring

The capture operations at sea will be organised in teams, maximising the experience of this type of operation in France: tests and captures already carried out between 2012 and 2014 in St Brieuc Bay and Mor Braz, but using a method now considered too invasive and not very efficient.

We propose using a netgun capture method combined with attracting the birds by throwing dog food into the water, with the help of the team of Chris Gaskin from the Northern New Zealand Seabird Trust. This method has proved successful in the framework of similar programmes on procellariids with an unfavourable conservation status in various countries around the globe: New Zealand Storm Petrel (Fregetta maoriana) in New Zealand, Pincoya Storm Petrel (Oceanites pincoyae) in Chili, Beck's Petrel (Pseudobulweria becki) in Papua New Guinea, Black-capped Petrel (Pterodroma hasitata) in the USA.

The biologgers used will be miniaturised GPS (GPS-GSM), whose recorded data can be remotely downloaded. If possible, an altimeter and an accelerometer will be combined with the GPS, in order to enable better characterisation of the tagged birds' activity during the course of their movements (rest, feeding, transit). These tags will be fixed to the feathers (glue, tape), provided there are no constraints linked to the moult of the Balearic Shearwater which occurs as from the month of June.

In function of the progression of the R&D GEOBIRD programme, the utilisation of the GPS from that programme will be tested, as it includes an altimeter (important data, notably for assessing interactions with wind farms).

It is intended to have about ten sea trips per annual campaign, for with about fifteen individuals tagged per year in this first 2-year phase, i.e., 30 individuals tagged in 2021/2022.

The tagging of the birds will ideally be carried out at the start of the non-breeding season (June/July), but possibly later in the season (August/September) due to moulting constraints.

Second phase of the programme

1/ Monitoring operations carried out in the framework of the NOY marine wind power project

The study will be carried out over three years: one year during construction and two years from the start of the operating phase. For each of the three years, the target is to tag at least 15 birds (i.e., 45 tags in total over 3 years), around the wind farm project of the islands of Yeu and Noirmoutier.

The choice of the protocol for capturing and tagging the birds at sea (GPS device, attachment) will be proposed at the end of Phase 1 of the programme, carried out with European Union funding (EMFAF). This choice will be clarified by the feedback on experience of these 2 summer bird capture/tagging campaigns (summer 2021, summer 2022), which will test, refine and if necessary improve the technique for capturing and tagging the birds at sea.

2/ Monitoring operations carried out in the framework of the SNA and EFGL marine wind power projects

Not precisely defined at present, under discussion (EDF-RE, ENGIE Green) with the governance and scientific bodies of these 2 projects.

SAMPLING PLAN

PHASE 1 (Atlantic: northern Gascony and northern Brittany) :

- Year 1 (summer/autumn 2021): Mor Braz SPA for the testing and possible adaptation of the technique for capturing and tagging the birds at sea ;
- Year 2 (summer 2022): St-Brieuc Bay SPA, Île d'Yeu SPA and Mor Braz SPA : these 3 SPAs regularly harbour a large number of shearwaters.

These SPAs will be the places where handling takes place in the field, but the tagged individuals will continue their movements, potentially towards the north (Mont-St-Michel Bay for example).

PHASE 2: NOY

The study will be carried out over three years and will target the sector where the wind farm is being set up :

- one year during construction ;
- two years from the start of the operating phase.

For each of the three years, it is intended to tag at least 15 birds, i.e., approximately 45 birds tagged during the duration of the project.

PHASE 2: SNA and EFGL

To be defined, but the birds will be captured and tagged within the sites where the wind farms are being set up.

FREQUENCY AND DURATION OF THE MONITORING

Phase 1 of the programme 2021-2023 (tagging during the summers of 2021 and 2022)

- 2020 : Setting up of the project and filing of request with EMFAF + CRBPO.
- June-September 2021 : 1st tagging campaign for the Balearic Shearwaters.
- June-September 2022 : 2nd tagging campaign (in function of the how the 1st campaign proceeded).
- September 2021-March 2023: data analysis.

Phase 2 of the programme (funding projects MRE) to be defined

During the construction and/or operation of the principal wind farms in the Bay of Biscay/Atlantic (NOY, St-Nazaire, St-Brieuc), and also in the Mediterranean if possible (near the offshore wind farms of Leucate and Gruissan).

INDICATORS AND METHODS OF STATISTICAL ANALYSIS

Spatial analysis by the method of kernels: this involves estimating the density functions of presence probabilities to hierarchise the importance of the areas used by the individuals. The results will be transcribed onto georeferenced maps.

Analysis of the phases of activity of the birds: this involves analysing the tracked GPS locations of the birds in order to extract the different phases of activity (sustained flight, feeding and roosting on the water).

Modelling of preferential habitats: based on the GPS traces acquired and the physical, biological and oceanographical characteristics of the study area (e.g. bathymetry, surface temperature of the water, salinity) so as to predict the favourable habitats prioritised by the birds for seeking food.

DELIVERABLES EXPECTED (INCLUDING MAPS)

Production of the raw data of GPS locations, arranged in an Excel spreadsheet (in the form of a consolidated file) and metadata (compliant with the European Union norms in force and, as much as possible, compatible with the ISO 19115 standard).

Archiving of the GPS data in the OFB database (or in the event of a technical difficulty, on the MoveBank site (https://www.movebank.org/), a database which compiles and archives data derived from telemetric monitoring operations).

Production of georeferenced maps showing the journeys of the tagged birds: the aim is to present the data gathered by GPS in the form of maps enabling raw GPS traces to be viewed directly. These maps will be produced in ArcGIS – ESRI format (.shp and/or .gdb, mxd) – coordinate system WGS84.

STAKEHOLDERS AND ORGANISATIONS MOBILISED

- Operator/Service provider: NAP facilitator for the general coordination of the programme.
- Partners:
  PHASE 1: OFB + CEBC-CNRS (Steering of the programme, analysis, organisation) / Bretagne Vivante (preparation of the field assignments, handling of capture/tagging of the birds, logistician support and participation in the analysis.
  OFB, CEBC-CNRS, Bretagne Vivante, LPO44 and LPO85, Geoca
  PHASE 2: ENGIE Green, EDF-RE / CNRS-CEBC / Bretagne Vivante.
- Project supervision: OFB.
- Associated partner: DREAL Bretagne, GISOM.

ESTIMATED BUDGET

Overall total amount for the action to be defined according to the budgets allocated by NOY, SNA and EFGL.

PHASE 1 : 293 000 € over 2 years (EMFAF-OFB-DREAL Bretagne) - 169 000 € financed by the EMFAF project AMOPUFOM + remainder OFB/DREAL Bretagne.

PHASE 2 : to be defined and validate with the partners (according to the budgets allocated by NOY, SNA and EFGL).

3.3.5 OBJECTIVE 5: MAINTAIN A HIGH LEVEL OF PARTNER INVOLVEMENT

INTERNATIONAL COOPERATION

FACILITATION OF THE NETWORK OF PARTNERS ABROAD

CODE 5.1 PRIORITY 1

GENERAL OBJECTIVES OF THE ACTION

Ensure sharing of knowledge and provide for collaboration concerning conservation actions for the Balearic Shearwater in the framework of the International Action Plan for the Balearic Shearwater.

OPERATIONAL OBJECTIVES OF THE ACTION

Prolong and ensure the facilitation of the network of partners (Spanish, Portuguese and British) initiated during the phase of writing of the NAP.

CONTEXT AND GENERAL DESCRIPTION OF THE ACTION

The Balearic Shearwater (Puffinus mauretanicus), a nesting bird species endemic to the Balearic Islands, is considered to be the most endangered seabird in Europe. France has a major responsibility for the conservation of this species in the non-breeding season (presence in French territorial Atlantic waters from May to October), and to a lesser extent in the breeding season (presence in the Mediterranean Sea).

After joint action by the OFB and DREAL Bretagne, the species was added to the list of species that could benefit from a NAP. This enabled the Water and Biodiversity Directorate to designate DREAL Bretagne as Coordinating DREAL of the NAP. DREAL Bretagne then designated the French Biodiversity Agency (OFB) for the writing phase of the plan, launched in December 2018 and finalised in late 2020.

This plan defined a medium- and long-term strategy which aims to :

1. Organise coherent monitoring of populations of the species through a specific monitoring strategy.
2. 2. Implement coordinated actions favourable to the restoration of the species and its habitat.
3. 3. Facilitate the integration of the protection of the species in human activities and public policies.
4. 4. Inform the stakeholders concerned and the public.

The concrete implementation of the action plan, after formalisation of the document in late 2020, is led by the French Biodiversity Agency (OFB). It involves a specific facilitator who will ensure the steering, coordination/facilitation and reporting of the measures laid out in the Plan.

DETAILED DESCRIPTION OF THE ACTION AND THE OPERATIONS TO BE CARRIED OUT

The NAP facilitator will ensure the facilitation of the network abroad, furthering the work initiated during the drafting phase of the NAP. This will involve sharing information gathered in the framework of the French NAP, seeking the advice of foreign partners, coordinating certain actions with implementation measures in Spain, Portugal and England, even mobilising their expertise to participate/collaborate in joint actions to acquire knowledge and monitor or improve conservation status.

The international network mobilised during the drafting stage, which needs to be facilitated during the course of the first cycle of this NAP, brings together the following contact persons :

- SEO in Spain: Pep Arcos, Beatriz Barajas Elizo
- SPEA in Portugal: Nuno Oliveira, Ana Almeida
- AZTI in Spain (Atlantic): Maite Louzao, Nicolas Goni
- Helena Moreno Colera of the Spanish Ministry of Ecology
- Chris Gaskin of the Northern New Zealand Seabird Trust
- Ivan Ramos of the Government of the Balearic Islands
- Helder Araujo (Departamento de Biologia, Centro de Estudos do Ambiente e do Mar (CESAM))
- Yann Rouxel (RSPB)
- Tim Guilford (University of Oxford)
- Channel Islands: John Horton & Justin Hart (Alderney Wildlife and ABO)

Organisation of a «bus tour» for sharing experiences between Portuguese and French fishing professionals

This action, in collaboration with the foreign partners, aims to arrange encounters in the field between Portuguese professional fishers involved in these programmes in Portugal and French professional fishers on 3 identified pilot sites in France. During this 3-day visit by mini-bus, exchanges, discussions and experience-sharing will be organised with French fishers who have volunteered become involved in this type of action (assessment and reduction of bycatch).

Organisation of 2 international symposiums during the first cycle of the NAP

The NAP facilitator will organise 2 symposiums open to foreign partners during the course of the first 5-year cycle :

- first symposium at T+2 years or T+3 years after the launching of the NAP, notably in order to present the actions implemented within the framework of the NAP ;
- second symposium at the end of the cycle, in order to present the result of actions carried out and to explore possible future collaborations.

Symposiums and seminars organised abroad

The NAP facilitator will represent the Balearic Shearwater NAP by participating in relevant seminars and symposiums on the conservation of species (conservation of seabirds, issue of bycatch, etc.) organised abroad. He/she will participate in annual seminars organised in Spain in the framework of the International Action Plan to promote the species.

GEOGRAPHICAL LOCATION

Atlantic and Mediterranean seaboards.

LINK WITH OTHER ACTIONS

"Facilitation of the NAP" action file

MONITORING AND ASSESSMENT INDICATORS

- Rate of activity of the network abroad: email exchanges, meetings.
- Participation in seminars and symposiums abroad.
- Organisation of 2 symposiums in France during the first cycle.
- Collaborations initiated with foreign partners.

DELIVERABLES EXPECTED (INCLUDING MAPS)

- Minutes of the meetings and exchanges held with international partners.
- Symposium proceedings.
- Annual summaries.
- Assessment of NAP facilitating activity.

STAKEHOLDERS AND ORGANISATIONS INVOLVED

- Operator/Provider: NAP facilitator (OFB).
- Partners: steering committee of the NAP.
- Project supervision: OFB, DREAL Bretagne.

ESTIMATED BUDGET AND FUNDING SOURCES AVAILABLE

Participation in 1 conference/yr abroad = 500 €/yr.

Organisation of 2 international conferences during the course of the cycle 1 : 10 000 €.

PROVISIONAL SCHEDULE

Duration of the first cycle of the NAP: January 2021 – December 2025.

Annual reports and summary report at the end of the 5 years.

BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

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3.3.6 OBJECTIVE 6: DISSEMINATE/SHARE KNOWLEDGE

PROMOTE THE CONSERVATION ISSUES OF THE SPECIES

COMMUNICATION AND AWARENESS-RAISING

CODE 6.1 | PRIORITY 1

GENERAL OBJECTIVES OF THE ACTION

Raise the awareness of a maximum number of stakeholders, institutions and organisations, and also the general public, about the conservation issues of the Balearic Shearwater.

OPERATIONAL OBJECTIVES OF THE ACTION

Implement a communications programme to promote the actions carried out in the framework of the NAP, via dedicated actions piloted by the NAP facilitator, in order to obtain the support of a maximum number of the stakeholders involved and increase the chances of success of the actions laid out in the plan.

CONTEXT AND GENERAL DESCRIPTION OF THE ACTION

The Balearic Shearwater (Puffinus mauretanicus), a nesting bird species endemic to the Balearic Islands, is considered to be the most endangered seabird in Europe. France has a major responsibility for the conservation of this species in the non-breeding season (presence in French territorial Atlantic waters from May to October), and to a lesser extent in the breeding season (presence in the Mediterranean Sea).

After joint action by the OFB and DREAL Bretagne, the species was added to the list of species to benefit from a NAP. This enabled the Water and Biodiversity Directorate to designate DREAL Bretagne as Coordinating DREAL of the NAP. DREAL Bretagne then designated the French Biodiversity Agency (OFB) for the writing phase of the plan, launched in December 2018 and finalised in late 2020.

This plan defined a medium- and long-term strategy which aims to :

1. Organise coherent monitoring of populations of the species through a specific monitoring strategy.
2. Implement coordinated actions favourable to the restoration of the species and its habitat.
3. Facilitate the integration of the protection of the species in human activities and public policies.
4. Inform the stakeholders concerned and the public.

The concrete implementation of the action plan, after formalisation of the document in late 2020, is led by the French Biodiversity Agency (OFB). It involves a specific facilitator who will ensure the steering, coordination/facilitation and reporting of the measures laid out in the Plan.

The tasks of this NAP facilitator include the coordination of a communications

programme, which is essential. This programme will support all the actions laid out in the NAP and will be developed around an array of varied and complementary procedures. This programme, run in parallel to the implementation of the NAP, will enable a maximum number of actors and stakeholders concerned by the issue of conserving the Balearic Shearwater in France to appropriate the issue and therefore optimise the chances of a successful outcome for the actions planned in the NAP.

DETAILED DESCRIPTION OF THE ACTION AND THE OPERATIONS TO BE CARRIED OUT

As from the first year of implementation of the NAP (1st quarter 2021), the project manager in charge of the facilitation of the NAP will also be in charge of designing, preparing and implementing a communications programme which will include the following :

- creation and regular updating of a **website** or webpage hosted by oiseaux-marins.org (OFB), quarterly publication of an associated newsletter ;
- providing **training /awareness-raising** for the partners and stakeholders concerned: CRPMEM and CDPMEM, POs, state services (DDTM/DML), MPA managing bodies (MNPs, marine Natura 2000 facilitators), nautical and leisure activity clubs, NGOs, representatives of socio-professional organisations, etc.
- design and creation of **communication media** for targeted dissemination:

  1/ Designing a facilitation-type video (cartoon) for the general public, summarising the issues of conservation related to the species in France and presenting the main actions carried out in the framework of the NAP.

  2/ Designing 2 versions of presentation and information leaflets (A4 leaflet, 4 pages): one version for professional fishing stakeholders on the bycatch issues, one version for the sea-using general public.
- organisation of a **mobile exhibition** on the issues and actions of the NAP. This rotating exhibition could be hosted successively by the following places: Océanopolis/Iroise MNP, La Rochelle Marine Museum/Aquarium, Biarritz Aquarium/Sea Museum, Banyuls sur Mer Biodiversarium, etc.
- organisation of **specific awareness-raising events**: annual theme day, RESOM meeting, etc.

The facilitator of the NAP will also be in charge of the administrative work of drawing up contracts and agreements with the various organisations contacted in the framework of the implementation of the NAP: writing of specifications and participation in the process of selecting candidates for providing services regarding the implementation of this programme, etc.

GEOGRAPHICAL LOCATION

Atlantic, Channel/North Sea and Mediterranean seaboards.

LINK WITH OTHER ACTIONS

All the action files of the NAP.

MONITORING AND ASSESSMENT INDICATORS

- Website visit rate.
- Number of events organised annually.
- Number of visits to the mobile exhibition.
- Number of print runs/dissemination of information leaflets.
- Number of broadcasts/viewings of the facilitation film.
- Number of training courses carried out.

EXPECTED DELIVRABLES

- Site Internet actualisé régulièrement.
- Newsletter trimestrielle.
- Plaquettes et vidéo d'animation.
- Exposition mobile.
- Evènements (rencontres) annuelles.
- Synthèses annuelles.
- Bilan d'activité de l'animation du PNA.

STAKEHOLDERS AND ORGANISATIONS MOBILISED

- Regularly updated website.
- Quarterly newsletter.
- Facilitation leaflets and video.
- Mobile exhibition.
- Annual events (meetings).
- Annual summaries.
- Assessment NAP facilitation activity.

ESTIMATED BUDGET AND FUNDING SOURCES AVAILABLE

- Facilitation and general coordination of the programme: including NAP facilitation.
- Website and awareness-raising/training: including NAP facilitation.

Specific budget for outsourced services:

- Creation of website and pages : 4000 €.
- Annual one-day event (venue rental/lunch) : 5000 €.
- Design/setup of rotating exhibition: 10 modules with photos and texts (including writing, graphic design, production) on 82cm X 2000cm modular boards: 10 000 €.
- Designing and printing of A4 size leaflet flyers (2 versions, print run with 200 copies each): 3000 €.
- Designing and making a documentary video (between 4 to 5 min): 3 days of filming outside (on longliner) including the pre-production, shooting, post-production, editing, voice over, subtitling: 20 000 €.

PROVISIONAL SCHEDULE

Duration of the first cycle of the NAP: January 2021 – December 2025.

Annual reports and summary report at the end of the 5 years.

BIBLIOGRAPHICAL AND DOCUMENTARY REFERENCES

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3.4 Definition of the partners' roles

The implementation of the national action plan is supported by a national steering committee, a national facilitator, a national coordinator, a network of local stakeholders and a scientific committee.

3.4.1 A national steering committee

The roles of the steering committee are to :

- monitor the progress of the implementation of the National Action Plan ;
- evaluate the actions carried out according to the programme each year ;
- (re)define the priority actions for the following year, as well as the human and financial resources needed to carry them out.

The Committee meets at least once a year in spring. An annual report will be sent in electronic format to the members of the Steering Committee 4 weeks before each meeting, presenting the results of each action, notably via the monitoring and implementation indicators accompanied by a qualitative analysis, the programming proposals for the following year and the financial report.

The composition of the steering committee for the NAP for the Balearic Shearwater, validated by the Water and Biodiversity Directorate, is as follows :

- The Water and Biodiversity Directorate (DEB)
- The Directorate of Marine Fishing and Aquaculture (DPMA)
- The Sports Ministry
- The DREAL Bretagne, coordinating body of the National Action Plan
- The OFB, delegated organisation for the implementation of the Plan
- Inter-Regional Marine Directorates (DIRMs)
- The DREALs of the regions concerned
- The DDTM
- The National Natural History Museum (MNHN)
- A representative of the CNPN
- Pierre Yésou
- The National Committee of Maritime Fisheries and Marine Fish Farming
- CRPMEMs: Normandie, Bretagne, Pays de Loire, Nouvelle-Aquitaine and Occitanie
- Sathoan PO, AMOP
- Inter-Regional Marine Directorates (DIRMs) MEMN, NAMO, SA, NA and MED
- LPO (national and regional)
- Bretagne vivante
- GEOCA, GON

- The Pélagis Observatory
- Chizé Centre for Biological Studies,
- Centre de la Mer de Biarritz
- GISOM
- AGLIA
- France Energie Marine
- France Energie Eolienne
- Syndicate of Renewable Energies
- EDF RE
- Engie
- Wings marine
- EOLFI
- National School of sailing and Water Sports (ENVSN)
- National Powerboating Federation
- National Federation of Recreational Boating and Fishing at Sea
- The Confederation of Sailing and Recreational Boating
- French Free Flight Federation

3.4.2 The role of the partners

The Water and Biodiversity Directorate (DEB) of the Ministry of Ecology :

- initiates the plan ;
- designates the coordinating DREAL in agreement with the prefect of the region concerned leading the plan ;
- approves the plan ;
- chose the facilitator with the coordinating DREAL ;
- instructs prefects about plan implementation ;
- ensures monitoring of the plan via the coordinating DREAL.

The other central administration directorates concerned by the plan :

- ensure monitoring of the plan via decentralised State services ;
- are informed about plan monitoring ;
- ensure that the plan actions they are involved in are integrated into the policies they implement.

The Directorate of Maritime Fisheries and Aquaculture of the Ministry of Agriculture, which is responsible for maritime fishery policies, is particularly. involved in this national action plan, as is the Directorate of Water and Biodiversity, which is responsible for supporting marine renewable energies.

The Coordinating DREAL :

- is the delegated pilot of the plan. It carries out this role in close collaboration with the OFB and the steering committee. It is responsible for technical coordination on a territory larger its region ;
- chose the plan facilitator (here the OFB) in association with the DEB ;
- defines the facilitator's tasks in line with the plan's strategy, within the framework of an agreement established between the strategy and the operator ;
- disseminates the plan ;
- convenes and chairs the steering committee ;
- validates the annual programme with the financial partners and disseminates it (by contacting the associated DREALs who are not necessarily present in the steering committee) ;
- is responsible for drawing up and disseminating the annual report on the plan actions, prepared by the facilitator ;
- coordinates external communication in association with the steering committee ;
- has a right to access data collected by partners in the framework of publicly funded actions.

The facilitator of the National Action Plan :

- centralises the information from the technical network and makes the corresponding summary ;
- leads the plan, participates in the steering committee, prepares the annual action programmes for submission to the steering committee and draws up the annual report of the plan's actions on behalf of the coordinating DREAL ;
- provides the secretaryship and engineering of the plan (including the steering committee minutes after validation by the coordinating DREAL) ;
- ensures communication transfers necessary for a better consideration of this species by elected representatives and the general public ;
- implements the action files that it pilots.

This work requires continuous facilitation throughout the year, with approximately 10/12 working days per month. The resources to be allocated to the operator to carry out their mission are estimated at 61 000 € (60% FTE hosted by the OFB) for 24 months.

The scientific committee

The Action Plan could be supported by a scientific committee (yet to be formalised) which would have the role of advising the COPIL and the coordinating DREAL on the scientific orientations regarding the conservation of the species and the actions to be prioritised.

The associated DREALs

This concerns at least the DREALs whose territory is occupied by the species. They :

- disseminate the plan among local partners ;
- coordinate the implementation of the plan with local partners and stakeholders in their region and contribute financially to its application within their territory, at least within the framework of the budgets allocated by the Ministry of Ecology ;
- inform the coordinating DREAL of any aspects related to the national action plan and notably transmit a summary of the data concerning their territory ;
- have a right to access data collected by their publicly funded regional partners.

The DREALs concerned by the Balearic Shearwater are the following: Nouvelle Aquitaine, Occitanie, Pays de la Loire, Bretagne, Normandie.

Other decentralised State services :

- play a role in ensuring that the plan is taken into account in the policy of their territory ;
- ensure that the measures in the plan are integrated into the sectoral activities for which they are responsible.

The DDTs and DDTMs, the departmental units of the DREALs are the main services concerned.

Other partners

The following partners are consulted during drawing up of the plan.

Local authorities and inter-commune cooperative organisations

Some local authorities (or inter-commune organisations) are involved in the management of Natura 2000 sites that have been designated due to the presence of Balearic Shearwater and will therefore be involved in the implementation of measures described in this NAP.

Public institutions and other scientific and technical partners

Public institutions will be involved in function of the species by the Ministry of Ecology (contract of objectives, etc.), in the development and implementation of the actions of the plan. Among these public institutions, it is particularly proposed that IFREMER and the National Museum of Natural History (MNHN) should be involved. The OFB and CNRS have already proposed to join the steering committee and the scientific committee.

Nature conservation associations and volunteer network

These stakeholders have a role to play in the implementation of the plan's actions. Locally, they benefit from the technical and financial support (sometimes also political) of the DREALs and the OFB, as well as local authorities, to which they submit funding requests that are consistent with the objectives and priorities of the NAP.

The facilitator is responsible for facilitating the network of volunteers and associations at national level.

Socio-professionals

Socio-professionals are key partners in the implementation of the plan's actions and are the principal contacts among the stakeholders of the plan from when it is drawn up. Among them, the regional fishery committees of the regions concerned, as well as professional organisations mobilised around this issue, are particularly targeted.

3.5 Estimated budget and provisional schedule

ACTION FILE	NAME	2021	2022	2023	2024	2025
1.1	Facilitation of the National Action Plan	150 000 € (Included in AMOPUFOM for the first 2 years)				
2.1	Characterise interactions with professional fishing - Saint Brieuc Bay sector	78 000 €				
2.2	Characterise interactions with professional fishing - Iroise Sea sector	130 000 €				
2.3	Characterise interactions with professional fishing - Mor Braz sector	Included in CARI3P				
2.4	Characterise interactions with professional fishing - Ile d'Yeu SPA sector	Included in CARI3P				
2.5	Characterise interactions with professional fishing - southern Landes Shelf sector			55 000 €		
2.6	Characterise interactions with professional fishing - Gulf of Lion sector	Included in CARI3P				
2.7	Characterise interactions with professional fishing - Development of applications (ECHOSEA/ OBSenPECHE)	29 000 €				
2.8	Assess interactions with angling and nautical activities	Cost included in facilitation				
2.9	Assess interactions with MREs (monitoring of ARC measures)	Cost included in facilitation				
3.1	Test measures for reducing bycatch Budget to be defined at the end of the characterisation phase			Budget à définir à l'issue de la phase de caractérisation		
3.2	Benefit from feedback on international experience	17 000 €				
3.3	Confirm, refine and share the issues regarding the Balearic Shearwater in the "Les Havres coast" sector	Cost included in facilitation				
3.4	Taking into consideration the issues regarding the Balearic Shearwater in Douarnenez Bay	Cost included in facilitation remit				
3.5	Taking into consideration the issues regarding the Balearic Shearwater in the SPA Saint Brieuc Bay – East	Cost included in facilitation				
3.6	Confirm, refine and share the issues regarding the Balearic Shearwater in the Gouf de Capbreton sector	Cost included in facilitation				

4.1	Set up a specific workgroup for questions of food resources	2 500 €		
4.2	Study of trophic level and monitoring of contaminants	13 650 € (Project submitted to the call for initiatives (AAI) "Marine Biodiversity 2020" of the Loire-Brittany Water Agency)		
4.3	Use of protocol-based data acquired at sea – absolute abundance assessment and habitat model approach	Analyses: 20 000 € - 30 000 € Capbreton surveys- 14 800 €		
4.4	analysis of data acquired at sea and from the coast– opportunistic observations	[3000 € - 5000 €]		
4.5	Observations from the coast – monitoring of stopovers	[100 000 € - 150 000€]		
4.6	Telemetric monitoring: setting up and coordinating a GPS biologging programme	>500 000 € Phase 1 = 230 000 € (partly included in AMOPUFOM) Phase 2: to be defined according to budgets provided by the marine EMYN, EFGL, PBG wind power projects		
5.1	Facilitation of the network of partners abroad	12 500 €		
6.1	Promote the conservation issues of the species	42 000 €		

The overall cost of the Balearic Shearwater NAP is assessed at between 1 250 000 € and 1 560 000 € over the 5 years of implementation **(including 351 791.11 € for the CARI3P project and 229 884.46 € for AMOPUFOM)**.

3.6 Articulation of actions with the framework documents on European Union policies for conserving marine biodiversity

By its proposed actions, the NAP will contribute to the implementation of public policies, notably those linked to the Birds Directive and the Marine Strategy Framework Directive (MSFD). On this last point, it will contribute to the indicators of specific Environmental Objectives (EOs) and to the implementation of certain actions of the DSF (Strategic Seaboard Documents).

<table>
<tr><th>ACTION FILE</th><th>NAME</th><th>ARTICULATION WITH STRATEGIC FRAMEWORK DOCUMENTS AT NATIONAL AND EU LEVEL</th><th>BIRDS DIRECTIVE</th></tr>
<tr><td>1.1</td><td>Facilitation of the National Action Plan</td><td>Not applicable</td><td>Not applicable</td></tr>
<tr><td>2.1</td><td>Characterise interactions with professional fishing - Saint Brieuc Bay sector</td><td rowspan="7">Environmental Objective D01-OM-OE01 :
Reduce the bycatch of seabirds* (off the coast and close to colonies), and reduce in particular the bycatch of the most vulnerable species such as Balearic, Yelkouan and Cory's Shearwaters by longlines, reef nets and seine nets for small pelagic fish
▪ Indicator 2: Number of birds captured by unit effort, by type of fishing gear and by species
▪ Indicator 3: Estimation of the annual numbers captured accidentally for the three species of shearwaters (Cory's, Yelkouan and Balearic) compared to the population
Good Ecological Status (GES), Decision 2017/848/EU :
Criterion D1C1 of GES: mortality rate by species due to bycatch: this rate must remain lower than the level likely to constitute a threat, so as to ensure the long-term viability of the species.
Surveillance Programme (SP) – Sea and coastal birds :
Subprogramme 5 "interactions between birds and human activities at sea", 2nd cycle monitoring procedures.
Estimation of bycatch of seabirds via onboard observers on fishing vessels Estimation of bycatch of seabirds via questionnaires/interviews with fishers
Action plans of the DSF :
Action name: Identify and reduce the risks of bycatch for all species of birds and marine mammals of community interest at the scale of the seaboard. Subaction 2: Analyse the risks for all species of community interest at the scale of each seaboard and strengthen the observation effort for the highest-risk fisheries, sectors and periods</td><td>Saint Brieuc Bay East Management Plan</td></tr>
<tr><td>2.2</td><td>Characterise interactions with professional fishing - Iroise Sea sector</td><td>Ouessant Molène Management Plan</td></tr>
<tr><td>2.3</td><td>Characterise interactions with professional fishing - Mor Braz sector</td><td>Mor Braz, Houat Hoëdic and Vilaine Bay Management Plans</td></tr>
<tr><td>2.4</td><td>Characterise interactions with professional fishing - Ile d'Yeu SPA sector</td><td>Marine sector of Île d'Yeu to the mainland Management Plan</td></tr>
<tr><td>2.5</td><td>Characterise interactions with professional fishing - southern Landes Shelf sector</td><td>/</td></tr>
<tr><td>2.6</td><td>Characterise interactions with professional fishing - Gulf of Lion sector</td><td>/</td></tr>
<tr><td>2.7</td><td>Characterise interactions with professional fishing - Development of applications (ECHOSEA/ OBSenPECHE)</td><td>Marine SPAs on the Atlantic and Mediterranean seaboards</td></tr>
</table>

** Recommendations of the 2nd cycle Surveillance Programme (2020-2026) in the process of finalisation (still not adopted by the European Commission). The recommendations in terms of monitoring procedures and actions to be deployed are therefore likely to change.*

2.8	Assess interactions with angling and nautical activities	**Environmental Objective D01-OM-OE01 :** Reduce the bycatch of seabirds (off the coast and close to colonies), and reduce in particular the bycatch of the most vulnerable species such as Balearic, Yelkouan and Cory's Shearwaters by longlines, reef nets and seine nets for small pelagic fish ▪ Indicator 2: Number of birds captured by unit effort, by type of fishing gear and by species ▪ Indicator 3: Estimation of the annual numbers captured accidentally for the three species of shearwaters (Cory's, Yelkouan and Balearic) compared to the population **Environmental Objective D01-OM-OE07 :** Limit the physical, sound and light disturbance of seabirds in their functional habitats **Action plans of the DSF :** Action name: Structure the practising of coastal sports and leisure activities (information, awareness-raising and regulation) on the questions of the fragility of species and habitats ▪ Subaction 1: Disseminate the appropriate spatialised information and prevention messages to promote good practices and avoid the pressures caused ▪ Subaction 2: Propose spatial (and if necessary temporal) protection measures in the framework of shared governance based on the knowledge of practices (subaction 1) and the fragility of habitats (subaction 2) ▪ Subaction 3: Incorporate a module dedicated to knowledge of the marine environment in the professional training of nautical sports instructors (Professional Qualification Certificate (CQP), Professional Diplomas for Youth, Popular Education and Sport (BPJEPS), State Diplomas for Youth, Popular Education and Sport (DEJEPS and DESJEPS), STAPS training courses) in order to manage coastal, nautical and underwater activities *[to be validated with the Ministry of Higher Education]*	/

2.9	Assess interactions with MREs (monitoring of ARC measures)	**Environmental Objective D01-OM-OE02 :** Prevent the collisions of seabirds with infrastructures at sea, notably wind farms (application of the Avoid, Reduce, Compensate sequence) Indicator 1 : Rate of projects authorised whose impact study, after application of the ARC sequence, assesses the residual impact on seabirds as being compatible with the achievement of the good ecological status of each species frequenting the area of the assessed project, on the scale of the seaboard(s) concerned by each of these species Indicator 2 : Rate of wind authorised farms with a system for assessing and, if necessary, reducing the level of collision pressure on the populations of species frequenting the wind farm. **Environmental Objective D01-OM-OE03 :** Avoid losses of functional habitats for seabirds*, in particular in marine areas where the density is maximum Indicator 2 : Surface areas concerned by new authorisations located in sites of maximum density* of seabirds leading to a loss of functional habitat. **Environmental Objective D01-OM-OE6 :** Limit the physical, sound and light disturbance of seabirds* in their functional habitats. For this OE, it is regrettable that there is no indicator for birds at sea which includes the effects of light pollution from offshore platforms (towers, maintenance vessels...) which have an attraction effect for many species including procellariids. **Action plans of the DSF :** Action name: Prefigure a national coordination body for the seaboard scientific councils (CSF) regarding marine wind power Subaction 2: Initiate a knowledge acquisition programme to limit the impacts of marine wind power. Action name: Strengthen the taking into consideration of the sensitivity of species to disturbance in authorisations at sea and in local regulations ▪ Subaction 1 : Summarise the available spatial and temporal information on the sensitivity of species to disturbance and the loss of functional habitats, in particular via an evolutive map of the functional habitats of species to be disseminated on digital media. ▪ Subaction 2 : Draw up guides for each activity aiming to reduce their impact and train the competent administrative services to ensure the compatibility of authorisations at sea with environmental objectives. ▪ Subaction 3 : Propose spatial (and if necessary temporal) protection measures in the framework of shared governance based on the knowledge of practices (subaction 1) and the fragility of habitats.	
3.1	Test measures for reducing bycatch	**Environmental Objective D01-OM-OE01 :** Reduce the bycatch of seabirds (off the coast and close to colonies), and reduce in particular the bycatch of the most vulnerable species such as Balearic, Yelkouan and Cory's Shearwaters by longlines, reef nets and seine nets for small pelagic fish Indicator 1: Proportion of the surface areas of the feeding grounds of major-issue seabird colonies in which of avoidance, banning or reduction measures against the risks of bycatch are planned **Action plans of the DSF :** ▪ Action name : Identify and reduce the risks of bycatch for all species of birds and marine mammals of community interest at the scale of the seaboard. ▪ Subaction 3 : On the basis of an inventory of the methods of bycatch reduction, test and deploy reduction measures on pilot sites situated prioritarily in MPAs, and encourage the implementation of innovative actions, in particular in Natura 2000 sites.	Saint Brieuc Bay – East Management Plan Ouessant Molène Management Plan Mor Braz, Houat Hoëdic and Vilaine Bay Management Plan Marine sector of Île d'Yeu to the mainland Management Plan

3.2	Benefit from feedback on international experience	**Environmental Objective D01-OM-OE01 :** Reduce the bycatch of seabirds (off the coast and close to colonies), and reduce in particular the bycatch of the most vulnerable species such as Balearic, Yelkouan and Cory's Shearwaters by longlines, reef nets and seine nets for small pelagic fish.	Saint Brieuc Bay – East Management Plan Ouessant Molène Management Plan Mor Braz, Houat Hoëdic and Vilaine Bay Management Plan Marine sector of Île d'Yeu to the mainland Management Plan
3.3	Confirm, refine and share the issues regarding the Balearic Shearwater in the "Les Havres coast" sector	**Action plans of the DSF :** Action name : Develop and implement appropriate management and protection tools for major-issue seabird species at the scale of the marine subregion ▪ Subaction 1: Identify the particular species for which the drawing up of appropriate management measures is relevant ▪ Subaction 2: Produce and implement local management and protection tools for the species identified Action name: Strengthen the taking into consideration of the sensitivity of species to disturbance in authorisations at sea and in local regulations ▪ Subaction 3: Propose spatial (and if necessary temporal) protection measures in the framework of shared governance based on the knowledge of practices (subaction 1) and the fragility of habitats	Memorandum DNP/SDEN N° 2007 with regard to the designation of marine Natura 2000 sites
3.4	Taking into consideration the issues regarding the Balearic Shearwater in Douarnenez Bay		
3.5	Taking into consideration the issues regarding the Balearic Shearwater in the SPA Saint Brieuc Bay – East		
3.6	Confirm, refine and share the issues regarding the Balearic Shearwater in the Gouf de Capbreton sector		
4.1	Set up a specific workgroup for questions of food resources	**Environmental Objective D04-OE01 :** Change the mortality rate of foraging* species due to fishing so as to favour the maintenance of the food resources required for higher predators	/
4.2	Study of trophic level and monitoring of contaminants	**Environmental Objective D08-OE02 :** Reduce the direct inputs of contaminants at sea, notably hydrocarbons linked to maritime transport and shipping **Good Ecological Status (GES), Decision 2017/848/EU :** ▪ Criterion D4C1 of GES: the diversity of the trophic guild is not affected by human pressures ▪ Criterion D4C2 of GES: the equilibrium of total abundance between trophic guilds is not affected by human pressures ▪ Criterion D8C1 of GES: the concentrations of contaminants do not exceed the threshold values (as defined in Decision 2017/848/EU) ▪ Criterion D8C2 of GES: the characteristics linked to the health of species and the status of habitats do not suffer nefarious effects due to contaminants, notably cumulative and synergetic effects ▪ Criterion D8C4 of GES: the nefarious effects of significant acute pollution episodes on the health of species and the status of habitats are reduced to a minimum and, if possible, eliminated ▪ Criterion D10C3 of GES: the quantity of waste and microwaste ingested by marine animals is at a level which does not damage the health of the species concerned **Surveillance Programme (SP) – Sea and coastal birds :** Subprogramme 5 "interactions between birds and human activities at sea", 2nd cycle monitoring procedures ▪ Monitoring of contaminants in seabirds	

4.3	Analyse the data acquired at sea habitat model	**Environmental Objective D01-OM-OE01:** Reduce the bycatch of seabirds* (off the coast and close to colonies), and reduce in particular the bycatch of the most vulnerable species such as Balearic, Yelkouan and Cory's Shearwaters by longlines, reef nets and seine nets for small pelagic fish. ▪ Indicator 1: Proportion of the surface areas of the feeding grounds of major-issue seabird colonies in which of avoidance, banning or reduction measures against the risks of bycatch are planned **Environmental Objective D01-OM-OE03 :** Avoid losses of functional habitats for seabirds, in particular in marine areas where the density is maximum ▪ Indicator 2: Surface areas concerned by new authorisations located in sites of maximum density** of seabirds leading to a loss of functional habitat. **Good Ecological Status (BEE), Decision 2017/848/EU :** ▪ Criterion D1C2 of GES: abundance of populations: the abundance of populations of species must not be nefariously affected by human pressures in order to ensure the long-term viability of populations. ▪ Criterion D1C3 of GES: demographic characteristics: the demographic characteristics of populations (size structure, age structure, sex distribution, fertility rate, survival rate) bear witness to a healthy population, unaffected by human pressures ▪ Criterion D1C4 of GES: area of distribution: the area of distribution of the species corresponds to the dominant physiographical, geographical and climatic conditions. If necessary, the distribution diagram in the area concerned can be used. ▪ Criterion D1C5 of GES: habitat: the habitat of the species provides the surface area and conditions necessary to enable the accomplishment of the different steps in their life cycle **Surveillance Programme (SP) – Sea and coastal birds** Subprogramme 5 "interactions between birds and human activities at sea", 2nd cycle monitoring procedures : ▪ Monitoring of birds at sea from the coast ▪ Aerial monitoring campaigns of marine megafauna and marine waste at national or regional scale (SAMM, SCANS, ASI) Monitoring campaigns of marine megafauna and marine waste from IFREMER vessels (Mégascope) Monitoring campaigns of marine megafauna and marine waste from opportunistic vessels (ferries, State actions at sea, ...) Monitoring campaigns of marine megafauna and marine waste at local scale by boat or plane (MPAs, MRE facilities) Telemetric monitoring of seabirds	ZPS en mer façades Atlantique et méditerranée
4.4	Analysis of data acquired at sea and from the coast - opportunistic sightings		
4.4	Observations from the coast – monitoring of stopovers		
4.5	Telemetric monitoring of individuals		
5.1	Facilitation of the network of partners abroad	Not applicable	Not applicable
6.1	Promote the conservation issues of the species	Not applicable	Not applicable

***Recommendations of the 2nd cycle Surveillance Programme (2020-2026) in the process of finalisation (still not adopted by the European Commission). The recommendations in terms of monitoring procedures and actions to be deployed are therefore likely to change.*

3.7 Monitoring and assessment of the plan

3.7.1 Annual and final assessment

The annual monitoring annual of the plan is a key point which needs to assess the progression and implementation of the actions. The annual assessment will be drawn up by the plan facilitator and will be presented to the Steering Committee at its annual general meeting.

This assessment will include :

- a summary of the actions implemented ;
- the level of achievement of actions (100%: carried out, 75%: advanced, 50%: partially carried out, 25%: started) and, if necessary, the reasons for the delays observed ;
- a summary by action (indicators, meeting minutes, partners involved, map of the action carried out, funding resources developed, difficulties encountered, etc...) ;
- a summary of the communication media produced ;
- a financial assessment including funding obtained and pledged, available and future funding, funding not found, etc. ;
- the schedule of future actions.

This annual assessment will provide the Steering Committee (COPIL) with the items necessary for any shifting of priorities, and if necessary for adjustments to actions (actions deemed inefficient or new items to be taken into account such as developments in knowledge, a sudden deterioration in conservation status, new commitments in the European Union or France, etc.).

A technical and financial assessment must also be carried out at the end of the 5 years of implementation of the Plan. It will be carried out by the facilitator of the Plan, under the control of the DREAL Bretagne and the OFB.

3.7.2 Assessment of the Plan

In addition to the final assessment, the objective of a plan assessment is to evaluate the effectiveness of actions using indicators set based on each action.

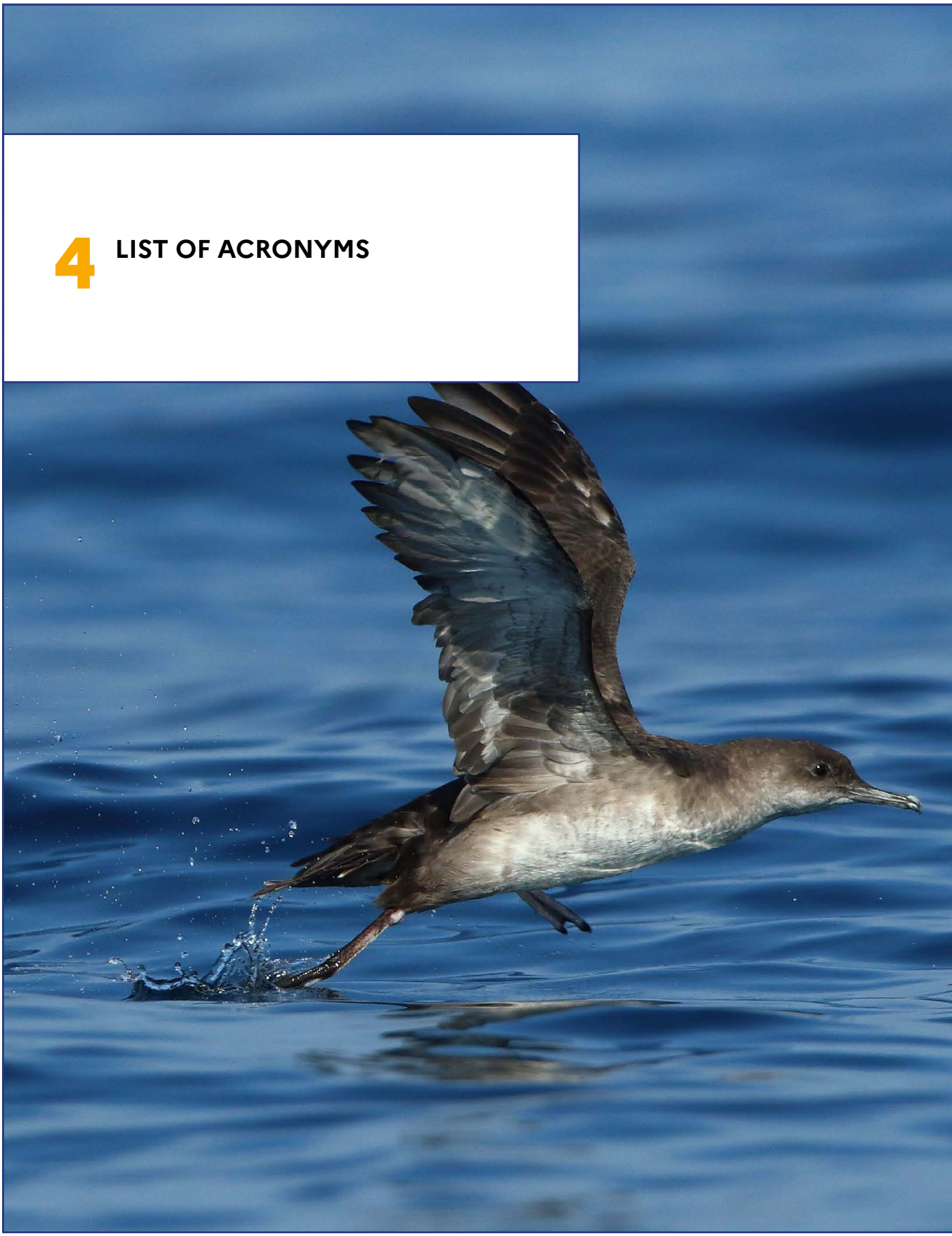
The indicators of monitoring operations formulated for each action of the Plan will therefore be used as the basis of its assessment. The list is not exhaustive, and the Steering Committee will define supplementary indicators.

The assessment will lead to writing a final report providing an analysis of the results of the actions. This will enable the contracting authority to decide on the effectiveness of the actions undertaken, on the necessity or not to renew or adjust actions.

The assessment of this NAP will be carried out in 2025 and must present all the assessment reports including :

- a summary of the comprehensive annual reports ;
- an analysis of the conservation status of the species, in relation with the knowledge acquired during the course of the plan ;
- a summary of the actions carried out: level of achievement, year carried out, partners involved, funding ;
- a summary of the difficulties and limits encountered ;
- an overall financial assessment ;

4 LIST OF ACRONYMS



ACAP: Agreement on the Conservation of Albatrosses and Petrels

AGLIA: Association du grand littoral atlantique (Association for the whole Atlantic Coast)

AMOP: Association méditerranéenne des organisations de producteurs (Mediterranean Association of Producers' Organisations)

CNPN: Conseil National de Protection de la Nature (National Council for the (Protection of Nature)

CNPMEM: Comité national des pêches maritimes et des élevages marins (National Committee of Maritime Fishing and Marine Aquaculture)

CNRS CEBC: Centre national de la recherche scientifique, Centre d'études biologiques de Chizé (National Scientific Research Centre, Chizé Centre of Biological Studies)

CNRS CEFE: Centre national de la recherche scientifique, Centre d'écologie fonctionnelle et évolutive (National Scientific Research Centre, Centre of Functional and Evolutive Ecology)

CRPMEM: Comité régional des pêches maritimes et des élevages marins (Regional Committee of Maritime Fishing and Marine Aquaculture)

CDPMEM: Comité départemental des pêches maritimes et des élevages marins (Departmental Committee of Maritime Fishing and Marine Aquaculture)

DDTM: Direction départementale des territoires et de la mer (Departmental Directorate for Territories and the Sea)

DREAL: Direction régionale de l'environnement, de l'aménagement et du logement (Regional Environment, Planning and Housing Directorate)

EMFAF: European Maritime, Fisheries, and Aquaculture Fund

GEOCA: Groupe d'études ornithologiques des Côtes-d'Armor (Côtes-d'Armor Ornithological Studies Groupe)

GISOM: Groupement d'intérêt scientifique sur les oiseaux marins (Scientific Interest Group on Seabirds)

GON: Groupe ornithologique normand (Normandy Ornithology Group)

IFREMER: Institut français de recherche pour l'exploitation de la mer (French Research Institute for Exploitation of the Sea)

IUCN: International Union for the Conservation of Nature

LPO: Ligue pour la protection des oiseaux (Birds Protection Society)

OFB: Office français de la biodiversité (French Biodiversity Agency)

OP SaThoAn: Organisation de producteurs de sardine, thon et anchois (Sardine, Tuna and Anchovy Producers' Organisation)

RESOM: Réseau national oiseaux marins (National Seabirds Network)

SEO: Sociedad española de ornitología (Spanish Ornithology Society)

SPEA: Sociedade portuguesa para o estudo das aves (Portuguese Society for the Study of Birds)

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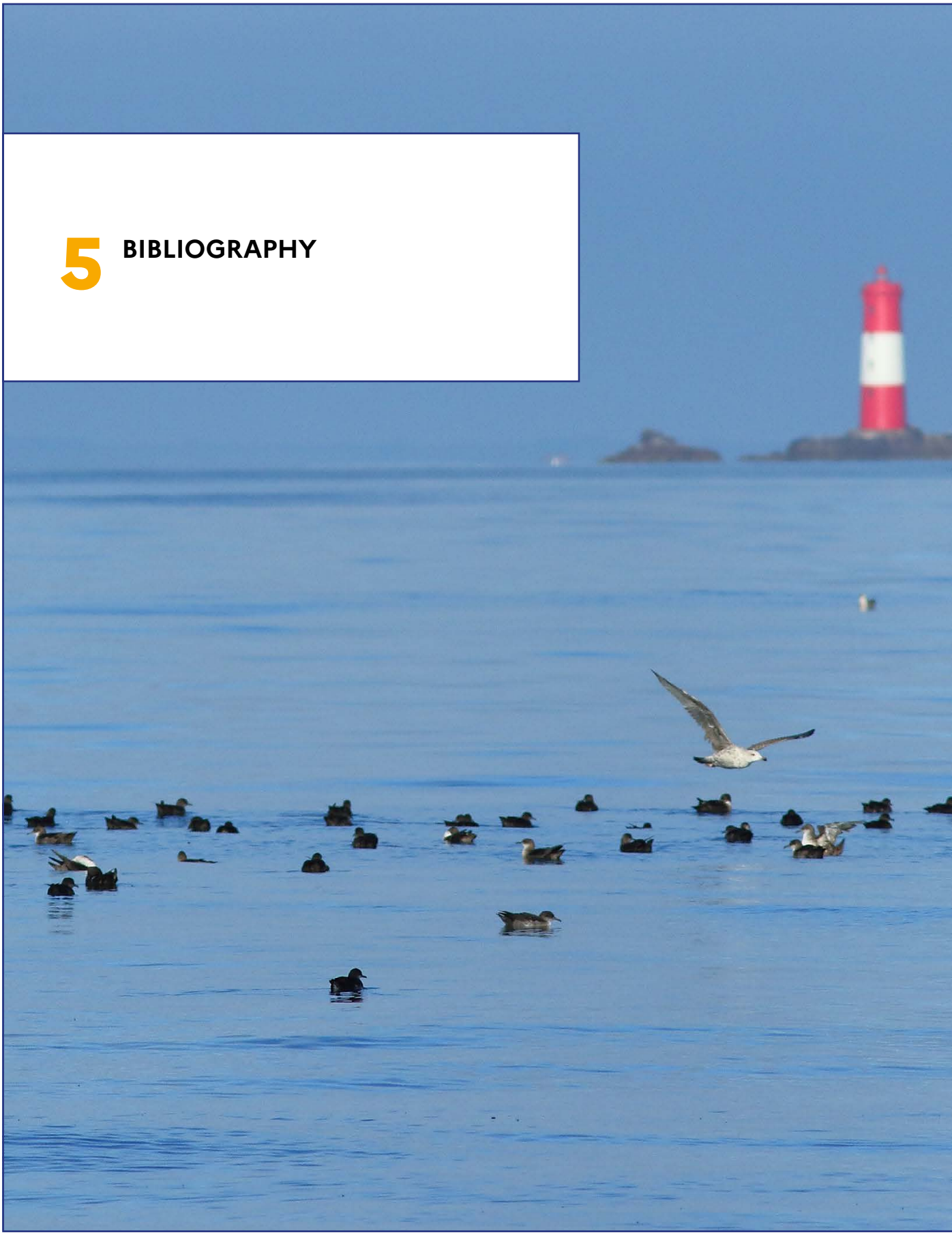

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6 ANNEXES

ANNEXE 1: Summary of knowledge on the Balearic Shearwater

Since Annexe 1 is a large document, it is directly downloadable from the same sites as the NAP, those of the Ministry, the DREAL and the OFB (oiseaux-marins.org).

ANNEXE 2: Meta-analysis of the data available in the French EEZ between 2004 and 2018

Since Annexe 2 is a large document, it is directly downloadable from the same sites as the NAP, those of the Ministry, the DREAL and the OFB (oiseaux-marins.org).

ANNEXE 3: Definition of a monitoring strategy for the Balearic Shearwater on the French seaboards

Since Annexe 3 is a large document, it is directly downloadable from the same sites as the NAP, those of the Ministry, the DREAL and the OFB (oiseaux-marins.org).

ANNEXE 4: Avoidance, reduction and compensation measures for the Balearic Shearwater proposed or undertaken for each Atlantic or Mediterranean wind farm project as of 30th June 2020

ANNEXE 5: Summary of knowledge regarding bycatch of Balearic Shearwater by professional fishing.

Since Annexe 5 is a large document, it is directly downloadable from the same sites as the NAP, those of the Ministry, the DREAL and the OFB (oiseaux-marins.org).

ANNEXE 6: contributions of the various large-scale programmes (specific or not) carried out during the last decade

ANNEXE 7: Summary of knowledge acquired in the framework of the development of offshore windfarm projects and of the study of the marine SPAs

ANNEXE 4

Avoidance, reduction and compensation measures for the Balearic Shearwater proposed or undertaken for each Atlantic or Mediterranean wind farm project as of 30th June 2020

SITE	ACTION NR	DESCRIPTION OF ACTION
DIEPPE – LE TREPORT	MR7	Minimisation and optimisation of lighting during the works Additional measure Limitation of disturbance by light attraction during the works phase Auditing of boats and checking for the absence of night lighting in areas where no works are taking place (excluding maritime buoys) - Control lighting types used Avifauna: collection of data on collisions/landing of birds on boats/barges used for construction
	MR13	Awareness raising of construction vessel pilots operating on behalf of the project owner Additional measure Limitation of impacts linked to disturbance by marine traffic of coastal stopovers and the Natura 2000 site
	MR14	Adapting the flight altitude of maintenance helicopters Additional measure Limitation of impacts linked to disturbance by marine traffic of coastal stopovers
	SE2	Long-term monitoring of seabird populations (and other groups of marine megafauna) according to the BACI protocol at sea and on nesting colonies Digital aerial monitoring; 12/year 11 surveys
	SE3 bis	Monitoring of airborne bird and bat activity within the wind farm Monitoring by video camera (day + night) + radar
	E1	Creating an «Offshore Wind Energy» Scientific Interest Group and strengthening its future work
	E5	Positioning of buoys for the monitoring of vertebrate movements at sea - MAVEO
	E10	Enhancing knowledge of bird flight altitudes by financing a thesis
FECAMP	R02	Preferential navigation routes for vessels Major stopovers were observed in the coastal strip (notably of auks and divers between November and March). Two priority movement corridors will be determined to limit disturbance. These corridors will avoid the areas of highest density. One will be determined for boats arriving from the port of Le Havre (mainly during the construction phase) and the other will be determined between the area of the facility and the port of Fécamp (maintenance). We propose a corridor width of 1 to 2 nautical miles, located between the ports (Le Havre and Fécamp) and the area of the facility and of 1 nautical mile around the facility. boats will ensure that they remain within these corridors in order to limit disturbance to avifauna. Auks and divers are sensitive to disturbance and the increase in traffic can cause habitat loss and additional disturbance on top of the habitat loss caused by the presence of the wind turbines
	R04	Limiting the beacon lighting of the wind farm At present, the beaconing regulations for offshore wind farms are inappropriate and require both aeronautical and maritime lighting. A dual light source could aggravate the impact of light attraction. A discussion has been initiated with the authorities to limit this lighting. Indeed, current aeronautical regulations require that each wind turbine has lighting, whereas the maritime regulations only require the lighting of wind turbines on the edge of the park. The authorities' choice is not yet known.
	R05	Flight altitude of helicopters If helicopters are used for getting to the facility (maintenance visits during periods of high swell), the coast- facility journey will be carried out at a minimum height of 800 feet (approximately 250 m) in order to limit disturbance to bird populations in the 10 km coastal strip. This height is used for overflying sensitive ornithological areas (e.g., nature reserves). This measure will be adopted except for emergency interventions.
	MA02	Participation in scientific programmes/theses in the Channel area: Seabirds
	MS01	Monitoring by radar (within the wind farm)
	MS02	Monitoring by aircraft and boat 12 trips per year? 9 surveys in total

COURSEULLES		Limitation of light attraction Reduction of light emissions by lighting cones during the construction phase
		Limitation of disturbance by helicopter Sufficient flight altitude between the coast and the wind farm to avoid disturbing birds during the construction phase
	Su9	Baseline distribution across the extended study area (Seine Bay) for impact monitoring Multi-species observation observations by large-scale visual aerial overflight (Seine Bay) twice a year/4 surveys + during the construction works
	Su5	Assessing potential changes in behaviour due to the presence of the wind farm Multi-species observation at sea by boat and monitoring of the species frequenting the wind farm, 12 trips/year; 1 campaign before the works, 3 campaigns after the works
	Su4	Assessing potential changes in behaviour due to the presence of the wind farm Observations by automated radar during the operational phase
	Su14	Enhancing knowledge and technologies related to the avoidance rate of avifauna within an offshore wind farm ORJIP R&D programme for monitoring avoidance behaviour through the development of new technologies (TADS camera, SCANTER 5000 radar, LAWR 25 radar and Vectronix 21 laser)
	Su15	Modelling direct and indirect effects on the food web Co-financing of the TROPHIK thesis consisting of the implementation of food web models using the example of the Calvados offshore wind farm project
SAINT-BRIEUC	R3	Reduction of photo-attraction Reduction of light intensity and downwards facing lights using cones or any similar device to reduce photo-attraction
	RS	Additional reduction measure for the Balearic Shearwater Minimise the disturbance of rafts of Balearic Shearwater caused by vessels mobilised for the works, and also by pleasure boating and the spatial distribution of rafts (radar + observers) + communication/awareness raising
	S6	Visual monitoring of avifauna by aircraft and boat using a suitable method after setting up the wind turbines Boat: 24 trips over 1 year; digital monitoring: monthly trips over 4 years
	S7	Radar monitoring of birds Evaluation of potential changes in the behaviour of seabirds (flight paths and flight altitudes) due to the presence of the wind farm Measuring the migratory flow through the development site + land-based radar
	AC3	Experimentation of a collision avoidance system for avifauna Experimentation of one existing system to avoid bird collisions with wind turbine blades. In the event of a lack of favourable conclusions, assessment of the impacts of wind turbines on avifauna
GROIX		Participation in the GEOBIRD research programme Based on renowned experts and cutting-edge technologies, the GEOBIRD project aims to develop and manufacture a smart, connected and miniaturised geolocation tag (bio-logger) with integrated physiological and environmental data recorders. This tag could be used to monitor sensitive medium-sized avifauna
		Participation in the APPEAL research programme The main objective of the APPEAL project is to implement an approach combining natural sciences and humanities and social sciences to measure the effects of floating offshore wind farms (FOWFs) on the functioning of coastal socio-ecosystems

SAINT-NAZAIRE	ME8	Reduce the attractiveness of the wind farm at night (number and intensity of lights)
	MR9	Reduce disturbance to Balearic Shearwater migration stopovers Improve migration stopover conditions for the Balearic Shearwater Monitor migration stopover conditions (population size, distribution, behaviour), with GPS tagging? Determination of a preferential route for vessels + roaming team + awareness raising Evaluation of the public awareness-raising action via modules integrated into the actions carried out 550kE over 8 years;
	MSU9	Opportunistic monitoring of maintenance vessels: training of navigation staff Training of staff in marine mammal recognition, possibility of extending this to seabirds?
	MSU10	Monitoring of avifauna Boat surveys Studies on the 3 large gulls and the Balearic Shearwater: functioning of migratory stopovers, tagging individuals 125 k€/year over 8 years; prospective partner PERISCOPE
		Accompanying measure - Support for actions to preserve nesting sites
NOIRMOUTIER-YEU	MR5	Minimising and optimising lighting during works During construction, the following adaptations will make it possible to limit nocturnal light disturbances. Minimise night works as much as possible; No permanent lighting of work zones outside of construction operations (excluding maritime buoys); Use of cone lighting with reduced luminosity to limit halo lighting losses
	MR10	Raising awareness on the presence of marine mammals and avifauna for the pilots of maintenance and monitoring vessels operating on behalf of the project owner This awareness only concerns small and highly mobile vessels manoeuvrable enough to relatively easily avoid disturbing bird behaviour
	MR11	Adapting the flight altitude of maintenance helicopters In compliance with flight regulations (particularly visual flight rules, visibility conditions), a minimum flight height of 800 feet (250 m) will be sought when overflying the coastal fringe (first 4 kilometres) and, if possible, during the entire journey towards the wind farm. Wherever possible, a flight height above 1500 feet (450 m) will be sought. This height is in line with the most recent recommendations in the UK (BTO, 2015)
	SE1	Long-term aerial monitoring of birds and marine megafauna and assessment of the real impacts of the project phases (construction, operation) monthly trip/10 campaigns
	SE2	Telemetric monitoring of seabirds (Greater Black-backed Gull, Lesser Black-backed Gull, Herring Gull, Balearic Shearwater) likely to use the wind farm area, and modelling of their preferred habitats GPS-GSM between June and October; 392kE in total (4 species).
	SE3	Study of bird movements and flight altitudes by radar (within the wind farm)
	SE3 bis	Video monitoring of avifauna activity and mortality evaluation Monitoring of flight behaviour in proximity to 4 wind turbines, from initial use and over 2 years Updating of collision risk assessment
	E6	Contribution to the National Action Plan for the Balearic Shearwater 100kE
PROVENCE GRAND LARGE	R02	Minimise lighting Minimise light sources to the strict regulatory requirements related to air and maritime safety Remove all continuous lighting (boat landing, mast bottom, door, wind turbine nameplate, nacelle, etc.), which would attract birds close to the wind turbines and increase collision risk
	R04	Choice of logistical resources and raising awareness of pilots The aim is to reduce the impact of disturbance caused by the means of wind turbine access from the coast. The construction and maintenance of the wind farm will be carried out using vessels; no airborne means are planned. This choice reduces the risk of disturbance to avifauna in the development site. The pilots will be trained on environmental issues and on what to do in the event of a concentration of birds (and other groups) on the wind farm access route.
	S01	Monitoring of bird behaviour during the wind farm operational phase: Monthly boat monitoring Day and night camera monitoring (thermal) Visual monitoring from the park

EOLMED GRUISSAN	MR14	Minimise lighting during construction and operation Minimise night work, which will only be considered when absolutely necessary During the operational phase, lighting will be reduced to the strict regulatory requirements related to air and maritime safety
	MR15	Raising the awareness of pilots on environmental issues and on what to do in the event of an encounter with marine species. This awareness raising will be carried out in two stages: - Creation of a booklet on good practices showing what to do and what to avoid doing; - In-session training
	MS09	Automated bird monitoring by cameras: Night + day, placed facing the rotor + float + 360°
	MS12	Visual monitoring by boat - Monthly trips, 6 surveys
	MS13	Monitoring of bird movements from the coast: 1 point at the coast (Leucate plateau), every 2 weeks
	MA02	Participation in the funding of the actions of the Balearic Shearwater NAP (50K€)
EFGL LEUCATE	R6	Reduce lighting during marine works and operations
	SC10	Carry out video monitoring of avifauna activity and mortality evaluation Night + day, placed facing the rotor + float + 360°
	SC11	Carry out monitoring of avifauna by boat, monitoring of marine mammals and marine turtles by specialist observers Monthly trips - 6 campaigns
	SC13	Participate in scientific telemetric monitoring programmes (GPS tag) on the Yelkouan Shearwater, Balearic Shearwater and Scopoli's Shearwater In connection with the NPA for the Balearic Shearwater; 50K€ planned (100K€ = 20 individuals tagged and monitored for 1 year)
	SC14	Carry out monitoring of bird movements from the coast 1 point on the coast (Leucate plateau), every 2 weeks

ANNEXE 6

CONTRIBUTIONS OF THE VARIOUS LARGE-SCALE PROGRAMMES (SPECIFIC OR NOT) CARRIED OUT DURING THE LAST DECADE

The contributions of the LPO programme FAME (2010-2012)

Structured on the scale of the three countries the most concerned (Spain, Portugal and France), this European Union programme notably enabled monthly protocol-based and simultaneous monitoring operations on 30 sites from Normandy to the Spanish border.

At the end of the programme, a summary report formalised and mapped the sectors playing an important functional role for the Balearic Shearwater :

The most important stopover areas in terms of numbers and interannual stability are :

- estuary of the Vilaine/Mor Braz ;
- Lannion Bay ;
- Saint Brieuc Bay ;
- Mont Saint Michel Bay ;
- the "Vendée Corniche" ;
- the southern Landes Shelf (coasts of Landes and Pyrénées-Atlantiques).

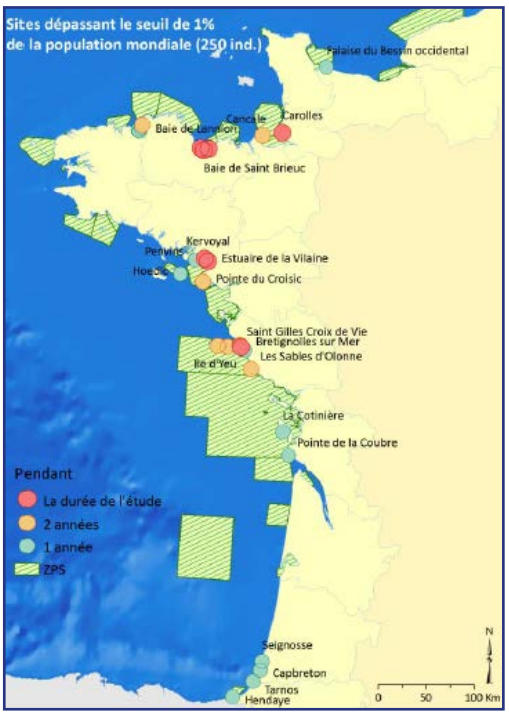


Figure 12 : Coastal sites harbouring more than 1% (250+ ind.) of the estimated world population (25 000 ind.) during 1, 2 or 3 of the years of FAME programme monitoring (Boué et al., 2013)

The coastal sectors where significant numbers of migratory birds can be seen during the summer flows (heading North and then heading South) :

- coasts of Normandy (Cotentin) .
- coasts of the Charente-Maritime ;
- the southern Landes Shelf (coasts of the Landes and of the Pyrénées-Atlantiques).

Some of these sites a record number of individuals, reaching significant proportions of the estimated total population as in July 2010 with over 5780 birds (i.e., approximately 25% of the world population) which stopped over in Lannion and Saint Brieuc Bays.

When all the data collected by observers in the field in 2011 and 2012 are take into consideration, the maximum number of Balearic Shearwater identified in August 2011, and in September 2012, were respectively close to 7000 and 6000 individuals.

The results of the study suggest French coastlines harbour, at peak abundance, slightly less than 30% of the total population of Balearic Shearwater which is presently assessed at close to 25 000 individuals, which confirms France's responsibility in the conservation of the species. Double counts having been eliminated, but sightings being only coastal, this proportion (around 7 000 individuals) is a minimum estimate..

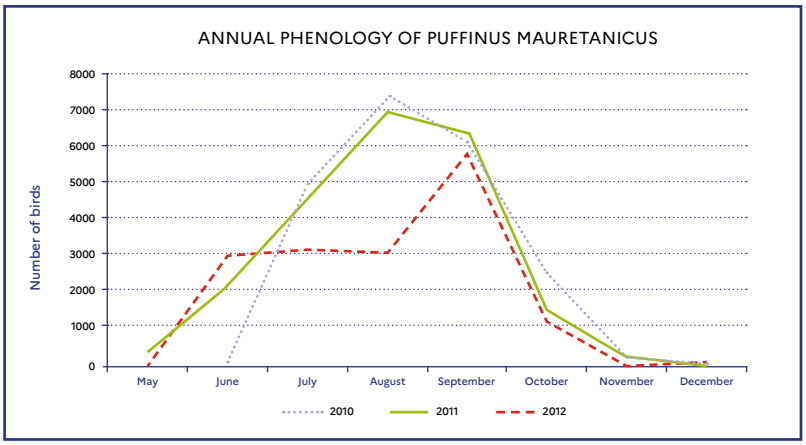
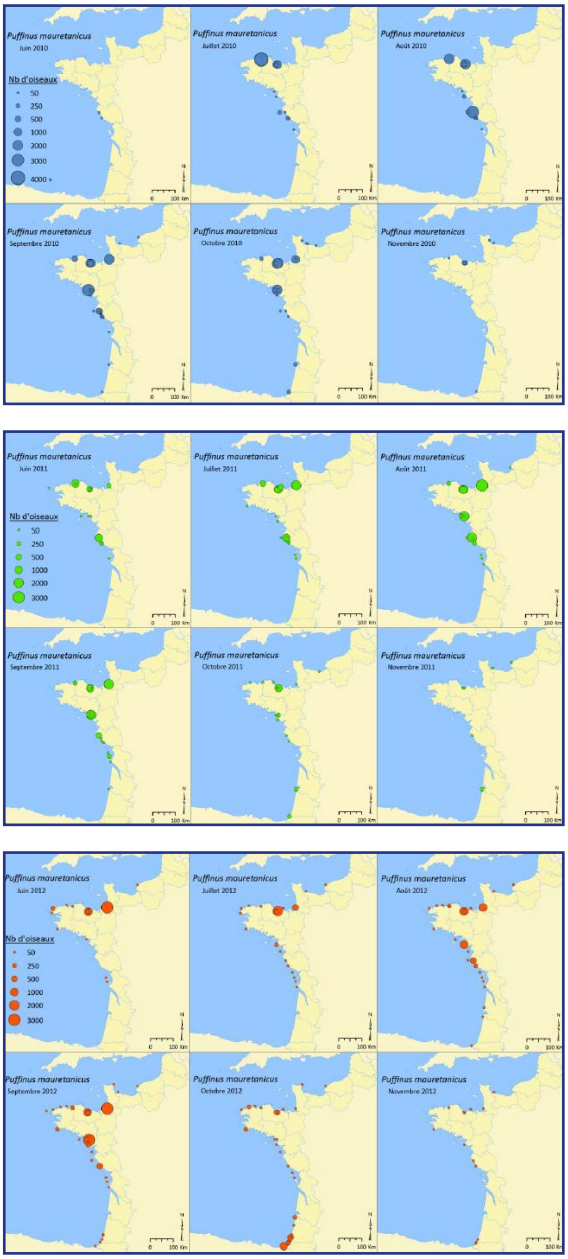


Figure 72 : Temporal distribution of sightings of Balearic Shearwater in France (Atlantic) during the course of the 2010-2011 and 2012 seasons, from May to December (Boué et al.

Aside from slight interannual variations, the sites harbouring Shearwaters were used in a similar manner during the course of the 3 sampling years. At the start of the inter-nuptial season, the Shearwaters occupied mainly the Normandy and Northern Brittany sectors (Mont Saint Michel Bay and Saint Brieuc Bay). After that, the sectors adjacent to the Vilaine Estuary (southern Mor Braz) and the Vendée were gradually occupied (August).

Finally, and especially in 2012, during their prenuptial movements individuals seem to frequent the Landes coasts in greater numbers (October). Considering the biology of the species, this could suggest that in the beginning of the season birds coming from the Balearic Islands and proceeding along the Spanish coast branch off from Galicia to reach the English coast (Southern England and Northern France). This flow probably involves just adults and juveniles.

Figure 71 : Spatial and temporal evolution of numbers of Balearic Shearwater observed in the framework of the FAME programme, from 2010 to 2012



These cohorts may finally be joined by the last adults and the young of the year concerned. Finally, from September, and more markedly from October, less experienced individuals or those dependant on autumn low pressure systems, proceed along the coasts of the Bay of Biscay to gradually reach the South of Spain and the Mediterranean. This scenario is only a hypothesis based on the summary of the programme, since observations made from the coast provide no information on bird status (breeding or not), except for observations made during the breeding period in the Balearic Islands, due to limited knowledge on the behaviour of juvenile and non-breeding individuals.

A national summary in 2016

In order to update information related to the species, in 2016 the OFB financed a summary about the stopovers, transit and dispersion of the Balearic Shearwater on the Channel/North Sea and Atlantic seaboards (from the north to the Vendée), coordinated by the GEOCA and Bretagne Vivante.

This study was carried out in the area concerned by the protocol-based monitoring operations to census the main stopover sites, seawatch monitoring and the exploitation of opportunistic data banked in collaborative regional databases.

2016 - Phenology of presence and principal stopovers

In Vendée and Loire-Atlantique, the birds were observed from the beginning of the monitoring operations in June, with flows of several hundred birds, decreasing in numbers by late August.

In the western Channel and off Brittany, the species was almost absent in winter and the first were observed in late April (off Morbihan, Finistère and Côtes-d'Armor), but not before late May for larger flocks. Between weeks 21 and 28, the largest number of stopovers were recorded off Finistère (1500 individuals in early July), notably in Douarnenez Bay, after which the department is deserted and the large flocks occupy sites further east (Saint Brieuc and Mont Saint Michel Bays), for approximately 2 months, with 5000 to 6000 birds present overall in the 2 sectors. Massive numbers were observed in the Channel (Mont Saint Michel Bay) during the second week of July and the massive presence of birds, around 3000 individuals, lasted 2 months over the whole of the Normandy Brittany Gulf (Cotentin) with probable exchanges between the different sectors: bay head, Baubigny.

A mass departure of the birds was observed in week 38 (mid-September) and corresponds to the observation of an exceptional migration of 5500 individuals on 16 September from the seawatch site of Brignogan in northern Finistère.

Sightings in the eastern Channel/North Sea were very limited, just a few individuals from August to September.

2016 - Trends observed

The Bays of Lannion and Morlaix appear to confirm a certain irregularity in frequentation by the species (fluctuating food resources?), unlike other more stable sites such as Saint Brieuc and Mont Saint Michel Bays.

Frequentation of Mor Braz was low in 2016 (no more than a few hundred individuals), compared to 2015 and to previous years. On the contrary, more birds were observed off the coast of Le Croizic in Loire-Atlantique.

Frequentation of the tip of Finistère was higher than in 2015, with a possible bias due to higher observer pressure, notably from seawatch points.

Contributions from monitoring carried out within the framework of the ERMMA programme: distribution and phenology in the south of the Bay of Biscay (1976 to present)

The regional programme Environment and Resources of Aquitaine Marine Habitats (ERMMA) is a global tool providing multidisciplinary and inter-organisational scientific knowledge and expertise, specialising in marine biodiversity trends in Aquitaine.

For seabirds, the protocol used has been identical since 1976, date of its creation by the Centre de la Mer de Biarritz with the National Museum of Natural History (MNHM). Line transect surveys are carried out every month under standardised observation conditions onboard Coast Guard patrol boats. The method aims to determine a "relative density" of populations, i.e., the number of individuals multiplied by the observation time or distance covered.

On the basis of these data, 2 atlases have been published, respectively in 2009 and late 2018.

The Nouvelle-Aquitaine coastline appears as a key region for measuring trends in these species based on the important sectors for higher predators in its territory, such as the canyons of Capbreton and Cap Ferret, the fringes of Arcachon Bay or the Gironde Estuary. All these areas are well known for contributing to the feeding, breeding or resting of birds and marine mammals.

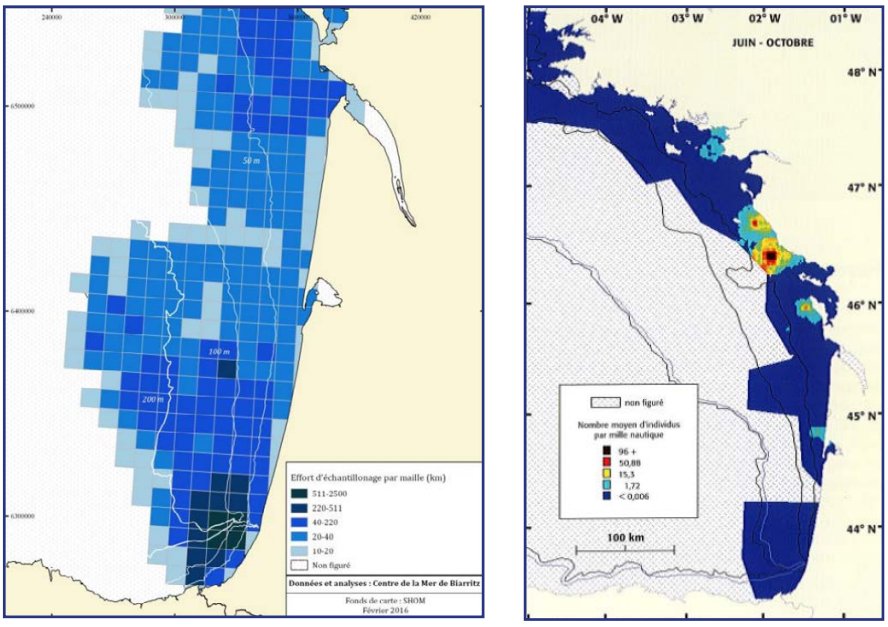


Figure 73 : Sampling effort for the period 2003-2015 («Data and analyses: Centre de la Mer de Biarritz»)

Results of the atlas 1976-2002

In the northern Bay of Biscay, the species is encountered regularly, but in small numbers, as far as the tip of Finistère, and is abundant only in the Mor Braz sector, off the coast of the Vilaine Estuary, where it is frequently associated with trawlers from the ports of Le Croisic and Turballe.

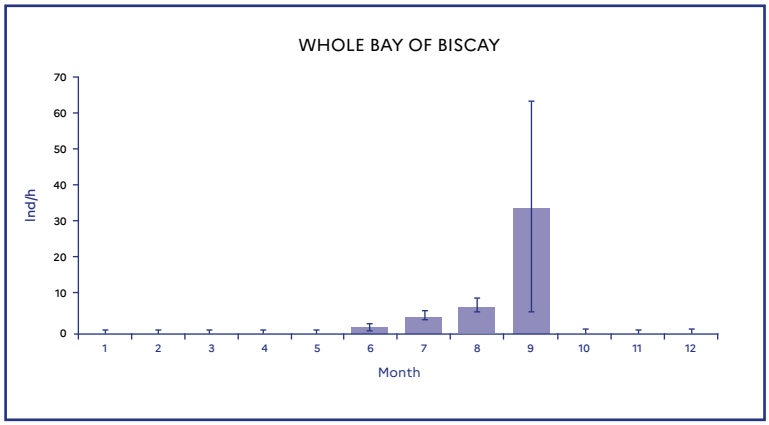
Peaks of abundance have been observed between late August and mid-September, up to 4000 birds in the 1980s, much fewer since then (800-1500 in September 2000, 1000 in September 2003).

In the central Bay of Biscay, the species is regular, but not very abundant, off the coast of Île d'Oléron and in the Pertuis Charentais. However, the highest concentrations are observed off the Vendée coast, mainly between the ports of Sables-d'Olonne and Saint-Gilles-Croix-de-Vie. In the 1980s, the species was present from May to September, with repeated peaks in abundance of 6000 to 7000 birds in July/August. During the 1990s and until 2003, these stopovers became more irregular sometimes only a few tens of birds in June-July, 4000 individuals in September 1999, and 6000 to 7000 birds in August 2003.

In the southern Bay of Biscay, the species is fairly regular off the coast from Pyrénées Atlantiques to Gironde, and particularly off the coast of the Arcachon Bay sector, but in limited numbers.

During this period, for summering Balearic Shearwaters (inter-breeding period), the Bay of Biscay harboured at least 50% of the worldwide numbers of the species (adjusted upward since that time), for adult individuals over 1 year old and in the crucial flight feather moulting period.

Figure 74 : Relative abundance and phenology of the Balearic Shearwater in the southern Bay of Biscay over the period 1976-2002 ("data and analyses: Centre de la Mer de Biarritz")



Results of the 2003-2015 atlas

Over this period, it appears that 2 sectors are mainly frequented by the species :

- the most coastal fringes of the Gouf de Capbreton ;
- off the Estuary of the Gironde.

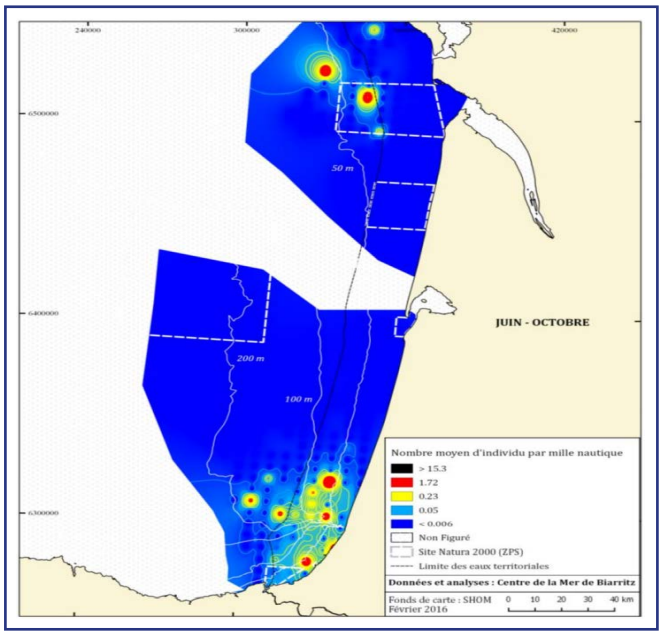


Figure 13 : Distribution of the Balearic Shearwater in the southern Bay of Biscay over the period 2003-2015 (Castège I. & Milon É. (coord.) 2018)

While the first sector appears to correspond to known coastal affinities of the species, the second sector corresponds to areas further offshore. There are 2 hypotheses: i/this sector is a regular landing area ii/ it corresponds to sightings of birds on direct transit from north-western Spain to sites known for high concentrations off the Vendée and Brittany coasts.

The atlas also mentions the regular presence, although in small numbers (undetected by the dedicated protocol), of birds off the northern Gironde coast.

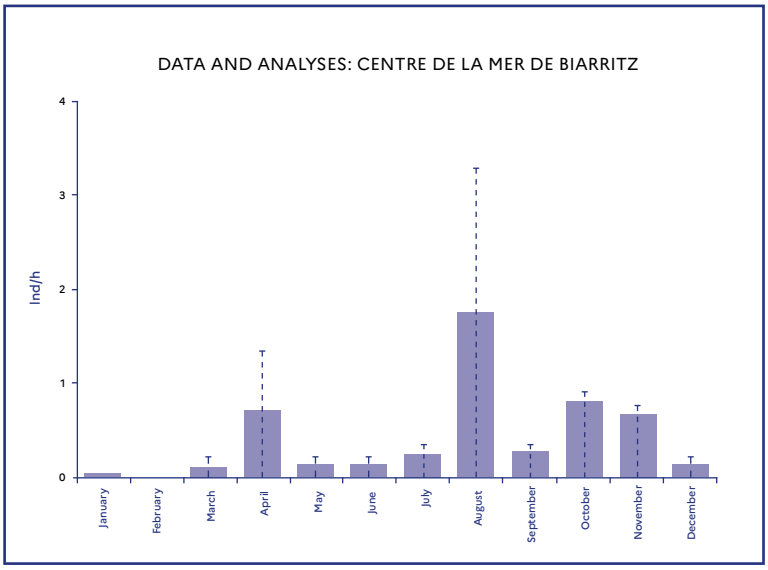
These 3 sectors have in common their richness in food, due to 3 different phenomena :

- the thermal front of the upwellings of the Gouf of Capbreton ;
- the river plume of the Gironde ;
- anchovy spawning grounds in the south of the Gironde Estuary.

The first peak in abundance is recorded in April, which corresponds to the first migrants arriving in the Bay of Biscay. The species is then more abundant between August and November, as is the case in the northern Bay of Biscay and the Channel.

Comparison of the consolidated results for these 2 periods (1976-2002 then 2003-2015) highlights the increased abundance in the southern Bay of Biscay, with a marked abundance off the coast of the Basque Country (Gouf de Capbreton) which had not been highlighted in the atlas of 1976-2002 data. These results and interpretations are weakened by the relative low abundance of the species and by the high numerical and temporal variability of sightings.

Figure 75 : Relative abundance and phenology of the Balearic Shearwater in the southern Bay of Biscay over the period 2003-2015 («Data and analyses: Centre de la Mer de Biarritz «)



ANNEXE 7

Summary of knowledge acquired in the framework of the development of MRE projects and the study of marine SPAs

A number of offshore Marine Renewable Energy projects were developed throughout the 2000s and 2010s.

This annexe provides a summary of knowledge on the Balearic Shearwater acquired during these studies, some of which involved the implementation of sea surveys on marine megafauna: boat surveys, aircraft flyovers, coastal observations. This summary is based on a selection of extracts about the Balearic Shearwater taken from published regulatory studies.

This annexe finishes with the presentation of the results of a knowledge acquisition campaign in the Île d'Yeu SPA.

The Balearic Shearwater within the study area of the Dieppe-Le Tréport wind farm project (Offshore wind farm at Dieppe-Le Tréport)

Regarding the shearwaters, 3 species were identified (Manx Shearwater, Balearic Shearwater and Sooty Shearwater), all 3 of which are migratory only within the study area furthest offshore. Little data were acquired on this group showing that it has low presence at this stage.

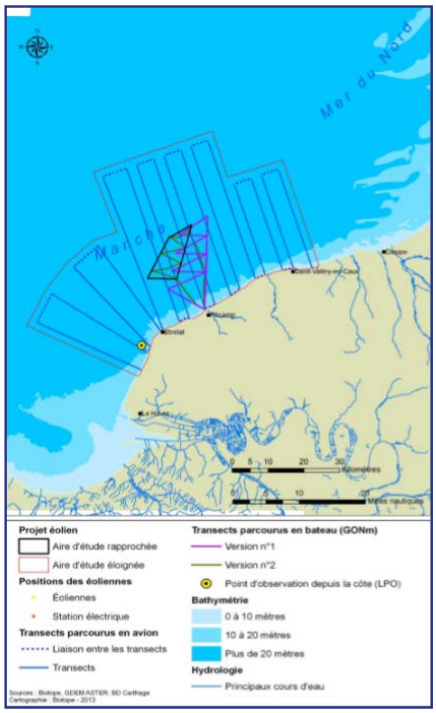
Figure 76 : Location of the Dieppe-Le Tréport project

Migration monitoring operations (notably at Cap Gris-Nez) showed that wind influences their presence on the coastal fringe (Caloin & al, 2014). The low number of data is mainly due to the observation conditions (boats do not go out in bad conditions and observations by aircraft are then made difficult by the bad sea state). These data do not give a reliable idea of the distribution of this group, but nevertheless they allow us to judge the occasional presence of this group of species in the inshore and areas further offshore.

The Balearic Shearwater within the Fécamp offshore wind farm project (EDF-RE)

The species has low presence during sea surveys. When there are strong south-westerly winds, the species can be «pushed» into the East Channel (the phenomenon can be seen as far as the Dover Strait). The species is then observed when it returns to its summering grounds. Its presence is mainly noted between July and October. The observations of this species were all made during this period from the boat just outside the close study area or from the coast.

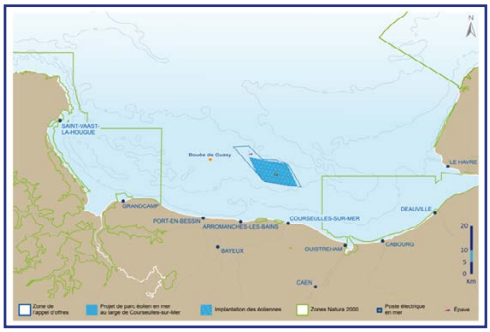
Figure 77 : Location of the Fécamp project (source EDF-RE)



Balearic Shearwater in the Courseulles offshore wind farm project study area (EDF-RE)

During the monitoring operations by boat carried out by the GONm (12 monthly trips) in 2013, only 1 Balearic Shearwater was observed at the development site and 41 between the development site and the coast.

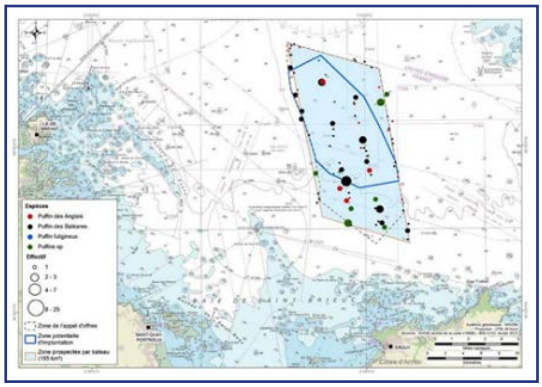
Figure 78 : Location of the Courseulles-sur-Mer project (source EDF-RE)



If the trend continues, the Seine Bay could be used more frequently in the coming decades (Yésou & Wynn, 2007). 191 individuals were counted at the Pointe of Hoc on 24th August 2013, on the same day there were 2,159 individuals counted passing the Cap of The Hague, 848 the next day (http://www.trektellen.nl).

The Balearic Shearwater within the Saint-Brieuc Bay project study area (Ailes Marines)

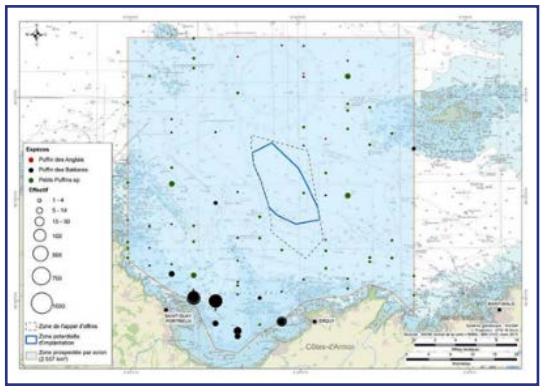
Figure 79 : Distribution and numbers of Balearic Shearwaters (in black) – boat surveys in 2012/2013/2014 (IN VIVO)



The distribution of observations made by boat transects indicates a relatively homogeneous presence throughout the monitored area. Most of the shearwaters observed were moving although a few groups were seen fishing or resting. The largest group observed was 25 Balearic Shearwaters observed resting on 6th August 2013.

The mean number of shearwaters per plane monitoring operation is low most of the year except in July with more than 1700 birds.

Figure 35 : Distribution and numbers of the Balearic Shearwaters (in black) – aircraft surveys in 2013/2014 (IN VIVO)



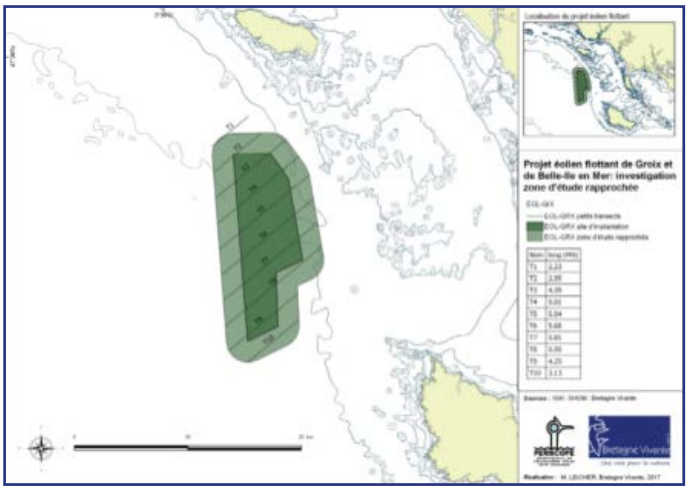
The presence should be noted of gatherings of thousands of Balearic Shearwaters in the south of Saint-Brieuc Bay, outside the area covered by the boat transects. These gatherings have in fact been observed during the returns to the port, notably in 2014 with a raft of at least 3000 individuals on the 24th July, and a total of over 2700 birds on the 1st August.

Despite the low detectability of shearwaters by aerial visual monitoring, the wide coverage of the transects carried out enables emphasis of the large gatherings of Balearic Shearwaters that take place in the south of Saint-Brieuc Bay. Thus, we notice that these groupings concentrate in the shallow sectors located near the rocks of Saint-Quay-Portrieux and the rocks of Erquy.

Shearwaters frequent the entire study area, but in smaller numbers, or at least more sparsely outside the nearby coastal strip (a few kilometres) where the Balearic Shearwater is particularly found, with summer gatherings of over 3,000 birds in 2014 for example.

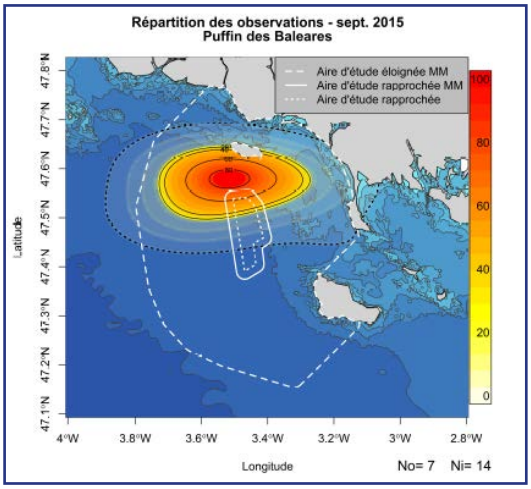
The Balearic Shearwater within the study area of the île de Groix offshore pilot wind farm project

Figure 80 : Close study area and boat transects for the project off the Île de Groix (Callard and Fortin, 2017)



The Balearic Shearwater is observed throughout the whole coastal area to the north of Biscay Bay, but a few sites gather for the vast majority of numbers. Vendée, the Loire estuary and the Mor Braz concentrate a high proportion of the world population of the species [Yésou and Thébault, 2012, Fortin et al., 2014], but the sector from Quiberon to Les Glénan seems to be less attractive to the species. Numbers vary from year to year, although the available data are almost exclusively coastal observations despite the species being known to feed up to several kilometres offshore [Yésou and Thébault, 2012]. The main gatherings detected from the coast are observed in the Vilaine estuary where rafts of several hundred or even thousands of individuals can form [Fortin, 2010], and between Sables d'Olonne and Yeu Island where large rafts are also noted [Ouvrard et al., 2011].

Figure 81 : Close and distant study areas and distribution in autumn 2015 (Callard and Fortin, 2017)



The distribution of the species across the study area does not appear to be concentrated specifically in the inshore area. It should be noted that the distribution of the species is frequently found in relation to trawlers, which greatly influences its distribution at sea.

The Balearic Shearwater does not appear to be present in this area. Indeed, no preferential area could be identified in relation to the ecological requirements

of the species, which frequents more coastal areas (sheltered bays or just off estuaries) during migratory stopovers. The individuals observed are likely moving to sites in northern Brittany.

The Balearic Shearwater in the study area of the Saint-Nazaire offshore wind farm project

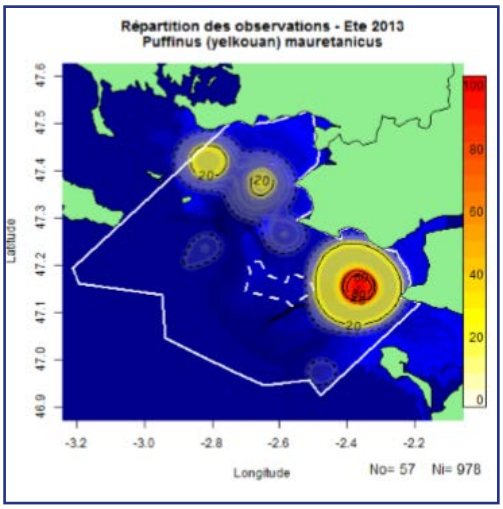


Figure 46 : Location of the project and boat transects of the extended study area (Fortin et al., 2014).

Balearic Shearwaters were observed in very large numbers off the Loire Estuary. This area, located between the estuary and the waiting area for vessels entering the Loire, had very large rafts of Balearic Shearwaters and Herring and Great Black-backed Gulls. This specific area is located in the same location as an important feeding area for Common Murres identified during the winter transects. Other notable concentrations were observed around Île de Dumet.

In summer, the Distance-Sampling analysis estimates a mean density of 2.006 ind/km² (Uniform, Cosine: GOF=0.972, CV=0.11) which is considered to be very robust. The population present in the study area is estimated at 5460 individuals, i.e., nearly 22% of the world population.

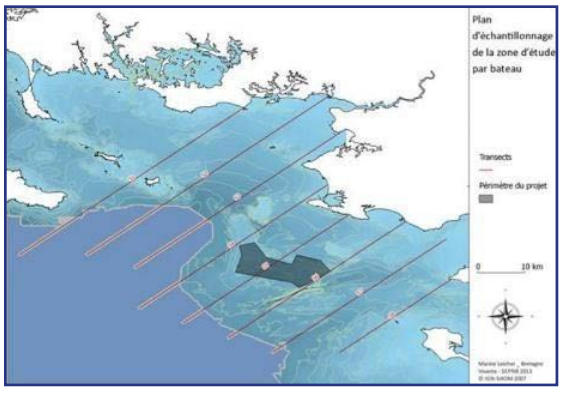
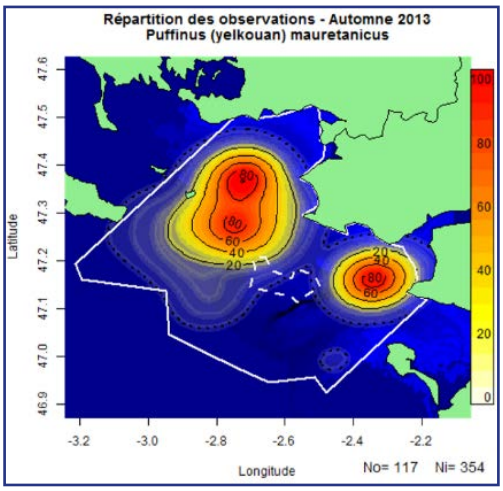


Figure 82 : Distribution of the species in summer 2013 (Fortin et al., 2014).

Figure 46 bis: Distribution of the species in autumn 2013 (Fortin et al., 2014).

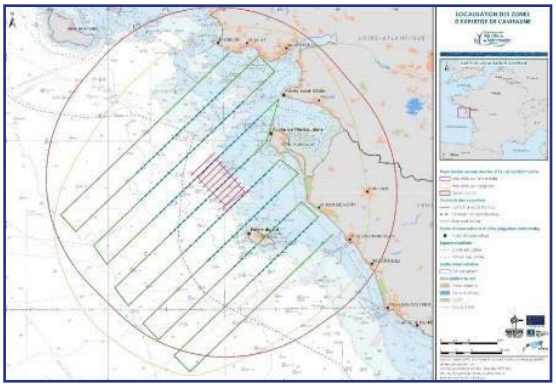


In autumn, Distance-Sampling analysis provides an estimated density of 1.785 ind/km² (Uniform, Cosine: GOF=0.954, CV=0.05) which is considered to be robust. The population present in the study area is estimated at 4858 individuals, i.e., nearly 19.5% of the global population.

The Balearic Shearwater is observed from May to October on the development site. Most observations are made in June-July with an average of about fifty individuals contacted per trip.

The Balearic Shearwater in the study area of the Noirmoutier-Yeu wind farm project

Figure 83 : Location of the project and boat/aircraft transects (source EMYN)



In the early 2000s, the Vendée coast, between Les Sables-d'Olonne and Saint-Hilaire-de-Riez, hosted the roosts of over 4000 birds in August and September (up to 6500 observed in September 2003). Although these large numbers of birds seem to have moved further north (northern Brittany, eastern Channel), probably due to the increase in surface water temperature (Yésou & Thébault, 2012), this sector continues to regularly host the roosts of over 1000 birds, particularly off Saint-Hilaire-de-Riez, which is one of the main areas for the species on the French coast along with the Vilaine Estuary (Boué & Dalloyau, 2013; Fortin, 2010).

Rarer and smaller roosts (maximum 250 birds) are noted around Yeu Island, where transit can nevertheless be substantial (over 500 birds observed on certain days), but a little earlier (July-August).

All the datasets compiled indicate a low presence of the Balearic Shearwater,without any areas for settling or grouping. The sector studied seems

to be of secondary importance for the species during the summer period. Nevertheless, the literature indicates that approximately 20% of the global population transits through southern Brittany based on the estimates of Arcos et al. (2012) (Yésou & Thébault, 2013; Thébault & Yésou, 2014; Fortin et al., 2014). Although no Balearic Shearwater gatherings have been noted, the immediate study area and its surroundings are largely frequented by individuals on transit as indicated by the results of satellite monitoring of the species off southern Brittany (Fortin et al., 2013; Boué et al., 2014).

The Balearic Shearwater within the study area of the Gulf of Lion pilot offshore wind farm project (EFGL)

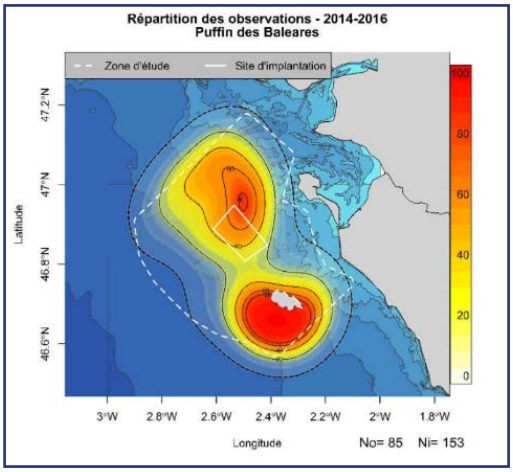


Figure 54 : Geostatistical representation of the densities of the Balearic Shearwater on the Yeu Noirmoutier sector during the 2014-2016 period (Eoliennes en mer, 2017)

Figure 84: Location of the pilot offshore wind farm project in the Gulf of Lion (source EFGL)

In the Mediterranean, only sightings made by boat allow the species to be identified with certainty (with respect to the related Yelkouan Shearwater), under good conditions. The data used concern Balearic Shearwaters that have been duly identified. However, it is likely that individuals of the species were present among all the unidentified small shearwaters (probably less than 10% of the «Yelkouan/Balearic Shearwater» individuals).

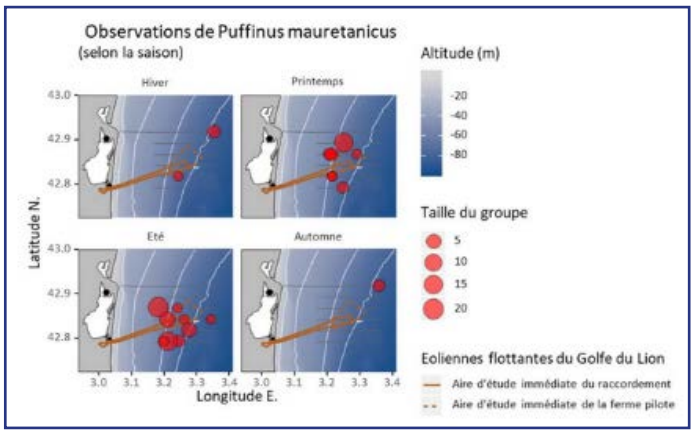
The species was mainly observed in mixed groups with Yelkouan Shearwaters. The two species have very similar behaviour and share the same activities in the study area (resting, transit, feeding, moulting).

Between 0 and 53 individuals were reliably identified during boat trips (0 to 110

individuals if we estimate a proportion of 8% - from photographic identifications - of Balearic Shearwaters among undetermined small shearwaters), mainly in May and June.

Like the Yelkouan Shearwater, individuals have been observed on depths of 40 to 80 metres, at a distance of 5 to 20 km from the coast. The species is observed alone or in small groups, which are bigger in summer (especially in June).

Figure 19 : Density of Balearic Shearwater sightings along boat transects



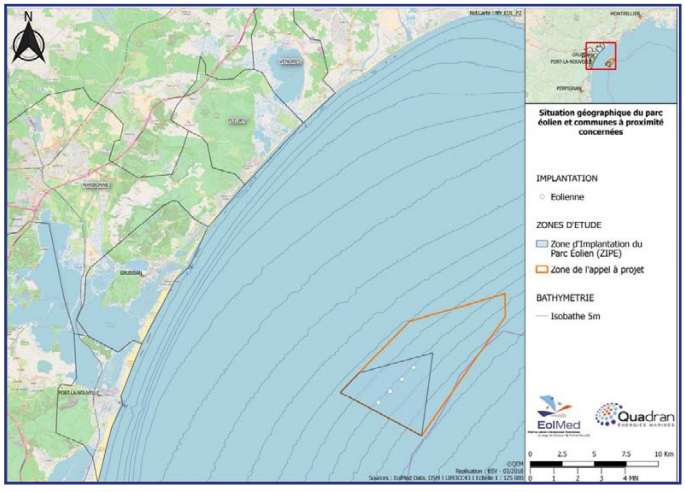
The Balearic Shearwater was observed in the close study area, but in small numbers. However, the species shows variability in its use of the Gulf of Lion and is not well known in the Mediterranean (breeding period). Paradoxically, its distribution is better known during the summer period when it uses the Atlantic and Channel coasts.

The Balearic Shearwater in the study area of the Gruissan pilot offshore wind farm project (EolMed)

The species was mainly observed in mixed groups with Yelkouan Shearwaters. The two species have very similar behaviour and share the same activities in the boat and aircraft study areas (resting, transit, feeding, moulting).

Between 0 and 25 individuals were reliably identified during boat trips (0 to 50 individuals if we estimate a proportion of 8% - from photographic identifications - of Balearic Shearwaters among undetermined small shearwaters), mainly in June. The September data correspond to individuals that did not leave the Mediterranean for the Atlantic after the breeding season.

Figure 85 : Project location (Source EolMed)

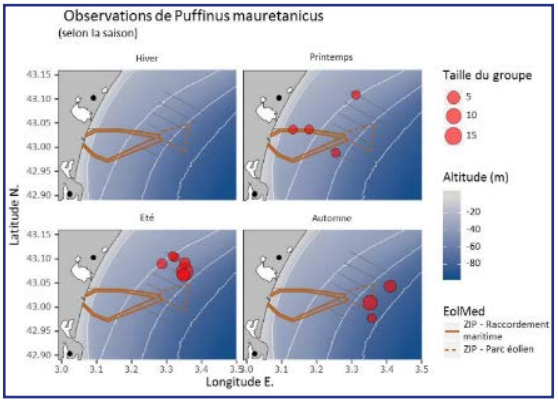


The species was observed throughout the study area monitored by boat, with any particular concentration, given the low quantity of data.

Like the Yelkouan Shearwater, individuals have been observed on depths of 20–80 m at a distance of a few kilometres from the coast to 25 km offshore.

The species is observed alone or in small groups, which are bigger in summer (especially June). Like the Yelkouan Shearwater, the species has been observed in transit, feeding, resting and moulting.

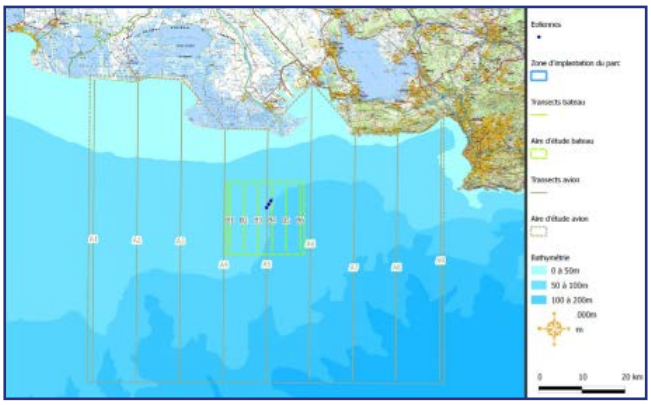
Figure 86 : Distribution of the Balearic Shearwater along boat transects bateau during the 4 seasons



The Balearic Shearwater within the study area of the Provence Grand Large pilot wind farm project (EDF-RE)

The species is above all present in the Mediterranean during the breeding season, between November and July, and breeds like the Yelkouan Shearwater between February and June. Most of the observations made coincide with these dates, except for 4 sightings made in September 2013. These last data illustrates the fact that some of the population remains in the Mediterranean during the breeding season (rather than wintering along the Atlantic or Channel coasts), which is also confirmed by observations from the coast (LPO PACA/ Tour du Valat) or during winter sea trips in the Gulf of Lion (Découverte du Vivant).

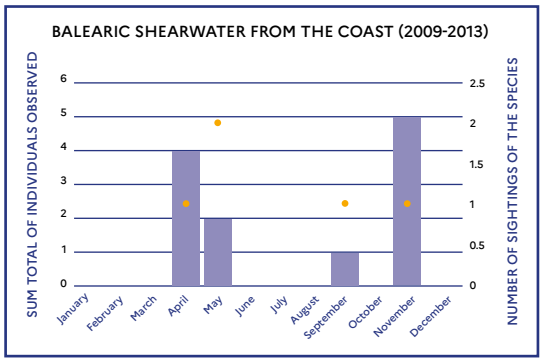
Figure 87 : Project location (Source EDF-RE)



Only 11 individuals were observed during the 12 boat trips in 2013 (of which 7 were along transects), and 11 between September 2011 and August 2012 around the area of the facility.

However, these numbers are a minimum, as it ishighly likely that individuals associated with groups of Yelkouan Shearwaters may have gone unnoticed, particularly in difficult observation conditions.

Figure 88 : Phenology of occasional observations of Balearic Shearwaters from the coast from 2009-2013 in the Camargue (© TdV/LPO PACA 2015)



However, their presence in the study area is not comparable to that of the Yelkouan Shearwater. The numbers concerned by the project are low, and no dense sectors were identified during the 2013 surveys, as in 2011 and 2012.

The Balearic Shearwater in the « Yeu Island» SPA - Results of the digital monitoring carried out in August 2016

In the framework of the ecological diagnosis of the Management Plan of the "Île d'Yeu sector" SPA of the marine Natura 2000 site, headed by the French Biodiversity Agency (OFB), a flyover with implementation of the digital monitoring technique was carried out on 11th August 2016, in particular to quantify and map the presence of the Balearic Shearwater in this sector.

An aircraft equipped with 4 high-definition video cameras covered 12% of the study area (295.6 km^2) along 23 transects (651 km in total length), aiming to estimate the abundance and distribution of bird and marine mammal species by following the strip transect protocol.

446 individuals were identified during the flyover.

The Balearic Shearwater was the most abundant species recorded during this survey. The density was 1.79 birds/km^2, which was equivalent to 4401 birds (± 95% CI 158 - 13596) over the whole study area.

The species mainly occupied the coastal areas in the east and south-east of the study area.

Figure 89 : Location of the study area and transects monitored during the digital monitoring survey (source OFB)

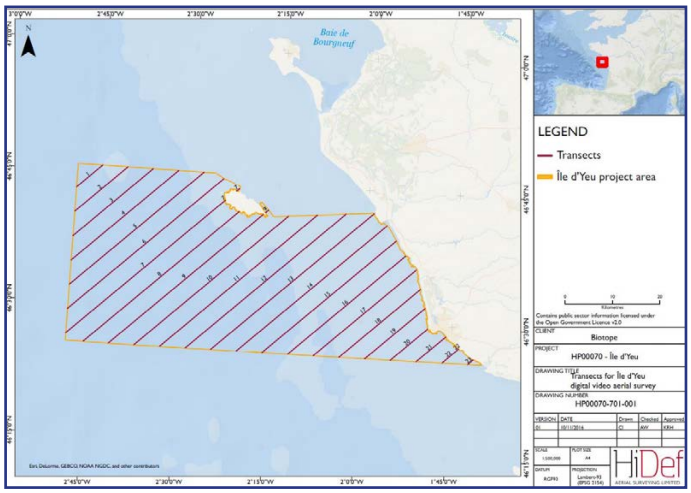
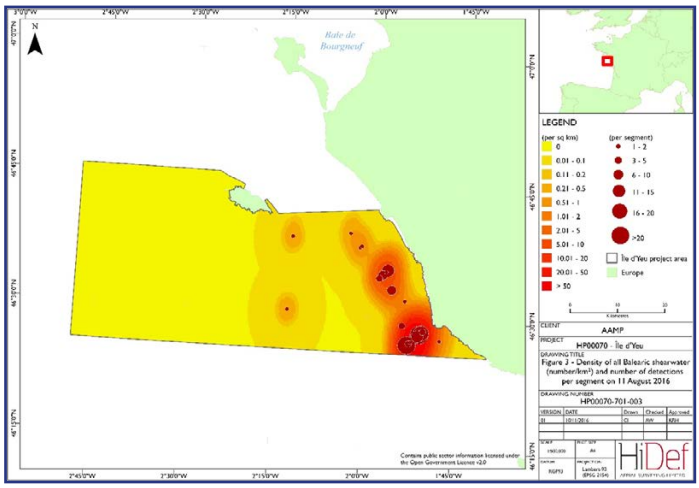


Figure 53 : Distribution and density of the Balearic Shearwater during the flyover of 11th August 2016



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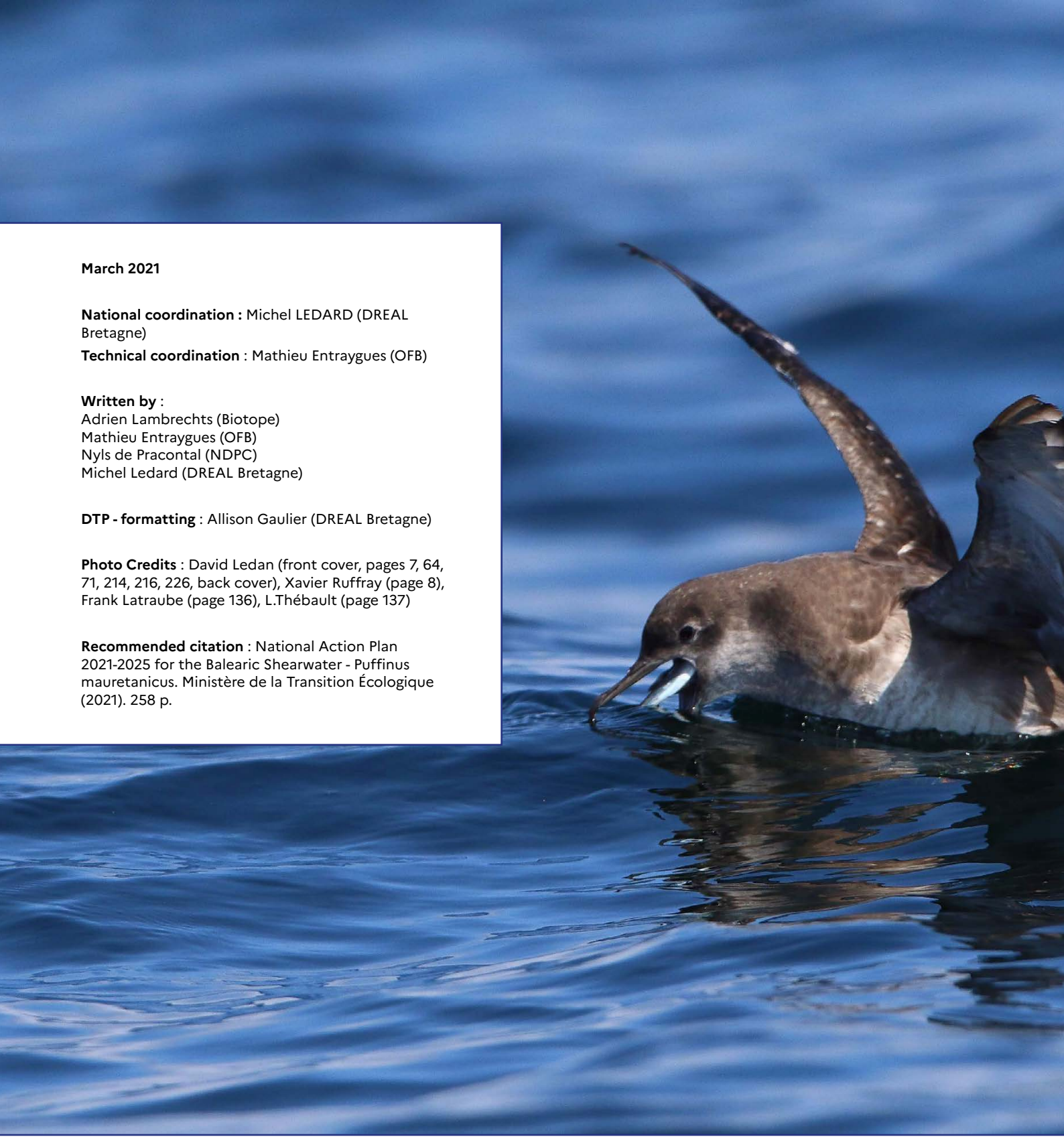

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