

Draft nomination proforma for a “North Atlantic Current and Evlanov Seamount” MPA in the OSPAR Maritime Area (Region V, Wider Atlantic)

Contents

A	GENERAL INFORMATION	2
1.	PROPOSED NAME OF MPA.....	5
2.	AIM OF MPA	5
3.	STATUS OF THE LOCATION	7
4.	MARINE REGION.....	7
5.	BIOGEOGRAPHIC REGION	7
6.	LOCATION	7
7.	SIZE	8
8.	CHARACTERISTICS OF THE AREA	9
B	SELECTION CRITERIA	16
A.	ECOLOGICAL CRITERIA/CONSIDERATIONS	16
1.	THREATENED AND/OR DECLINING SPECIES AND HABITATS.....	16
2.	IMPORTANT SPECIES AND HABITATS	19
3.	ECOLOGICAL SIGNIFICANCE	25
4.	HIGH NATURAL BIOLOGICAL DIVERSITY	28
5.	REPRESENTATIVITY	28
6.	SENSITIVITY	29
7.	NATURALNESS.....	30
B.	PRACTICAL CRITERIA/CONSIDERATIONS.....	31
1.	POTENTIAL FOR RESTORATION	31
2.	DEGREE OF ACCEPTANCE	31
3.	POTENTIAL FOR SUCCESS OF MANAGEMENT MEASURES	32
4.	POTENTIAL DAMAGE TO THE AREA BY HUMAN ACTIVITIES	32
5.	SCIENTIFIC VALUE	35
C.	PROPOSED MANAGEMENT AND PROTECTION STATUS	36
1.	PROPOSED MANAGEMENT	36
2.	ANY EXISTING OR PROPOSED LEGAL STATUS	38

Versioning: OSPAR seeks views on this version of the nomination proforma from other actors.

A General information

Introduction

Within the North East Atlantic, a number of countries have made significant progress in identifying important sites for pelagic marine species, such as seabirds and cetaceans in the coastal and inshore waters and designated these as Marine Protected Areas (MPAs) (JNCC 2017; Ramirez et al. 2017). A few countries have also begun designating MPAs in offshore areas within their Exclusive Economic Zones (JNCC 2017; Ramirez et al. 2017). In comparison, the identification and designation of MPAs within Areas Beyond National Jurisdiction (ABNJ) has been recognised as important and ongoing gap in the global network of MPAs (Game et al. 2009; Scales et al. 2014). This is in part due to the existing gap in global governance models for the conservation and sustainable use of biodiversity beyond national jurisdiction. However, the few regional seas initiatives with ABNJ under their geographical coverage area, such as the OSPAR Convention, have been leading the way in protecting species in the high seas through area based measures.

In the North-East Atlantic, OSPAR has designated seven MPAs in ABNJ, with a particular focus on benthic habitats and communities (OSPAR 2017). The Ecological Coherence Assessment of the OSPAR MPA network recognised the lack of ABNJ sites for protecting seabirds as an important gap (OSPAR 2013). Whilst the current network of ABNJ MPAs includes pelagic species as features of specific sites (e.g. seabirds in the Charlie Gibbs Fracture Zone and Milne Seamount MPAs), the boundaries and proposed management were based on the conservation objectives for benthic communities and habitats (OSPAR 2010a, b, d, e, f, g).

In contrast to benthic species, many pelagic species such as seabirds are highly mobile, ranging within and across ocean basins for foraging, migration and breeding (Eckert 2006; Egevang et al. 2010; Lascelles et al. 2012; Scales et al. 2014; Walli et al. 2009). However, despite their mobility, many pelagic species exhibit more spatially restricted movements during key life stages, often occurring predictably and consistently within defined areas, which makes the identification of 'hotspots' and subsequent site based conservation more feasible (Grecian et al. 2016; Lascelles et al. 2012; Queiroz et al. 2016; Ronconi et al. 2012; Young et al. 2015).

In comparison to subsurface pelagic species, seabirds are comparatively easily accessible (particularly at colonies), which facilitates the monitoring of populations and at-sea dispersal using ringing and tracking. Seabirds are the best-known group of marine animals in terms of at-sea distribution and habitat use, due to the large number of tracking studies. For example, around 40% of all seabird species globally have been the target of a tracking study and from these, about 60% have been studied from more than one colony (Birdlife International 2016b). Many species have also been studied for long periods of time - up to 20 years in some cases (e.g., Dias et al. 2011; Wakefield et al. 2015; Weimerskirch et al. 2014) - revealing patterns of spatial consistency in site use that justify the identification of stable 'hotspots', and thus the implementation of site-based conservation measures (Lascelles et al. 2012; Lascelles et al. 2016). Additionally, as apex predators, seabirds are established indicators of pelagic biodiversity and ecosystem health (Croxall et al. 2012; Einoder 2009; Furness and Camphuysen 1997; Harding et al. 2006; Mallory et al. 2006; Ronconi et al. 2012; Thompson et al. 2012; Weimerskirch et al. 2003).

Due to the advances of tracking technology in data quality and quantity over the last decades, seabird tracking data is now recognized as a key tool for the identification of marine Important Bird and Biodiversity Areas - IBAs (e.g., Dias et al. 2017; Lascelles et al. 2016; Soanes et al. 2016). Based on robust, standardised scientific criteria, marine IBAs have been extensively used to inform MPA designation and

marine spatial planning processes around the world (e.g., Augé et al. 2015; Lascelles et al. 2012) and have formed the backbone of marine Special Protection Areas (SPAs) for birds across the EU and the MPAs of many of the OSPAR countries (Kukkala et al. 2016; Lascelles et al. 2016; Ramirez et al. 2017). In addition, marine IBAs can be of importance for other species and habitats. The current IBA network, delineated for seabirds, overlaps with the global distributions of approximately 80-100% of all cartilaginous fish, corals, lobsters, mangroves, seagrasses and marine bony fish, demonstrating the role of seabirds as ‘umbrella species’ for other marine taxa (Butchart et al. 2015; Kukkala et al. 2016).

The quantity and quality of data on seabird distribution and habitat use collected over the last decade in the North East Atlantic and the identified lack of OSPAR MPAs in ABNJ focusing on seabirds, justified a systematic review of the importance of ABNJ for highly mobile, pelagic species within the OSPAR maritime area. This review resulted in the present proforma that puts forward a proposal for an OSPAR MPA in ABNJ, using seabird density and diversity as the basis for its delineation.

Summary of Methodology & Results

The [proposed] area has been identified based on seabird tracking data, using the approach in Lascelles *et al.*, (2016). A full description of the methodology is included in Annex 3. In undertaking this analysis, BirdLife International sought collaboration with marine scientists working with Atlantic seabirds and other taxonomic groups across the region (Annex 1). This included the sharing and compilation of tracking datasets by 66 researchers for 23 species collected from 105 colonies, corresponding to 2188 tracked individuals - the first time this quantity of data had been brought together in any fora. Data and analytical approaches were discussed and agreed at a scientific workshop held in Reykjavik in June 2016, which was attended by 17 people from 8 different OSPAR countries. The data shared has now been stored in the BirdLife Seabird Tracking Database (www.seabirdtracking.org), where it is available for further exploration and future use (by request to the data owners).

The analysis focussed on seabird species occurring in the area (from the evidence collected with tracking data) – the list included OSPAR Threatened and Declining seabirds (Black-legged Kittiwake *Rissa tridactyla*, Thick-billed Murre *Uria lomvia* and Audubon’s Shearwater *Puffinus lherminieri baroli*), as well as seabirds which are globally and regionally threatened (IUCN Red List) and listed in the Convention of Migratory Species (CMS), the African Eurasian Waterbird Agreement (AEWA) and the EU Birds Directive. Furthermore, the analysis was focused only on areas beyond national jurisdiction (ABNJ), and areas where extended continental shelf claims have been made were excluded from the final results.

The most important areas for each species within OSPAR ABNJ were identified by estimating the percentage of birds (from the tracked population) using each 2° grid cell within the area of analysis (Annex 3, Figures A.41-A4.21). The total number of birds of each species was then estimated by multiplying the percentage of the tracked population by the total number of birds in the Large Marine Ecosystem (LME) of origin (Annex 6, Figures A6.1-A6.21), following the procedures described in Lascelles *et al.*, (2016). Finally, the individual species maps were combined to create maps of richness and density of use by the community of seabirds within OSPAR ABNJ (detailed methods described in Annex 3; see also maps in Annexes 5).

The most species rich and abundant area has formed the basis of the [proposed] MPA (see Annexes 4 and 5). In defining the boundary of the proposed site, prioritisation was given to OSPAR listed seabird species (the presence of an OSPAR species counted 3x for the identification of the boundaries; see Annex 4) and to

globally and European threatened species (following the Red List classification (BirdLife International 2016a); the presence of a threatened species counted 2x for the final boundaries). Thus, the final [proposed] MPA represents the area containing the highest abundance of seabirds and the area of highest species richness. The [proposed] MPA has been estimated to support a maximum of 2.9-5 million seabirds throughout different seasons, and is used by over 42 pelagic species, with the area demonstrated to be important foraging grounds for at least 25 pelagic species (Table 1). The complex oceanography of the [proposed] MPA which creates higher primary productivity and concentrations of zooplankton and biomass are likely underlying the high levels of biodiversity and abundance of the area.

The findings of the analysis were also validated based on preliminary and independent dataset, collected *in-situ* during a multi-disciplinary cruise carried out between 6th June to 2nd July 2017, under the auspices of the UK Natural Environment Research Council (NERC) -Cruise DY080 - *Distribution and Ecology of Seabirds in the Sub-Polar Frontal Zone of the Northwest Atlantic*, led by Dr. Ewan Wakefield of the Institute of Biodiversity Animal Health and Comparative Medicine, University of Glasgow; (Annex 8). The survey included line transects through the [proposed] MPA, with trained teams conducting distance sampling of seabirds and other marine biodiversity. Furthermore, ten Great Shearwaters *Ardenna gravis* were also tagged with GPS devices to investigate their fine scale movements. Oceanographic data was recorded along-track and through deployment of Conductivity Temperature Depth (CTD) instruments. Chlorophyll data was recorded along track and during CTD stations. Trawls for fish, cephalopods and crustaceans were also conducted at CTD stations along the track. The data remains in preliminary form, and will be published in 2018. Permission was granted from Dr Wakefield to refer to the preliminary information in this proposal, although it is not available for wider distribution until it has been published through peer-review.

1. Proposed name of MPA

North Atlantic Current and Evlanov Seamount MPA (NACES MPA)

2. Aim of MPA

Conservation vision¹:

Maintenance and, where appropriate, restoration of seabird populations and the integrity of the various ecosystem and their processes that support those populations of the North Atlantic Current and Evlanov Seamount MPA (NACES MPA, the site)².

Method to achieve the vision:

Cooperation between competent authorities, stakeholder participation, scientific progress and public learning are essential prerequisites to realize the vision and to establish a Marine Protected Area at this site subject to adequate regulations, good governance and sustainable utilization. Long-term research and monitoring provides a detailed understanding of the biodiversity, ecosystem and oceanic processes related to seabirds and any threats to them. Best available scientific knowledge and the precautionary principle form the basis for conservation.

General conservation objectives^{3,4}:

- (1) To **protect and conserve** the range of habitats and ecosystems including the water column and benthos that support the seabirds of the site.
- (2) To **prevent** loss of biodiversity, and promote its recovery where practicable, so as to maintain the natural richness and resilience of the ecosystems and habitats to enable populations of seabird species to maintain or recover natural population densities and population age structures.
- (3) To **prevent** degradation of, and damage to, habitats and ecological processes, in order to maintain the structure and functions - including the productivity - of the ecosystems that support seabird populations in the Site.
- (4) To **provide** a refuge for seabirds and to protect the area from human activities that would have negative impacts on seabird populations.
- (5) To **increase** ecological understanding of the ecosystem and inform the effective management of the site.
- (6) To **enhance** the ecological coherence of the OSPAR Network of Marine Protected Areas in the North-East Atlantic.

¹ The conservation vision describes a desired long-term conservation condition and function for the ecosystems in the entire [proposed] MPA. The vision aims to encourage relevant stakeholders to collaborate and contribute to reach objectives set for the area.

² Recognizing that species abundances and community composition will change over time due to natural processes.

³ Conservation objectives are meant to realize the vision. Conservation objectives are related to the entire [proposed] MPA or, if it is decided to subdivide, for a zone or subdivision of the area, respectively.

⁴ It is recognised that climate change may have effects in the area, and that the MPA may serve as a reference site to study these effects.

Specific conservation objectives⁵:

- a. To maintain or restore populations of OSPAR listed and globally and/or regionally threatened seabirds at the Site (see **Table 1**) to improve seabird body condition and survival rates.
- b. To maintain or restore populations of pelagic seabirds that use the area for foraging during both breeding and/or non-breeding life stages (see **Table 1**) from *direct* current and emerging pressures and human activities, including fisheries (bycatch), and acute pollution, occurring at the site.
- c. To maintain or restore populations of pelagic seabirds that use the area for foraging during both breeding and/or non-breeding life stages (see **Table 1**) from *indirect* current and emerging pressures and human activities, including fisheries (prey removal), climatic changes, disturbance from shipping and extractive activities, and chronic pollution, occurring at the site.
- d. To maintain the supporting ecosystem processes in order to maintain the structure and function of the habitats and food webs on which pelagic seabird species rely.
- e. To prevent deterioration of the environmental quality of the site from levels characteristic of the ambient ecosystems, and where degradation from these levels occur, if applicable, to recover environmental quality to levels characteristic of the ambient ecosystems.
- f. To prevent other physical disturbance from human activities adversely impacting seabird populations at the site.
- g. To protect, maintain and, restore where appropriate from impacts that have occurred, the epipelagic and bathypelagic ecosystems, including their functions for pelagic seabird species.

Table 1. List of seabird species considered under the specific conservation objectives of the site.

Common Name	Scientific Name	Species listed as threatened and/or declining by OSPAR
Audubon's Shearwater	<i>Puffinus lherminieri</i>	x ⁶
Black-legged Kittiwake	<i>Rissa tridactyla</i>	x
Thick-billed Murre	<i>Uria lomvia</i>	x
Cory's Shearwater	<i>Calonectris borealis</i>	
Great Shearwater	<i>Ardenna gravis</i>	
Manx Shearwater	<i>Puffinus puffinus</i>	
Sooty Shearwater	<i>Ardenna grisea</i>	
Northern Fulmar	<i>Fulmarus glacialis</i>	
Bermuda Petrel	<i>Pterodroma cahow</i>	
Bulwer's Petrel	<i>Bulweria bulwerii</i>	
Desertas Petrel	<i>Pterodroma deserta</i>	
Leach's Storm Petrel	<i>Hydrobates leucorhous</i>	
Zino's Petrel	<i>Pterodroma madeira</i>	
Arctic tern	<i>Sterna paradisaea</i>	
Sabine's gull	<i>Xema sabini</i>	
Great Skua	<i>Catharacta skua</i>	
Long-tailed Jaeger	<i>Stercorarius longicaudus</i>	
South Polar Skua	<i>Catharacta maccormicki</i>	
Atlantic Puffin	<i>Fratercula arctica</i>	
Common Murre	<i>Uria aalge</i>	
Little Auk	<i>Alle alle</i>	
Razorbill	<i>Alca torda</i>	

⁵ Specific Conservation Objectives shall relate to a particular feature and define the conditions required to satisfy the general conservation objectives. Each of these specific conservation objectives will have to be supported by more management orientated, achievable, measurable and time bound targets.

⁶ OSPAR listed Little shearwater, *Puffinus assimilis baroli*, in 2010. It should be noted that the taxonomic grouping of the species has recently been reviewed. The taxonomical issue needs to be clarified during the meeting cycle 2018/2019.

3. Status of the location

The proposed area has been designed to be located beyond the limits of national jurisdiction of the coastal states in the OSPAR Maritime Area and outside the areas of extended continental shelf claims.

The international legal regime that is applicable to the site is comprised of, inter alia, the United Nations Convention on the Law of the Sea (UNCLOS), the OSPAR Convention, the North East Atlantic Fisheries Commission, the International Commission for the Conservation of Atlantic Tunas, International Seabed Authority, International Maritime Organisation (IMO), conventions and other rules of international law. This regime contains, among other things, rights and obligations for states on the utilization, protection and preservation of the marine environment and the utilization and conservation of marine living resources and biodiversity as well as specifications of the competence of relevant international organizations.

4. Marine region

The [proposed] site is within the OSPAR Region V.

5. Biogeographic region

The [proposed] MPA is located at the dynamic interface between three different biogeographic provinces.

Under Dinter's (2001) classification of pelagic biogeography this includes the cool temperate waters province, the warm temperate waters and the cold Arctic waters and the Atlantic (Deep Sea) and North Atlantic Abyssal Province.

Spalding *et al.*, (2012) the 'Pelagic Provinces of the World' classification identifies the [proposed] area as straddling the North Central Atlantic Province, The North Atlantic Current Province and the Subarctic Atlantic. The region falls within the Northern Coldwater Realm (North Atlantic Gyre), and the Atlantic Warm-water Realm (Western boundary).

Using Longhurst (2010) biogeographical provinces the [proposed] area is at the meeting point of the North Atlantic Drift Province, the Atlantic Arctic Province, the Gulf Stream Province and bordering the NW Atlantic Shelves Province.

6. Location

The coordinates of the [proposed] MPA are 43° N-53° N, 31° W-42° W and fully detailed in Annex 2.

The [proposed] MPA is located within the area beyond national jurisdiction within the OSPAR Maritime Area (Figure 1).

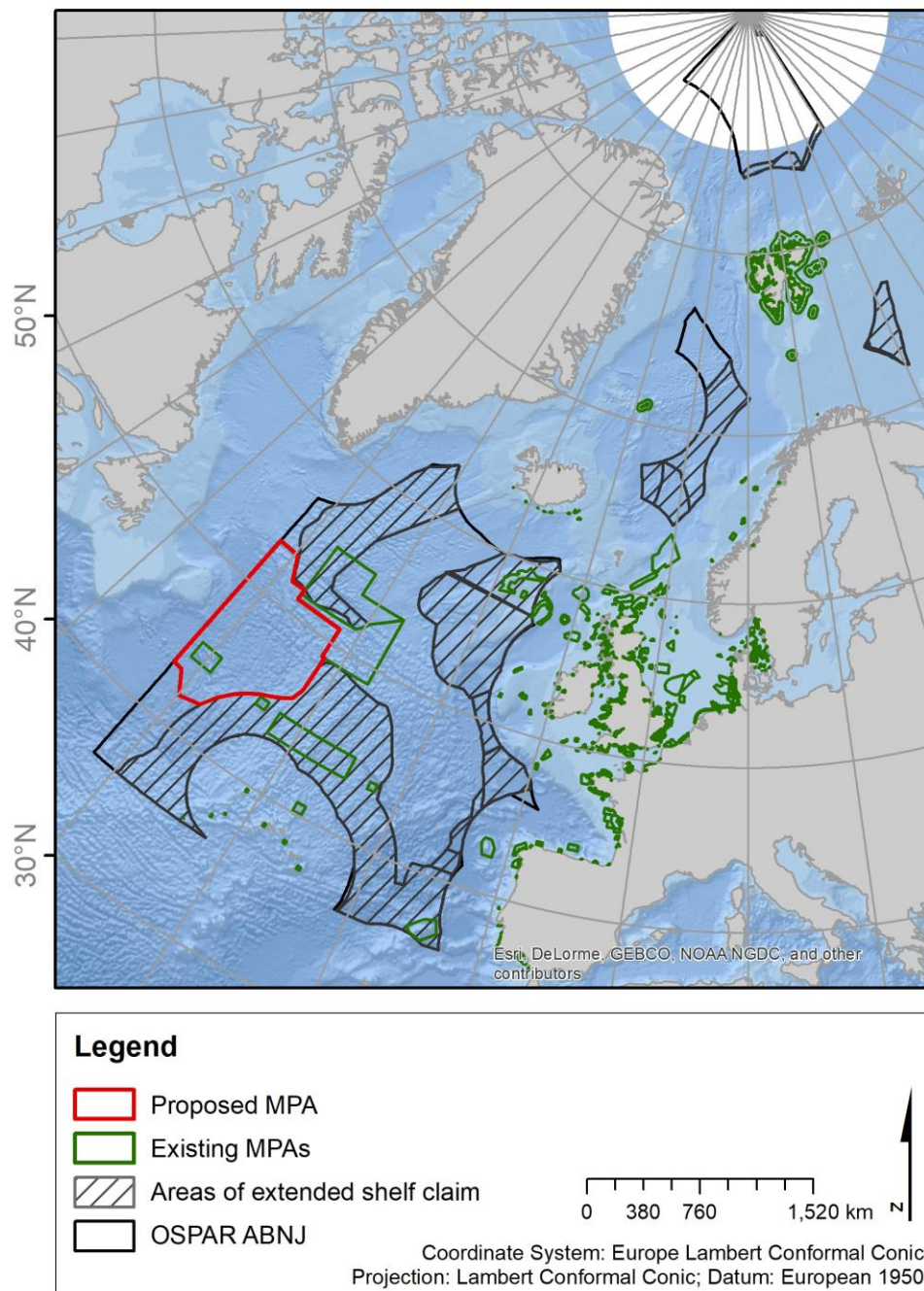


Figure 1. Location of the [proposed] MPA within the OSPAR ABNJ and the existing network of OSPAR MPAs. [CAVEAT: the figure presents a draft of the final delineation and is subject to change]

7. Size

The [proposed] MPA is 641 612 km² [CAVEAT: the size presents the size of the draft delineation and is subject to change].

8. Characteristics of the area

This section of the proforma provides a general description of the site. It provides information about features of direct relevance to the conservation objective as well as providing a broader context.

Bathymetry

The [proposed] MPA is bounded in the north by the Charlie-Gibbs Fracture Zone (CGFZ), to the west by the Flemish Cap and the Grand Banks of Newfoundland and to the east by the Mid-Atlantic Ridge and to the south the Azores (Figure 1).

The [proposed] MPA includes the Northwest Atlantic Mid-Ocean Canyon, a depositional-erosional feature that extends from the Labrador Sea to the Sohms Abyssal Plain (Heezen et al., 1969; Hesse et al., 1987). In the south-west the area is characterised by an abyssal plain, >4000 m deep. To the north and east the area shoals towards the CGFZ and Mid-Atlantic Ridge. Here the bathymetry is more complex, with narrow canyons and seamounts (Figure 2). There are 47 seamounts within the [proposed] MPA boundary that range in depth from ~4500m to ~1900m below sea level, including the Evlanov Seamount in the centre of the [proposed] MPA (Kim and Wessel 2011; Morato et al. 2016).

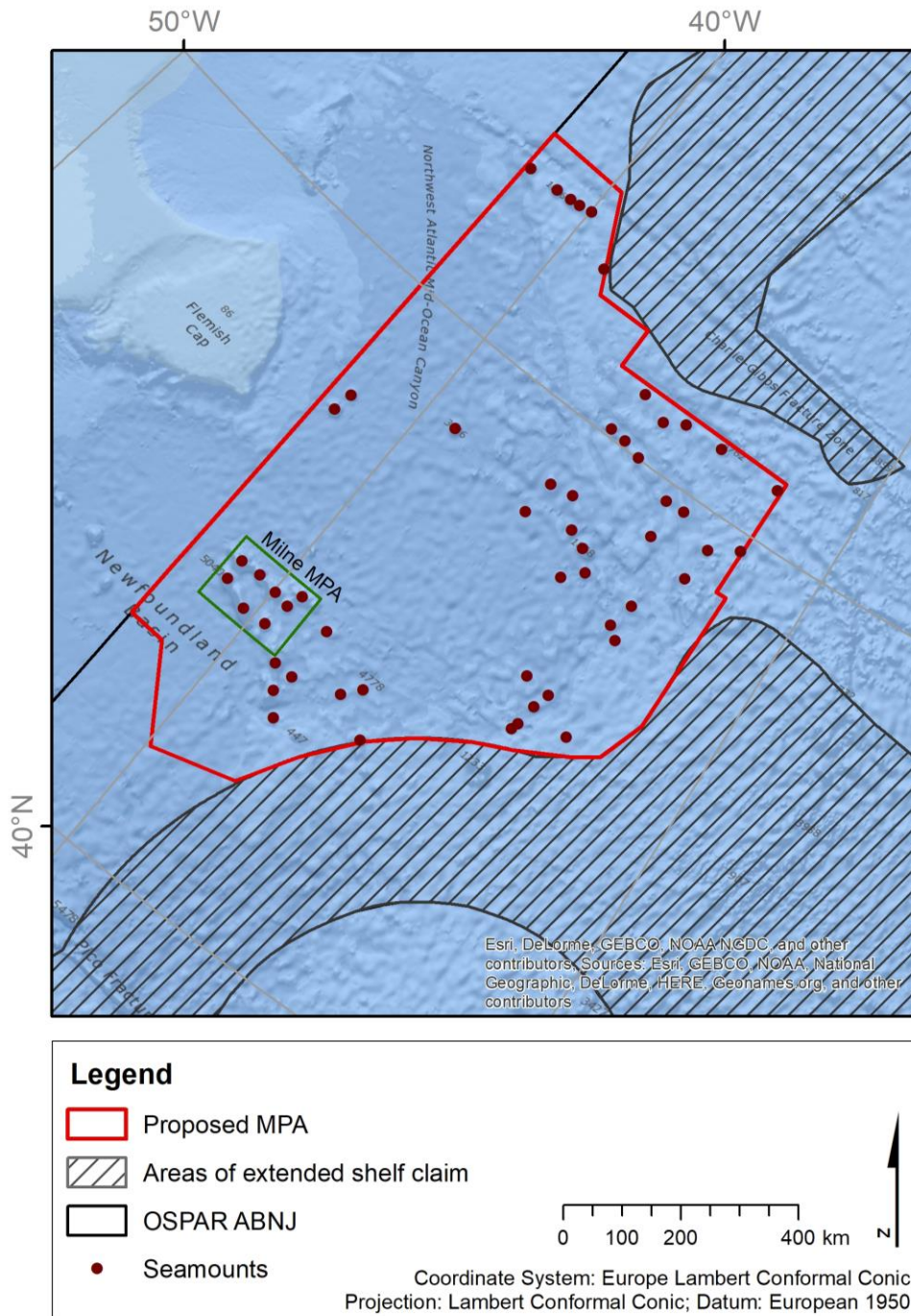


Figure 2. Map of the [proposed] MPA with location of known bathymetric features (seamounts). [CAVEAT: the figure presents a draft of the final delineation and is subject to change]

Oceanography

The [proposed] MPA encompasses a globally unique location; a region of year-round vigorous horizontal and vertical mixing where waters from the tropical/subtropical Atlantic encounter water from the subpolar Atlantic and from the Arctic Ocean, promoting enhanced primary productivity and diversity.

The area lies across the Northwest Atlantic Mid-Ocean Canyon, a depositional-erosional feature that extends from the Labrador Sea to the Sohm Abyssal Plain (Heezen et al. 1969; Hesse et al. 1987). In the south-west the area is characterised by an abyssal plain, >4000m deep.

The area is dominated by the formation zone of the North Atlantic Current (NAC), which grows out of the Gulf Stream extension. In this location, the Gulf Stream has carried warm tropical water to a higher latitude than any other western boundary current (Rossby 1996). After travelling along the eastern edge of the Grand Banks, the Gulf Stream turns eastwards at the 'North West Corner' (Dutkiewicz et al. 2001; Lazier 1994) and spreads into the broad frontal zone of the NAC

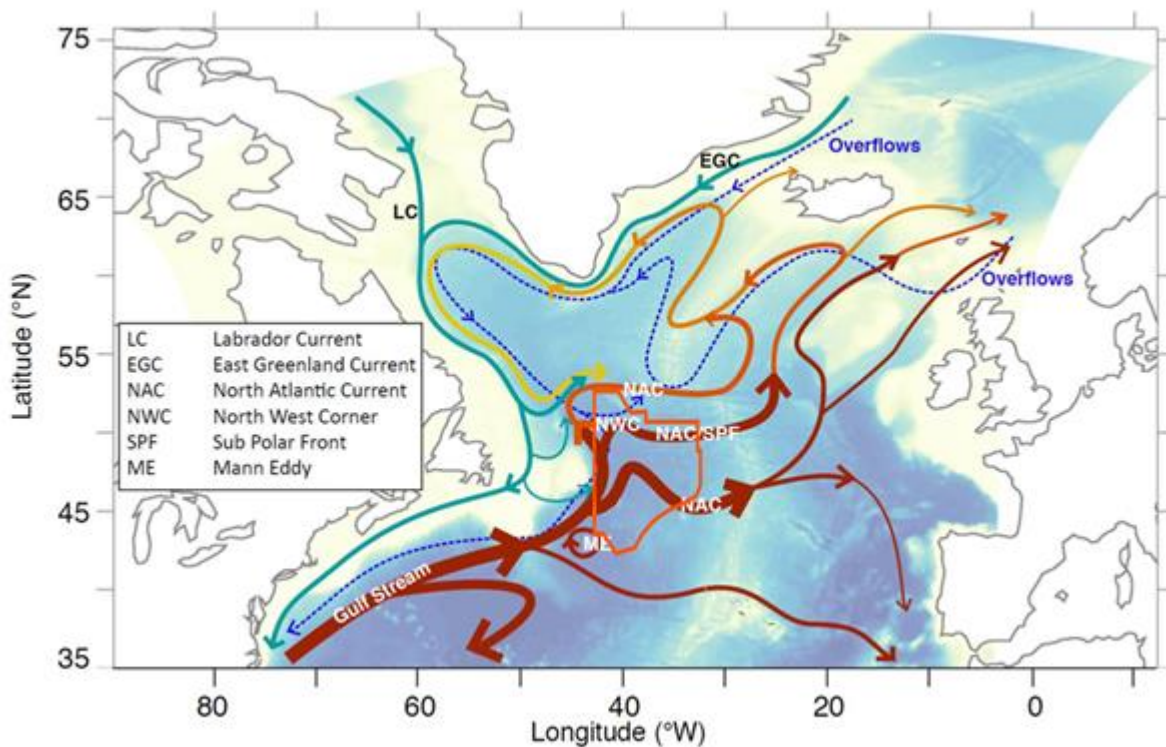


Figure 3) (Rhein et al. 2011; Roessler et al. 2015). Three major branches of the NAC can be distinguished, and their paths across the Atlantic are quite stable over time because they appear to be locked to Mid-Atlantic Ridge fracture zones (Bower and von Appen 2008; Daniault et al. 2016). The central NAC branch is called the Subarctic (or Subpolar) Front because it represents the boundary between truly subpolar and subtropical water types (Daniault et al. 2016; Rossby 1996).

The NAC is a transition zone as well as being part of the cold subpolar gyre (large-scale wind-driven cyclonic recirculation north of 47°N) and the warm, saline and nutrient-depleted anticyclonic subtropical gyre to the south. It has a wide banded structure with distinct water types that get progressively cooler and fresher from south to north separated by the three branches and their density fronts. The fronts are associated with vigorous vertical velocities (bringing nutrients to the surface) and some horizontal exchange, especially southward from the subpolar region (Dutkiewicz et al. 2001). Density contrasts across the fronts lead to instability and the development of eddies (Volkov 2005). These eddies may enhance and concentrate primary production and therefore represent an important habitat for oceanic higher predators (Bost et al. 2009; Godø et al. 2012; Haney 1986; Oschlies and Garçon 1998). The combination of localised high intensity mixing in the eddies results in patchy, but high surface productivity at fine scales (Vecchione et al. 2015). South of 52° N the eastward-flowing eddies ranging over the [proposed] MPA potentially act as temporary

barriers for dispersal of plankton and other pelagic fauna, and restricting their movement, and that of their associated predators, out of this zone (Priede et al. 2013; Vecchione et al. 2015).

As well as benefiting from mixing between the subpolar and tropical/subtropical water the [proposed] MPA uniquely receives influence from a remote third ocean; the Arctic. Arctic water that is very cold, very fresh and high in nutrients is carried in the North Atlantic by the East Greenland Current and the Labrador Current (Azetsu-Scott et al. 2012; Dickson et al. 2007). Much of this Arctic water leaves the shallow shelf along several pathways near the Flemish Cap and Grand Banks, joining the NAC circulation and bringing nutrient-rich waters into the [proposed] MPA all year round (Fratantoni and McCartney 2010). Below the Gulf Stream and the formation zone of the NAC branches, the deep western boundary current carrying cold, dense "overflows" moves southward following the seafloor topography. This, along with an intermediate layer of water from the Labrador Sea, also recirculates away from the boundary at the 'North West Corner' (Bower et al. 2009).

Subpolar frontal regions are known to be hotspots for higher predators, due to enhanced production at lower trophic levels caused by the mixing of different water masses (Hyrenbach et al. 2007; Polovina et al. 2001). Primary and secondary production is high in the SAF (Acha et al. 2015; Beaugrand et al. 2002) but the distribution of lower tropic level production and therefore higher predators may be more tightly constrained here than in other oceans due to bathymetric steering of the NAC branches. The globally unique oceanographic features of the [proposed] MPA mean that straddles several biogeographical regions (Letessier et al. 2012), including the warm North Central Atlantic Province, Gulf Stream Province, North Atlantic Current Province and the cold Subarctic Atlantic Province (Spalding et al. 2012). Moreover, ecological theory suggests that diversity in the area will be high because the NAC zone is an ecotone - a transitional boundary between the different biomes (Beaugrand et al. 2002). Due to habitat complexity, ecotones often have higher diversity than any one of their constituent biogeographical regions.

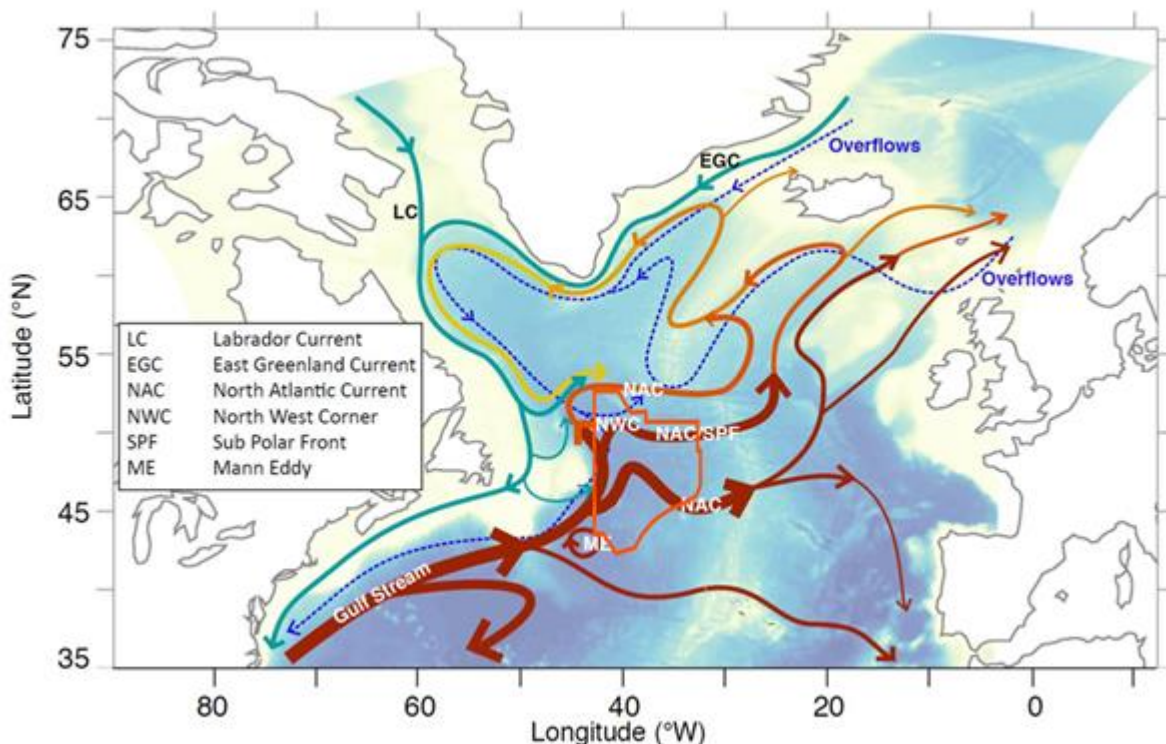


Figure 3. Schematic diagram of the large-scale circulation of the northern North Atlantic (adapted from: Danialt et al. 2016). The [proposed] MPA encloses the three branches of the North Atlantic (NAC) that form as the Gulf Stream turns eastward at the North West Corner (NWC). The progressive change of colour from red to yellow indicates cooling and freshening (through interaction with the atmosphere) of the major water masses carried by the subpolar currents. The shallow, cold and fresh East Greenland Current (EGC) and Labrador Current (LC) carry nutrient-rich Arctic-origin water into the subpolar region. The dashed blue lines indicate the deep pathways of cold and dense overflow waters. [CAVEAT: the figure presents a draft of the final delineation and is subject to change]

Biodiversity

The complexities of the food web in the specific region of the [proposed] MPA remain poorly known because the limited studies in the region have been conducted either on the Canadian continental shelf or along the Mid-Atlantic Ridge and its seamounts (Priede et al. 2013; Sweetman et al. 2013). The MARECO/ECOMAR programme (Priede et al. 2013), which produced the most complete study of the ecology of the Mid Atlantic Ridge and the CGFZ, did not overlap with the entire extent of the [proposed] MPA, therefore information on most trophic level assemblages can only be inferred for the [proposed] MPA from adjacent areas. However, the available evidence does suggest that there are concentrations of planktonic, mesopelagic fish and higher trophic predators (Table 2) within the [proposed] MPA.

As described above, the oceanography of this region is highly complex, with multiple frontal zones and persistent eddies. Fronts and high energy eddies are known to aggregate primary productivity and zooplankton, providing a temporally and spatially reliable foraging zone for higher trophic level predators (Scales et al. 2014). Prey availability can be further enhanced when these features occur over seamounts, as zooplankton can become entrained over the abrupt topography (the topographic blockage), and are then further restricted in their vertical migrations, thereby rendering them more accessible for mesopelagic fish and other top predators (Dias et al. 2016; Morato et al. 2016; Sweetman et al. 2013). Broad scale and remotely sensed studies of the region surrounding the [proposed] MPA have demonstrated that the frontal zone and CGFZ is subject to large scale phytoplankton blooms during spring and summer (Taylor and Ferrari 2011) with much higher chlorophyll concentrations than the adjacent waters (Gaard et al. 2008; Pelegrí et al. 2006; Vecchione et al. 2015).

In relation to zooplankton communities, the available evidence suggests that the [proposed] MPA corresponds to a region with a high abundance of copepods, gelatinous zooplankton and euphausiids (Gaard et al. 2008; Letessier et al. 2011; Vecchione et al. 2015). Copepods, such as *Calanus finmarchicus* are found in high concentrations close to the Flemish Cap (Helaouet and Beaugrand, 2007; see Figure 1b for Flemish Cap location to the west of the [proposed] MPA), the CGFZ/Subpolar front and the western boundary of the proposed area ~40° W (the 'North west Corner') whilst *C. hyperboreus* is relatively abundant in the subpolar frontal zone. Both species are important prey for gelatinous zooplankton, mesopelagic fish, and some seabird species (e.g., Little Auk, *Alle alle*) and are often associated with high seabird numbers in the North Atlantic as indicators of abundant food (Frederiksen et al. 2013; Karnovsky et al. 2008). Euphausiids are also abundant across the region and are important prey for mesopelagic fish, cetaceans and seabirds, including Thick-billed Murre, Little Auk and Black-legged Kittiwake (Mehlum and Gabrielsen 1993).

Mesopelagic fish are a major source of biomass in the oceans, and important prey for higher trophic predators, including seabirds (Gjøsaeter and Kawaguchi 1980; Harris et al. 2015; Paredes et al. 2014; Waap et al. 2017). Mesopelagic fish prey on gelatinous zooplankton, and they in turn are preyed on by larger fish,

such as Redfish and the OSPAR listed Atlantic Bluefin Tuna and by squid, cetaceans and seabirds (Granadeiro et al. 1998; Granadeiro et al. 2002; Waap et al. 2017). These small fish are particularly associated near fronts and eddies, such as those occurring within the [proposed] MPA (Paredes et al. 2014). Within the areas investigated by MARECO/ECOMAR, mesopelagic species such as the Goiter Blacksmelt (*Bathylagus euryops*) and Lanternfish (Myctophids) were found in the highest abundance at the Subpolar Front and the CGFZ and with a tendency to be distributed in the upper surface layers (Sweetman et al. 2013).

Cephalopods are also potentially concentrated within the region of the [proposed] MPA. Studies from the MARECO/ECOMAR programme indicating the highest diversity and abundance occurring south of the CGFZ (Vecchione et al. 2010). Abundant species included the oceanic cephalopod species *Teuthowenia megalops*, *Gonatus streenstrupi*, *Grimpotheuthis discovery*. The importance of cephalopods in the diet of some Atlantic seabirds is well documented, for example in Audubon's Shearwater, *Puffinus lherminieri*, Cory's Shearwater, *Calonectris borealis*, Manx Shearwater, *Puffinus puffinus* and Bulwer's Petrel *Bulweria bulwerii* (Den Hartog and Clarke 1996; Neves et al. 2012; Petry et al. 2008; Waap et al. 2017) other species such as Desertas Petrel, *Pterodroma deserta* and Atlantic Puffin *Fratercula arctica* are also known to prey on squid (Harris et al. 2015; Ramos et al. 2016).

The broad region surrounding the [proposed] MPA, including the CGFZ, the Mid-Atlantic Ridge, the Grand Banks and Labrador Current are known to be important foraging areas for apex predators, based on at-sea surveys, fishery records and tracking studies. Historical data and at-sea surveys, although scarce in number, have consistently identified the region offshore of Newfoundland as high in seabird abundance and diversity (Bennison and Jessopp 2015; Boertmann and Mosbech 1998; Brooks 1934; Huettmann and Diamond 2006; Jespersen 1924; Jespersen 1930; McKittrick 1931; Priede et al. 2013; Sage 1968; Wynne-Edwards 1935). More recently, a research trip in 2006 (Boertmann 2014) found a dramatic and high density of seabirds beginning at 50° N in the area overlapping the proposed area. The ECOMAR surveys also found high seabird and cetacean abundance around transects over the Subpolar front and CGFZ (Priede et al. 2013).

Telemetry studies have demonstrated that the mid-Atlantic region where the [proposed] MPA is located is used as a foraging, migratory and staging area for at least 25 pelagic species, including seabirds, elasmobranchs (e.g. Blue and Mako shark and the OSPAR listed Basking shark) and fish, and that an additional 17 pelagic species have been observed in the area (Table 2; Annexes 6, 7 and 8; Bogdanova et al. 2011; Dias et al. 2012b; Edwards et al. 2016; Egevang et al. 2010; Frederiksen et al. 2016; Frederiksen et al. 2012; Gilg et al. 2013; Hedd et al. 2012; Kopp et al. 2011; Queiroz et al. 2016; Sittler et al. 2011; Torres et al. 2015; Walli et al. 2009).

In addition, at least 10 cetacean species, including the OSPAR listed Blue Whale and 9 non-OSPAR listed species have been recorded in the [proposed] MPA through at-sea surveys and tracking data. The nine non-OSPAR listed species includes medium and large baleen whales (Humpback, Fin and Sei), deep diving odontocetes (Sperm and Pilot whales) and dolphins (Common, Striped, Atlantic White-sided) (Doksæter et al. 2008; Prieto et al. 2014; Silva et al. 2014; Annex 7, Figures A7.11 and A7.12 and Annex 8, Table A8.2; Figures A8.6; Silva et al. 2013; Waring et al. 2008). Moreover, also the OSPAR listed Leatherback turtle occurs in the [proposed] area.

Table 2. Summary of species observed in the [proposed] MPA as features providing a general description of the area. Sources of scientific evidence to support high use or presence within the area are also listed.

IUCN Red List status at European and Global level: DD=Data Deficient, LC=Least Concern, NT=Near Threatened, VU=Vulnerable, EN=Endangered, CR=Critically Endangered. * = OSPAR listed species.

Species Common Name, Scientific Name, Red List status (European/Global)		Evidence		
		Tracking data	Cruise DY080	Scientific literature
Evidence of high use of the area in the [proposed] MPA	*Audubon's Shearwater, <i>Puffinus lherminieri</i> (NT/LC)	x		x
	Cory's Shearwater <i>Calonectris borealis</i> (LC/LC)	x	x	x
	Great Shearwater <i>Ardenna gravis</i> (-/LC)	x	x	
	Manx Shearwater, <i>Puffinus puffinus</i> (LC/LC)	x	x	
	Sooty Shearwater, <i>Ardenna grisea</i> (-/NT)	x	x	
	Northern Fulmar, <i>Fulmarus glacialis</i> (EN, LC)	x	x	x
	Bermuda Petrel, <i>Pterodroma cahow</i> (-/EN)	x		
	Bulwer's Petrel, <i>Bulweria bulwerii</i> (LC/LC)	x	x	
	Desertas Petrel, <i>Pterodroma deserta</i> (VU/VU)	x		x
	Leach's Storm Petrel, <i>Hydrobates leucorhous</i> (LC/VU)		x	x
	Zino's Petrel, <i>Pterodroma madeira</i> (EN/EN)	x		
	Arctic tern, <i>Sterna paradisaea</i> (LC/LC)	x	x	x
	*Black-legged Kittiwake, <i>Rissa tridactyla</i> (VU/VU)	x		x
	Sabine's gull, <i>Xema sabini</i> (LC/LC)	x		
	Great Skua, <i>Catharacta skua</i> (LC/LC)	x		
	Long-tailed Jaeger, <i>Stercorarius longicaudus</i> (LC/LC)	x		x
	South Polar Skua, <i>Catharacta maccormicki</i> (-/LC)	x	x	x
	Atlantic Puffin, <i>Fratercula arctica</i> (EN/VU)	x		x
	Common Murre, <i>Uria aalge</i> , (NT/LC)	x		
	Little Auk, <i>Alle alle</i> (LC/LC)	x		x
	Razorbill, <i>Alca torda</i> (NT/NT)	x		
	*Thick-billed Murre, <i>Uria lomvia</i> (LC/LC)	x		
Presence observed within [proposed] MPA (no evidence on use of the area)	Wilson's storm petrel, <i>Oceanites oceanicus</i> (LC/LC)		x	
	Great Black-backed Gull, <i>Larus marinus</i> (LC/LC)		x	
	Arctic Jaeger, <i>Stercorarius parasiticus</i> (LC/LC)		x	
	Pomarine Jaeger, <i>Stercorarius pomarinus</i> (LC/LC)		x	
	Northern Gannet, <i>Morus bassanus</i> (LC/LC)		x	
	*Blue Whale, <i>Balaenoptera musculus</i> (EN/EN)		x	x
	Fin Whale, <i>Balaenoptera physalus</i> (NT/EN)		x	x

Sei Whale, <i>Balaenoptera borealis</i> (EN/EN)	x	x	x
Humpback Whale, <i>Megaptera novaeangliae</i> (LC/LC)		x	
Sperm Whale, <i>Physeter macrocephalus</i> (VU/VU)		x	x
Pilot Whale <i>Globicephala spp</i> (DD/DD)		x	x
Short-beaked Common Dolphin, <i>Delphinus delphis</i> . (DD/LC)		x	x
Risso's Dolphin, <i>Grampus griseus</i> (DD/LC)		x	
White-sided Dolphin, <i>Lagenorhynchus acutus</i> (LC/LC)		x	x
Striped Dolphin <i>Stenella coeruleoalba</i> (DD/LC)		x	x
*Leatherback Turtle, <i>Dermochelys coriacea</i> (LC/VU)	x		x
*Basking Shark, <i>Cetorhinus maximus</i> (EN/VU)	x		x
*Atlantic Bluefin Tuna, <i>Thunnus thynnus</i> (NT/EN)	x		x
Blue Shark, <i>Prionace glauca</i> , (NT/NT)	x		x
Shortfin Mako Shark, <i>Isurus oxyrinchus</i> , (VU/VU)	x		x
Habitat types occurring within the [proposed] MPA			
Seamounts, seamount-like features and associated communities			x
Abyssal plain			x
Mid-Ocean canyon			x
Oceanic fronts (Subpolar Front), seasonal and persistent eddies			x

B Selection criteria

a. Ecological criteria/considerations

1. Threatened and/or declining species and habitats

The [proposed] MPA includes the important foraging grounds of three OSPAR listed threatened and declining seabird species (OSPAR Agreement 2008-6, Table 1 and Annexes 4 and 6): the Black-legged Kittiwake, *Rissa tridactyla* (Annex 6, Figure A6.12), the Thick-billed Murre *Uria lomvia* (Annex 6, Figure A6.21) and the Audubon's Shearwater *Puffinus lherminieri baroli* (previously Little Shearwater) (Annex 6, Figure A6.1).

In addition to the seabirds described above, several other features included in the OSPAR list of threatened and/or declining species and habitats also occur within the [proposed] MPA, including both listed habitats (seamounts, see Fig. 2) and species (i.e., Blue Whale, Bluefin Tuna, Basking Shark and Leatherback turtle). Currently there is insufficient data to establish the importance of the area for these four OSPAR listed species.

Black-legged Kittiwake

The Black-legged Kittiwake is in decline within the OSPAR Areas I and II, with marked declines in Norway, Greenland and the UK (BirdLife International 2015; OSPAR 2009a; Thorvaldsen et al. 2015). The European population of Black-legged Kittiwake (which includes all OSPAR countries) is currently estimated at 1.7 million to 2.2 million pairs (3.4 - 4.4 million mature individuals), and has been listed as 'Vulnerable' in the European Red List Assessment (BirdLife International 2015).

The most significant threats to this species are the impact of overfishing of forage fish, and declines in prey availability caused by human induced ecosystem changes and climate change; and the species may also be susceptible to incidental by-catch in fisheries (BirdLife International 2016a).

The Black-legged Kittiwake is a highly pelagic species, particularly in the non-breeding season when it usually remains out of sight of land (Burger et al. 2013). Oceanic prey species include mesopelagic fish such as myctophids and invertebrates, including squid, euphausiids, amphipods and polychaetes (Hatch 2013; Paredes et al. 2014). The Black-legged Kittiwake has been found to be associated with the presence and abundance of the copepod *C. finmarchicus* - a key species within the Atlantic trophic food web (Frederiksen et al. 2012), and occurring in high densities to the north and west of the [proposed] MPA (Fort et al. 2012; Helaouët and Beaugrand 2007). Myctophid fish species are particularly abundant near fronts and high intensity eddies, which are present within the [proposed] MPA (Paredes et al. 2014).

The [proposed] MPA includes the foraging grounds for the Black-legged Kittiwake (Annex 4, Figure A4.12) tracked from seven different Large Marine Ecosystems across the OSPAR Maritime Area: Barents Sea, Faroe Plateau, Iceland Shelf and Sea, Norwegian Sea, West Spitsbergen, North Sea, and Celtic-Biscay Sea. The [proposed] MPA is an Important Bird and Biodiversity area for this species, being used by an estimated 1.3 million birds, especially during the non-breeding stage (Table 3 and Annex 6, Figure A6.12). Usage of the [proposed] area by the Black-legged Kittiwake was demonstrated to occur during all year quarters to varying degrees with the highest densities between October and March (i.e., Quarters 1 and 4, non-breeding period). High numbers (ca. 650 000 individuals) were also estimated to occur during quarter 3 (July-September, corresponding to the end of the breeding season and migration) (Table 3 and Annex 6, Figure A6.12). The north-west sector of the [proposed] MPA (close to the oceanographic feature the 'North-west corner') appears to be the most important for this species, all year round.

OSPAR has recommended the development of MPAs specifically for this species as a management measure (OSPAR 2009a).

Audubon's (Baroli) Shearwater

The Audubon's Shearwater- Baroli sub-species (*Puffinus lherminieri baroli*) was previously classified as the Little Shearwater (*Puffinus assimilis baroli*) and is now recognised within the *lherminieri* complex as one of three sub-species (Carboneras et al. 2016). The species was included on the OSPAR List of threatened and/or declining species and habitats based on taxonomical information available at the time (Agreement 2008-6).

In Europe, the species is considered Near Threatened (BirdLife International 2015). Population estimates for this sub-species are 2,900-3,800 pairs, or 5,900-7,600 mature individuals (BirdLife International 2015). The global population of the Audubon's Shearwater is estimated to be more than 20,000 mature individuals. It was listed by OSPAR as a Threatened and Declining Species in 2003 based on the decline in population, the importance of the OSPAR region for its population, and its sensitivity to threats (including oil spills and predation).

Within the OSPAR area an estimated 15-22% of the *P. l. baroli* sub-species is estimated to breed - essentially the colonies in the Azores (OSPAR 2009b). The remaining population breeds in the islands of Madeira and Canaries. In comparison to many of the summer breeding seabird species, the Baroli Shearwater sub-species breeds in the Northern hemisphere winter and early spring. The *P. l. baroli* sub-species remains in the North Atlantic area almost year-round (Neves et al. 2012; OSPAR 2009b).

The Audubon's Shearwater (including all sub-species) is a surface feeder, diving to depths of ~14m and targeting small fish (e.g., *Phycidae spp*), cephalopods and crustaceans, during both the day and night (Neves et al. 2012; Paiva et al. 2016). Cephalopods have been found to be the most common prey during the breeding stage, and birds may target juvenile cephalopods - including deep water species when they move to the surface waters during twilight and night time (Neves et al. 2012). Within the Canary Current and OSPAR region, the sub-species appears to forage in very deep oceanic areas and have large home ranges, with indications that birds from different colonies are segregating at sea and using different foraging strategies (Fagundes et al. 2016; Neves et al. 2012; Paiva et al. 2016). During the non-breeding season, individuals can range up to 2500km from the colony (Neves et al. 2012; Paiva et al. 2016), with previous research finding that birds breeding on the Azores and on Cima Islet in Madeira regularly disperse and forage within the Mid-Atlantic Ridge region (Fagundes et al. 2016; Paiva et al. 2016).

The foraging grounds of individuals tracked from colonies within the Canary Current LME overlap with the boundaries of the [proposed] MPA (Annex 6, Figure A6.1). The [proposed] MPA is an Important Bird and Biodiversity area for this species, with significant numbers (up to ~700 individuals) of birds estimated to use the area in July-September (Annex 6, Figure A6.1) in a relatively small area close to the north-east boundary with the Charlie-Gibbs Fracture Zone South MPA. Lower numbers (~270 individuals) are estimated to use the area during the transition between non-breeding and pre-breeding period of October-December (Table 3 and Annex 6, Figure A6.12) and the lowest numbers (~60 individuals) estimated during chick rearing and start of migration (April-June).

OSPAR has recommended the development of MPAs specifically for this species as a management measure (OSPAR 2009b).

Thick-billed Murre

The Thick-billed Murre is listed as a threatened and/or declining species by OSPAR due to its regional importance in the North-East Atlantic, its population decline and its sensitivity (as a long-lived species with delayed reproduction) and susceptibility to threats such as hunting, oil spills, bycatch in gill nets and loss of habitat and prey in relation to unsustainable fishing practices and climate change (Frederiksen et al. 2016; Irons et al. 2008; OSPAR 2009c). The European population is listed as Least Concern (BirdLife International 2015) and is estimated at ca. 2.3 million mature individuals, with colonies across the OSPAR Region I (Faroe Islands, Greenland, Iceland, Norway, Svalbard and Jan Mayen, Russia (BirdLife International 2015). Despite

its listing as Least Concern, significant declines of breeding populations have occurred in Svalbard, Norway, Iceland and Greenland (Descamps et al. 2013; Fauchald et al. 2015; Garðarsson et al. 2016).

During the breeding season, Thick-billed Murre feeds on a variety of fish species including capelin, sandeel and cod (Gaston 1985) as well as amphipods, and euphausiids (Mehlum and Gabrielsen 1993). During the non-breeding season, the diet includes forage fish (Capelin remaining an important species), squid, euphausiids (*Thysanoessa* spp, *Meganyctiphanes norvegica*) and amphipods (Falk and Durinck 1993; Orben et al. 2015; Renner et al. 2012). Thick-billed murre are capable of extremely deep dives up to 200m and are able to forage during both day-time and night-time (Croll et al. 1992).

Flying is very energetically costly for Thick-billed murre, making them susceptible to changes in prey distribution – particularly in the horizontal plane rather than vertically in the water column (Croll et al. 1992; Orben 2014). Adult survival has been linked to oceanographic conditions during winter with improved survival following winters with lower Arctic Oscillation indices, more ice and cooler sea surface temperatures (SST) (Smith and Gaston 2012).

Previous research from at-sea surveys and tracking suggests that Thick-billed Murres are broadly distributed across the North Atlantic during winter, from off west Greenland to offshore of Newfoundland and Labrador and south to the United States, and around Iceland, with birds from different colonies and sexes demonstrating differing migration strategies (Frederiksen et al. 2016; Gaston et al. 2011). An analysis of tracking data of 320 individuals from multiple colonies demonstrated the use of the area corresponding to the [proposed] MPA during the non-breeding period (with highest use from birds tracked from colonies in Canada, Spitsbergen, north-west Greenland and Iceland). Within the OSPAR high seas region some of the most important foraging grounds overlap with the [proposed] MPA boundaries year-round (Annex 6, Figure A6.21). During spring, birds from Arctic Canada and Iceland use the [proposed] MPA, whilst birds from Arctic Canada, north-west Greenland and Iceland used the area during the non-breeding season (October-March) (Annex 4, Figure A4.21). Within the [proposed] MPA, significant numbers of Thick-billed Murres use the area, with ca. 100-150,000 birds in winter (quarters 1 and 4), ca. 50,000 in summer/autumn (quarter 3), and the lowest number (which corresponds to the breeding season) in spring/summer (quarter 2) ca. 13,000 (Table 3 and Annex 6, Figure A6.21). In winter, spring, and autumn the highest concentrations are using the western boundary of the [proposed] MPA, closest to the Flemish Cap. In summer, Icelandic birds are concentrated within the centre of [proposed] MPA corresponding to the Mid-Atlantic ridge (Table 3 and Annex 6, Figure A6.21).

2. Important species and habitats

The available evidence demonstrates that the [proposed] MPA is used by numerous pelagic species not listed by OSPAR. Studies based on tracking data (results of BirdLife International's analyses and published information) show that the area is particularly important as foraging grounds for 19 non-OSPAR listed seabird species (Table 2, Annexes 6, 7 and 8). In addition, the existing scientific evidence and preliminary information from the recent NERC (DY080) research cruise has confirmed the use of the area by several non-OSPAR listed species, 14 of which are threatened at regional and/or global level (Table 2) and many are particularly vulnerable to human impacts (Croxall et al., 2012).

Seabird tracking data has also identified the high use by 18 non-OSPAR listed seabirds within the boundary of the [proposed] MPA, with the area qualifying as a marine Important Bird and Biodiversity area in each case. Seabirds from different functional groups were all found to be using the [proposed] MPA, including

Shearwaters and Fulmar, Petrels and Storm-petrels, Gulls/Terns and Skuas and Alcids.

The analysis presented in the proforma indicates that the [proposed] MPA is consistently used by significant numbers of between 17-22 different seabird species in all seasons. The highest number of birds using the site is estimated to occur during winter (ca. 4-5 million individuals), between December-March, when the area is used by large numbers of Alcid species. Highly significant numbers are also using the [proposed] MPA during spring and summer (April-September) with ca. 2-3 million individual estimated and this period also had the highest diversity of seabirds (17-18 different seabird species (Table 3, Annex 6).

A description of the use of the [proposed] MPA by species family groups is provided in the subsequent pages.

Table 3. Seabird species and estimated maximum number of individuals (max inds) using the [proposed] MPA based on analysis of tracking data and divided by year quarters. Estimates are not available for Leach's Storm Petrel. * = OSPAR listed threatened and declining species. See also Annex 6 and Annex 3, Table A3.2

Species name	Biogeographic population (mature birds)	Q1 Jan-March (max ind)	Q2 April-June (max ind)	Q3 July-Sept (max ind)	Q4 Oct-Dec (max ind)
*Audubon's Shearwater	6,750		62	743	278
Cory's Shearwater	505,500	66,354	20,801	40,851	59,442
Great Shearwater	8,000,000		1,564,472	1,819,681	
Manx Shearwater	734,500		71,827	167	
Sooty Shearwater	20,000,000		368,627	338,562	
Northern Fulmar	6,880,000	154,019	70,506	86,893	154,019
Bermuda Petrel	142			65	22
Bulwer's Petrel	102,200			1,418	
Desertas Petrel	340		13	57	13
Zino's Petrel	145	15	29	29	15
*Black-legged Kittiwake	3,935,000	1,324,344	63,650	653,309	1,341,590
Sabine's gull	3,100		375		
Arctic Tern	1,470,000			67,222	
Great Skua	33,550	2,291	1,309	2,618	2,945
Long-tailed Jaeger	72,850	27,766	34,765	46,131	4,482
South Polar Skua	18,000		1,036	1,108	
Atlantic Puffin	10,575,000	936,713	506,057	257,030	1,079,091
Common Murre	2,705,000		71,406	35,703	
Little Auk	45,600,000	2,333,333	1,29,630		1,555,556
Razorbill	999,500		26,123		
*Thick-billed Murre	2,380,000	156,867	50,625	13,619	139,992
Total		5,001,702	2,981,421	3,366,501	4,337,166

Shearwaters and Fulmar

The [proposed] MPA is frequently used by five species of shearwaters - Audubon's Shearwater (see above – OSPAR listed species), Cory's Shearwater, Manx Shearwater, Great Shearwater and Sooty Shearwater, and also by the Northern Fulmar. There have been few studies on the ecology of these species and their foraging grounds in the high-seas, but current evidence suggests that shearwaters are probably utilising the high abundance of mesopelagic fishes and cephalopods available here, including by shifting the daily activity patterns to respond to the higher abundance of these prey during the night period (Dias et al. 2012b). Tracking studies with Manx Shearwaters and Cory's Shearwaters have shown that the [proposed] area is also intensively used as a stopover during their long distance migration between the breeding areas (located in the North Atlantic) and non-breeding areas located in the South Atlantic (Dias et al. 2012a; Guilford et al. 2009), with some birds detouring more than 5,000 km from the main migratory pathway to spend between 15 and 31 days foraging in the region of the [proposed] MPA before heading south (Dias et al. 2012a; Appendix 7, Figures A7.2 and A7.3), showing the importance of the site as refuelling area. Recent at-sea surveys (June 2017) also confirmed the use of the [proposed] MPA by shearwater species (Annex 8, Figure A8.4).

Cory's shearwaters are north Atlantic breeders (Azores and Canary Current LMEs); high numbers of birds visit the area all-year round, but the [proposed] MPA is particularly important during the non-breeding season (Quarters 1 and 4, with ca. 66,000 and 59,000 birds, respectively), and late breeding (Quarter 3, with maximum abundances reaching 40,000 individuals; Table 3 and Annex 6, Figure A6.2).

A very high number of Northern Fulmars (coming from the North Sea LME) was also estimated to use the area all year round, with maximum abundances of more than 70,000 (reaching more than 150,000 during the winter months – Quarters 1 and 4; Table 3 and Annex 6, Figure A6.6). During the DY080 survey large numbers of birds were found in the northern sector of the [proposed] MPA (Annex 8, Figure A8.4), particularly north of the Subpolar Front (a finding consistent with Boertmann 2014). The Manx Shearwater is also a North Atlantic breeder; birds from colonies located in the Celtic-Biscay Shelf and from the Iceland Shelf and Sea LMEs visit the area especially during the Quarter 2 (breeding period), with an estimated maximum abundance of ca. 70 thousand individuals within the [proposed] MPA (Table 3 and Annex 6, Figure A6.4).

The area is also used by important numbers of Sooty and Great Shearwaters, migrant species breeding in South Atlantic Islands (studied individuals were tracked from the Falkland and Tristan da Cunha archipelagos, respectively), that visit the site as a wintering area during April-September. The highest use by Great Shearwaters occurred in Quarter 3 (July-September) in which an estimated 1.8 million birds used the [proposed] area, whilst 1.5 million birds were estimated to use the site during Quarter 2 (April-June) (Table 3 and Annex 6, Figure A6.3). The evidence of use is further supported by birds tagged during the DY080 research cruise. Ten birds, tagged with GPS transmitters at the end of June 2017 moved from the shelf area into the [proposed] MPA area during July/August (Annex 8, Figure A8.4). The Sooty Shearwater demonstrated the highest usage during Quarter 2 (ca. 360,000 individuals estimated) and Quarter 3 (ca. 330,000 individuals) (Table 3 and Annex 6, Figure A6.5).

Petrels and Storm-petrels

The [proposed] MPA is an important foraging area for several species of small petrels and storm-petrels, all highly pelagic and mostly nocturnal species (Dias et al. 2015; Dias et al. 2016; Ramírez et al. 2013) that are

also probably preying upon mesopelagic species that are highly abundant at the sea surface of deep waters during the night (Dias et al. 2016; Waap et al. 2017). Tracking data have shown the occurrence of three globally threatened species of gadflies – including the Endangered Bermuda Petrel *Pterodroma cahow* and Zino's Petrel *Pterodroma madeira*, and the Vulnerable Desertas Petrel, and of the Bulwer's Petrel. At-sea surveys conducted in June 2017 (DY080 NERC research cruise) revealed the additional presence of storm petrels (Wilson's Storm-petrel, Leach's Storm-petrels and several unidentified Hydrobatidae/Oceanitidae sp.; see Annex 8, Table A8.1 and Figure A8.4).

Small petrels are usually able to fly very long distances to find food, even during the breeding period, when restricted by colony attendance (e.g., Dias et al. 2016). Very recent studies, carried out with more accurate devices (GPS loggers) deployed on Desertas petrels, revealed that most birds travel more than 2,000km from the colony, located in Desertas (Madeira), to forage in the [proposed] MPA during the incubation period (Granadeiro and Catry *in prep*; Annex 7, Figure 7.5). The fact that these birds travel such long distances during a single incubation trip to target the waters of the [proposed] MPA indicates the value of the area for this Vulnerable species. BirdLife International's analyses and other studies (e.g., Ramírez et al. 2013) also suggest that the area is particularly important during the breeding season of the species (especially quarter 3: July-September; Table 3 and Annex 6, Figure A6.9).

The Endangered and very rare Bermuda Petrel, breeding on Nonsuch Island (January-June) in Bermuda, has a population estimate of 250 individuals after being re-discovered in the 1950s (BirdLife International 2016a). Tracking studies have indicated that the birds are capable of dispersing across the North Atlantic, with some individuals recorded off Ireland (Madeiros et al. 2013). The analysis of existing tracking data indicated that the birds used the site and surrounding area as foraging grounds from Spring (April) through to winter (December). High use of the [proposed] MPA occurred during the non-breeding summer period (July-September), particularly in the southern section, suggesting that this site is an important foraging ground for the global population of this species (Annex 6, Figure A6.7).

Both Zino's Petrel and Bulwer's Petrel occur more marginally in the [proposed] area, with usage predominantly in the eastern sector (Annex 6, Figures A6.8 and 6.10).

Alcids

The [proposed] MPA is an important foraging ground for at least 5 auk species, including the Thick-billed Murre (OSPAR-listed- see section above), the Atlantic Puffin, Common Murre, Little Auk and Razorbill (Table 3). The highest abundance of auk species within the boundaries of the [proposed] MPA appears to be in the winter months when large numbers of Atlantic Puffin and Little Auk use the area (Table 3 and Annex 6, Figures A6.17-A6.21).

Atlantic Puffins, which breed across much of the OSPAR area (Greenland, Iceland, Faroes, UK, Norway and France) are currently experiencing dramatic population declines in many of their major colonies. Lack of breeding success has been linked to climatic changes and human pressure on forage fish (e.g., Sand eel) in shelf waters surrounding their colonies (BirdLife International 2017). Major mortality of adult puffins is occurring in the Atlantic during the winter, which suggests that stable food supplies are critically important during this time (Harris et al. 2015). The species is known to be highly dispersive during winter and can use several wintering sites (Fayet et al. 2016). The prey species of Puffins on their wintering grounds is poorly understood (Harris et al. 2015), but studies from birds wintering off the Faroe Islands found their diet

included small mesopelagic fish (Lanternfish etc), crustaceans including Euphausiids, and juveniles of larger species (Forkbeards, Goby, Lumpsucker etc) and squid (Falk et al. 1992; Harris et al. 2015).

The Atlantic Puffin, tracked from the Iceland Shelf and Sea LME and the Celtic-Biscay Shelf LMEs use the [proposed] MPA year-round, with birds from the North Sea LME using the area in winter and summer/autumn (Annex 6, Figure A6.17).

Little Auks have a pan-Arctic breeding distribution, with the largest colonies found in east and north-west Greenland and in Spitsbergen (Stempniewicz 2001). Given the extremely large population size this species is considered an important component in marine ecosystems in relation to transfer of energy and organic matter (Fort et al. 2010a; Karnovsky and Hunt 2002; Mehlum and Gabrielsen 1995). The species has high energy demands (Fort et al. 2010b; Harding et al. 2006) and feeds almost exclusively on zooplankton, *Calanus* copepods in summer (Fort et al. 2010b), and Krill species (e.g., *Meganyctiphanes norvegica*, and *Thysanoessa raschii*) amphipods (*Themisto* spp.) and young capelin (*Mallotus villosus*) in winter (Rosing-Asvid et al. 2013). Existing studies have already highlighted the importance of the region offshore of Newfoundland for this species, estimating that millions of Little Auks are over-wintering in this area (Fort et al. 2013; Mosbech et al. 2012). Post-breeding Little Auks from Greenland move to staging areas in the Davis Strait and the Greenland Sea where they are likely to be moulting (Mosbech et al. 2012), before leaving in October to fly ~2000-3000 km to the waters around the [proposed] MPA where many spend three to four months (Fort et al. 2013). During the summer/autumn (July-September), Little Auks are not present within the [proposed] MPA or the mid-Atlantic region, as they complete chick-rearing and depart for their moulting/staging grounds (Fort et al. 2013)(Table 3). Based on the available tracking data, the most important winter foraging grounds for this species coincide with the boundaries of the [proposed] MPA and the region of the Charlie Gibbs Fracture Zone and western boundary of the OSPAR region (Quarter 1, Annex 4, Figure A4.19). Within the boundaries of the [proposed] MPA the highest densities in winter of Little Auk (ca. 1.2-2.3 million mature individuals) occurs in the north-west of the site (Quarter 1), with a move to the eastern boundary over the Mid-Atlantic ridge during spring (Annex 6, Figure A6.19).

The highest diversity of alcids in the [proposed] MPA occurs in spring and summer months (April-September) when the Common Murre and Razorbill tracked from colonies in the Iceland Sea and Shelf LME are also present. For these two species from this LME the mid-Atlantic provides more marginal foraging grounds than shelf waters and offshore areas closer to colonies (Annex 4, Figures A4.18 and A4.20). Within the boundary of the [proposed] MPA the two species appear to use a patchy and more spatially restricted areas within the boundary of the [proposed] MPA. In spring (April-June) Razorbills (ca. 25-26,000 mature individuals) are concentrated in the south (close to the Milne Seamount MPA) and the north-eastern boundary (Table 3; Annex 6, Figure A6.20). The Common Murre use the [proposed] MPA in both spring and summer, with the highest numbers in April-June (ca. 71,000 mature individuals) (Table 3; Annex 6, Figure A6.18).

Skuas, jaegers, terns and gulls

The [proposed] MPA is an important site for trans-equatorial migrants from the southern and northern hemispheres, such as the South Polar Skua, and the Long-tailed Jaeger and the Arctic Tern, respectively (Egevang et al. 2010; Gilg et al. 2013; Sittler et al. 2011; van Bemmelen et al. 2017; Annex 6, Figures A6.11-A6.16; Annex 7, Figures A7.7 and A7.8; Weimerskirch et al. 2015) Little is known about the ecology of these species during the non-breeding months because of their pelagic behaviour outside the breeding season.

However, the [proposed] MPA is used as a main staging site by Long-tailed Jaegers from Sweden, Greenland and Svalbard for one to three weeks in their southbound and northbound migrations (Gilg et al. 2013; Sittler et al. 2011; van Bemmelen et al. 2017) Annex 7, Figure A7.7); and for one week (birds tracked from the Netherlands) to one month (birds tracked from Greenland and Iceland) for Arctic Terns (Annex 7, Figure A7.6). The [proposed] MPA is also used as an important wintering ground for South Polar Skuas (Annex 7, Figure A7.8).

Although studies of at-sea foraging behaviour of these species in high-seas foraging grounds are scarce, de Korte (1985) has shown that Long-tailed Jaegers arrived in their breeding grounds in spring with maximum fat reserves, suggesting the importance of the North Atlantic foraging grounds associated with the [proposed] MPA as a refuelling site. The staging area probably also allows the Long-tailed Jaegers to restore fat reserves after the demanding breeding season before heading to the southern hemisphere (Sittler et al. 2011). Similarly, activity level of South Polar Skuas during the non-breeding season was reported to be low, suggesting that they spend little time trying to find food (less than 20% of their daytime in flight) possibly because of the good quality of the foraging grounds (Weimerskirch et al. 2015). Isotopic similarity indicated that South Polar Skuas feed on the same prey as terns and shearwaters or, more likely, they kleptoparasite these birds (Weimerskirch et al. 2015). Long-tailed Jaegers possibly also feed by kleptoparasitism, being often associated with the Sabine's Gull *Xema sabini* and Arctic Tern (both species occurring in the [proposed] MPA) during both migration periods and on wintering grounds (Gilg et al. 2013). Nevertheless, they probably can also feed by themselves, mostly by surface pecking because they are not deep divers and so rely on mechanisms bringing zooplankton or fish to the surface (van Bemmelen et al. 2017).

Great Skuas are endemic to the Northeast Atlantic, breeding in colonies from western Scotland to Svalbard, Norway. Birds coming from the Iceland Shelf and Sea LME used the [proposed] MPA all year-round, ranging from a maximum of 2,945 mature individuals during Quarter 4 to 1,309 mature individuals during Quarter 2 (Table 3 and Annex 6, Figure A6.14). The use of the [proposed] MPA as a wintering area for Great Skuas is also in accordance with data presented in Magnúsdóttir et al., (2012) for Icelandic and Norwegian birds.

Arctic Terns occupied the [proposed] MPA before departing to their wintering region during summer/autumn Quarter 3 (July-September, with ca. 67,222 mature individuals) and Quarter 4 (October-December, with ca. 82,500 mature individuals) (Table 3 and Annex 6, Figure A6.11). High numbers of Long-tailed Jaegers used the area all year-round (with ca. 27,766 (January-March), 34,765 (April-June), and 46,131 (July-September)) but with decreased numbers and only for the Greenland LME (there was no overlap during this quarter with birds tracked from Norwegian Sea and Barents Sea LME) during Quarter 4 (October-December), when birds are in their wintering grounds (maximum of 4,482 mature individuals) (Table 3 and Annex 6, Figure A6.15). The [proposed] MPA was used by ca. 1,100 mature individuals of South Polar Skua from South Shetland Islands LME as their main wintering ground (April-September) (Table 3 and Annex 6, Figure A6.16). The [proposed] MPA was also occupied by the Sabine's Gull during April-June (maximum of 375 mature individuals) (Table 3 and Annex 6, Figure A6.13).

The presence of skuas, jaegers, terns, and gulls in the [proposed] MPA has also been confirmed by the recent NERC at-sea survey (DY080- see Annex 8, Table A8.1 and Figure A8.4), carried out during June 2017, supporting the evidence collected using tracking data. The at-sea survey showed that the [proposed] MPA is used by the Arctic (*Stercorarius parasiticus*) and Pomarine (*S. pomarinus*) jaegers, and by Great Black-backed Gull (*Larus marinus*), species that lack tracking data.

Importance of deep oceanic habitat for the pelagic ecosystem

Life in open ocean pelagic systems is intrinsically linked to the deep-sea and the seafloor through downward flux of organic matter and upwelling of nutrients from the depth of the ocean.

The deep-sea is the largest habitat on Earth and accommodates a very high biodiversity (Brandt et al. 2007; Danovaro et al. 2008; Grassle 1996; Ramirez-Llodra et al. 2011; Woolley et al. 2016). The habitat comprises the dark waters below the euphotic zone generally from 200m and deeper, where biological processes lead to remineralization and sequestration of nutrients and carbon, as well as the seafloor (benthos).

Life in the deep aphotic pelagic zones mostly depends on energy flux from the upper water layers. It is characterized by a stable environment, to which zooplankton, other pelagic invertebrates, of which many are gelatinous, and mesopelagic fish are specifically adapted (Ramirez-Llodra et al. 2011).

Abyssal plains and deep-sea trenches, like the Atlantic Mid-Ocean Canyon, which is part of the [proposed] MPA, extend between 4000 and 11000m of depth, where due to limited food availability metabolic rates and biomass are low (Woolley et al. 2016), but biodiversity can still be high (e.g., Danovaro et al. 2010). Seamounts, like the Evlanov Seamount in the [proposed] MPA, rise more than 1000m above the surrounding seabed (Morato et al. 2015), where upwelling of nutrients supports increased biological productivity that in turn supports high abundance of animals such as sessile filter feeders, fishes, sharks, turtles, marine mammals and seabirds (Clark et al. 2012).

In addition, vertical migration of organisms, including daily as well as seasonal migrations, also links the deeper and shallower open ocean water layers. This migration is an important basis of the marine food web and is crucial for ecosystem functioning by making deep-dwelling organisms available as prey to predators of more shallow depths. Thus, the water column of the open ocean and the seafloor are closely linked and the integrity of this link is crucial of the sustaining marine biodiversity and ecosystem functioning.

Further oceanographic and biological research is required within the [proposed] MPA to understand the nature of the linkages between the seafloor topography, the complex oceanography and the diversity of lower and higher trophic levels. With the current available evidence and taking a precautionary approach, the benthos is included as a habitat supporting the seabirds within this proforma.

3. Ecological significance

The [proposed] MPA is a unique site in the high seas of the North East Atlantic, encompassing an area of complex oceanography and high species richness and density of pelagic seabirds using this area year-round, and consistently between years (Annex 3).

Foraging ground for high trophic predators

The [proposed] MPA is an Important Bird and Biodiversity Area and the most important pelagic foraging grounds in the OSPAR maritime high seas area for at least 22 seabird species. The [proposed] MPA is also used by at least 10 cetacean species, although further research is needed to understand the intensity of use and type of use of the site by the species (foraging/residency/migration corridors). Overall, the [proposed] MPA appears to be used by at least 42 different high trophic species, including some of the smallest

seabirds, up to the giant Blue Whale and representing a wide range of feeding ecologies and ecological niches- from krill specialists to those foraging on mesopelagic fish and squid and jellyfish.

The [proposed] MPA is used by an estimated 2.9-5 million seabirds (Table 3, Annex 6, Figures A6.1-A6.21). Long term datasets and multi-year data seabird colonies from around the Atlantic (OSPAR Marine Area, Canada and South Atlantic) demonstrates that the [proposed] MPA is used by species across different seasons and years (Annexes 3, 4, 6 and 7). The analysis of seabird tracking data, and previously published findings, support that the [proposed] MPA is used as a foraging ground by several pelagic species and by individuals from different colonies, during the same time periods (Annex 4). The highest concentrations of seabirds occurred during the winter period (October-March), when large numbers of deep diving Alcids (e.g., Little Auk, Atlantic Puffin, Thick-billed Murre) and Black-legged Kittiwake and Northern Fulmar use the area. Significant numbers of seabirds also use the [proposed] MPA during spring and summer- ca. 2.9-3 million individuals.

The available evidence suggests that the [proposed] MPA corresponds to a region with a high abundance of prey species for high trophic predators, including copepods, gelatinous zooplankton and euphausiids (Gaard et al. 2008; Letessier et al. 2011; Vecchione et al. 2015). The copepod *C. finmarchicus*, a key species within the Atlantic trophic food web (Frederiksen et al. 2013), and occurs in high densities within the [proposed] MPA (Fort et al. 2012; Helaouët and Beaugrand 2007). Euphausiids are also abundant across the region and are important prey for mesopelagic fish, cetaceans and seabirds such as Blue Whale, Thick-billed Murre, Little Auk and Black-legged Kittiwake (Mehlum and Gabrielsen 1993).

Mesopelagic fish -species such as the Goiter Blacksmelt (*Bathylagus euryops*) have been found to be the one of the abundant fish in the Mid-Atlantic Ridge region, with highest abundance at the Subpolar Front and the CGFZ (Sweetman et al. 2013). These fish prey on gelatinous zooplankton and copepods. They in turn are preyed on by larger fish, such as Redfish, Bluefin Tuna and by cetaceans and seabirds (Granadeiro et al. 2002; Waap et al. 2017). Another abundant mesopelagic group of fish- the Lanternfish (Myctophids) have been found in high abundance across the Subpolar Front boundary. These small fish are particularly associated near fronts and eddies, such as those occurring within the [proposed] MPA (Paredes et al. 2014). Myctophids are key prey for squid, cetaceans and seabirds (Harris et al. 2015; Paredes et al. 2014; Waap et al. 2017). Cephalopods are also potentially concentrated within the boundary and broader region of the [proposed] MPA, with studies from the MARECO/ECOMAR programme indicating the highest diversity and abundance occurring south of the CGFZ (Vecchione et al. 2010).

Despite the lack of information on the trophic dynamics within the broad mid-Atlantic region and the boundary of the [proposed] MPA, the importance of this area as a foraging and staging ground for seabirds and other taxa suggests that the complex oceanographic and biological conditions provides a reliable source of food during key life stages and energetically demanding periods.

Threatened species

The [proposed] MPA is of ecological significance for its use as a foraging area by OSPAR listed threatened and declining species and for globally and regionally threatened species. This includes significant use by 19 seabird species which are considered threatened or near-threatened at global or regional level, including the very rare Bermuda Petrel (BirdLife International 2016a)

The available scientific evidence supporting the [proposed] MPA indicates that the area is important for at least three OSPAR listed threatened and declining seabirdspecies (Black-legged Kittiwake, Thick-billed Murre, and Audubon's Shearwater).

The area is also particularly important for Atlantic breeding seabird species, such as the Atlantic Puffin and Northern Fulmar, both of which have suffered significant population declines in the European and OSPAR region, and are now considered regionally Endangered (BirdLife International 2015).

In addition, there is also the confirmed use of the area by the Blue, Sei and Fin Whale - all globally Endangered on the IUCN Red List (Reilly et al. 2013), but the intensity of the use is currently unknown and requires further research.

Seabird use during non-breeding period

Many Atlantic seabirds use the ABNJ during both the breeding and non-breeding period. However, high seas areas are known to be particularly relevant for seabirds during the non-breeding stage, both as a staging area during migration and as a final non-breeding destination (e.g., Bogdanova et al. 2011; Dias et al. 2011; Egevang et al. 2010; Fort et al. 2013; Frederiksen et al. 2012; Harris et al. 2010).

The non-breeding (winter) period is an important stage of a seabirds life-cycle, when they typically recover from the energetically demanding breeding period and prepare for the subsequent breeding season. This winter period is also when adult survival is most at risk, and it has been suggested to account for the highest mortality of Atlantic seabirds (Daunt et al. 2006; Fort et al. 2010a; Harris et al. 2010). Winter "seabird wrecks" - when thousands of birds die from starvation due to unfavourable conditions on non-breeding foraging grounds, are well documented along the Atlantic coast (Fort et al. 2015; Fort et al. 2009; Frederiksen et al. 2012). Protecting seabirds in these high sea areas is therefore critical to their long-term persistence.

As described above, the site was found to be extremely important as a key staging area for highly migratory seabirds, including both Northern and Southern Hemisphere breeders. For many of the long-distance migrants the site is likely used during both the outward and return journeys and plays an important role as stopovers, in restoring fat reserves before migration is resumed.

Biogeographic ecotone and persistent frontal zone

The [proposed] MPA is situated within the subpolar frontal zone, and is considered an ecotone: representing a transition zone between cold, polar seas and the warmer central Atlantic waters (Beaugrand et al. 2002). The region is therefore ecologically important, providing habitat for both cold and warm adapted species at the extreme end of their ranges (Acha et al. 2015; Beaugrand et al. 2002).

Previous studies have indicated the importance of the Subpolar Front and the CGFZ in relation to heightened primary productivity, copepod and euphausiid biomass and biodiversity and meso-pelagic fish (Pelegrí et al. 2006; Priede et al. 2013). Fronts and high energy eddies are known to aggregate primary productivity and zooplankton, providing a temporally and spatially reliable foraging zone for higher trophic

level predators (Scales et al. 2014). Productivity can be further enhanced when these features occur over seamounts, as zooplankton can become entrained over the abrupt topography (the topographic blockage), and are then further restricted in their vertical migrations, thereby rendering them more accessible for mesopelagic fish and other top predators (Morato et al. 2016; Sweetman et al. 2013). The frontal zone is stable throughout the year, suggesting that the [proposed] MPA provides a stable and predictable source of food, including during the challenging winter period.

4. High natural biological diversity

Based on the analysis of seabird tracking data the [proposed] MPA was found to have the highest seabird species richness, in comparison to all other ABNJ areas within the OSPAR region (Annex 5). The [proposed] MPA had the highest diversity during spring and summer, when 22 species were present during the same season. Species richness was also high during quarter 4, with 12-15 species using the [proposed] MPA.

In addition to seabird diversity, existing research indicates that the [proposed] MPA is also regularly used by at least 10 cetacean species, including both large baleen whales and odontocetes (Doksæter et al. 2008; Annex 8; Waring et al. 2008), three elasmobranch species (Blue, Mako and Basking sharks) and one seaturtle species (Leatherback turtle). Moreover, 47 seamounts can be found in the [proposed] site, eight of which are 1000m or higher (Fig. 2). Even though there is little scientific data available on the seamounts within the area, seamounts are generally considered as habitats supporting a high level of biodiversity, including cold-water coral and sponge reef habitats, due to upwelling and eddies close to the slopes of the seamounts.

5. Representativity

Pelagic foraging hotspot

The [proposed] MPA is the most important high seas foraging ground in the OSPAR area for pelagic seabird species. The [proposed] MPA contains a significant proportion of the North Atlantic assemblage of seabirds, and also appears to be used by at least 10 cetacean species during different times of the year (Annexes 6-8). The analyses suggest it has the highest species diversity and abundance of seabirds across the entire OSPAR ABNJ area (Annex 5). Although important pelagic areas have been identified for individual species in the Atlantic previously, there has not been a multi species analysis on this scale. The multi-species and multi-taxa use of the [proposed] area suggests that the inclusion of the [proposed] MPA would allow the OSPAR MPA network to achieve greater representativity for multiple pelagic species.

Seabirds

The 2013 Ecological Coherence Assessment (OSPAR, 2013) indicated that seabirds are currently not well represented in pelagic high seas ABNJ MPAs. The current OSPAR MPA network includes protected sites close to land and seabird breeding colonies, which are of high importance during the breeding season. Our analysis indicates that the most important sites for seabirds in the ABNJ are currently outside of the MPA network (Annex 5). In relation to seabirds and the existing OSPAR sites. The inclusion of the [proposed] MPA would therefore increase the ecological coherence and representativity of the existing MPA network

for seabirds through inclusion of the foraging grounds of North Atlantic breeding seabirds at multiple points in their life stages, and representing birds from colonies around the OSPAR region.

The [proposed] MPA also adds important staging and foraging grounds for South Atlantic and Caribbean breeding seabird species (e.g., Bermuda Petrel, Sooty Shearwater, Great Shearwater and South Polar Skua), an element which is not currently found in any of the OSPAR ABNJ MPAs.

Productive frontal zone and deep ocean

The [proposed] MPA is globally unique in its oceanography, situated at a convergence zone between the cool, polar seas and the warm, central Atlantic. Within the boundary of the [proposed] MPA successive frontal zones fork out as the Subpolar Front meanders across the mid-Atlantic. The unique oceanographic conditions and complex bathymetry potentially drives both primary and secondary diversity and abundance. It is therefore a unique pelagic habitat, and a habitat type (highly productive frontal zone) that is not well captured within the current OSPAR MPA network.

6. Sensitivity

The threatened pelagic seabird species present within the boundary of the [proposed] MPA are predominantly long-lived and slow to mature, making the populations of these species particularly sensitive to human based activities and threats.

Seabirds are of conservation importance, and also suitable indicators of pelagic biodiversity and ocean ‘hotspot’ areas. All seabird species are long-lived and slow reproducing (1-3 eggs once a year), meaning they are vulnerable to mortality events and slow to recover. Of the 82 seabird species that occur within the European region, 24 are threatened or near threatened (BirdLife International 2015). In the boreal Northeast Atlantic (ca. 55–70°N), many seabird species have had repeated breeding failures and experienced high adult mortality over the last decade, which has resulted in pronounced declines in species such as Atlantic Puffin, Black-legged Kittiwake and Northern Fulmar (Burthe et al. 2012; Cordes et al. 2015; Durant et al. 2003; Grosbois and Thompson 2005; Miles et al. 2015; OSPAR 2017; Wanless et al. 2005). The 2017 OSPAR Intermediate Assessment concluded that seabirds in the OSPAR region were in trouble, with significant reductions in abundance and continued breeding failures.

The [proposed] MPA includes the important foraging grounds for seven seabird species which are considered to be globally or regionally threatened or near-threatened according to IUCN Red List criteria: the Atlantic Puffin (Globally Vulnerable and Endangered in Europe), Bermuda Petrel (Endangered at global level), Northern Fulmar (Endangered in Europe), Desertas Petrel (Vulnerable at global level) and Zino’s Petrel (Endangered at global level). An additional three species (Audubon’s Shearwater, Razorbill and Common Murre) are considered ‘Near Threatened’ within Europe (Table 2).

In addition to seabirds, also the cetaceans, elasmobranchs as well as the leatherback turtle occurring in the [proposed] area are considered long-lived and slow to mature and thus susceptible to anthropogenic changes in habitat and prey availability as well as pressures and disturbances of human activities.

Table 4. List of OSPAR Priority threatened and declining species and IUCN threatened species using the [proposed] MPA and known/likely threats at sea.

Species common name	Known/likely threats at sea
Audubon's Shearwater	-Bycatch in pelagic and demersal longline fishing gear and other gears -Oil spills and surface pollutants
Black-legged Kittiwake	-Climate induced changes to food availability -Human induced changes to ecosystem functioning (over-exploitation of prey species) -Bycatch in longline gear and other fishing gears.
Thick-billed Murre	-Climate induced changes to food availability -Oil spills and surface pollutants -Human induced changes to ecosystem functioning (over-exploitation of prey species) -Bycatch in gillnets (Note- depth of dives includes 200m)
Atlantic Puffin	-Bycatch in gillnets and longlines. -Climate induced changes to food availability -Human induced changes to ecosystem functioning (over-exploitation of prey species) -Extreme weather events -Habitat displacement -Oil spills and surface pollutants
Bermuda Petrel	-Climate induced changes to food availability -Light pollution/ship strikes
Desertas Petrel	-Climate induced changes to food availability -Light pollution/ship strikes
Zino's Petrel	-Climate induced changes to food availability -Light pollution/ship strikes
Northern Fulmar	-Bycatch in demersal longline fishing gear and other gears -Climate induced changes to food availability -Light pollution/ship strikes -Human induced changes to ecosystem functioning (over-exploitation)
Razorbill	-Bycatch in gillnets and other fishing gear. -Climate induced changes to food availability -Oil spills and surface pollutants
Common Murre	-Bycatch in gillnets and other fishing gear. -Human induced changes to ecosystem functioning (over-exploitation of prey species) Climate induced changes to food availability -Oil spills and surface pollutants

7. Naturalness

The area has a high degree of naturalness, with species and habitats/biotope types still in a very natural state as a result of the lack of human-induced disturbance or degradation. However, the pelagic waters of

the [proposed] MPA are assumed to not be in pristine state, given that both shipping and fishing activity take place within and surrounding the [proposed] MPA.

b. Practical criteria/considerations

1. Potential for restoration

The need for restoration measures, i.e. recovery from human impacts by excluding further human pressure, is not known. Further data on the current status of the [proposed] MPA is needed before its potential for restoration can be assessed.

It is unknown if and how the [proposed] MPA will be affected by most human activities directly or by anthropogenic impacts like climate change.

The [proposed] MPA rather aims to protect the ecosystems and biological diversity in the area against any additional adverse impacts of human activities.

At the same time, however, and beyond the scope of the [proposed] MPA, OSPAR Contracting Parties may consider taking relevant measures in line with their respective national policies to not contribute further to climate change.

2. Degree of acceptance [CAVEAT: this section is subject to change based on views and information OSPAR may receive from other actors]

Fishing

Current extent and intensity of fishing effort unknown, but appears to be less commercially important than adjacent areas. Bycatch observer programmes on board vessels would require acceptance and dialogue with fishing community.

Science

The [proposed] MPA has a very high level of support from the scientific community, including seabird, turtle, cetacean and shark ecologists working across the Atlantic from 12 different countries (Annex 1). This has been achieved via the expert workshop held in Iceland in June 2016 and regular information exchanges throughout the identification process and the recent NERC DY080 research cruise.

Shipping

Major shipping lines between Canada, USA and Europe pass through the boundary of the [proposed] MPA, and any potential future management will need the engagement of transport and shipping stakeholders.

Tourism

No known tourism present.

Offshore mining and extraction

Subject to ISA licensing, no exploration or exploitation plans known as yet. Oil and gas activities in nearby waters (Canadian Jeanne d'Arc basin).

Cable laying

Not known. As conservation objectives of the [proposed] MPA focus on protection of seabirds, it is unlikely that cable laying activities would constitute a sustained and major threat to the species.

3. Potential for success of management measures

The remoteness of the proposed [MPA] means there is currently a lower level of use and human activities compared to more accessible marine areas. However, it is not known how this may change in the future. Monitoring and control of human activities in the area should be possible by form of information provided to/from different sectors which plan to access the area, as well as through the application of remote technologies.

Considering the mandate of the OSPAR Commission as provided for by the OSPAR Convention, it is obvious that effective conservation of the ecosystems and biological diversity will require a collaborative management building upon and encompassing all relevant actors and competent authorities with a mandate in the Arctic and North Atlantic region.

A research and monitoring plan, as suggested in this proforma could prove highly successful within this region.

Programmes and measures carefully designed and effectively implemented by OSPAR Contracting Parties, individually and/or jointly, and in accordance with the OSPAR Convention, e.g., with regards to awareness raising, information building, marine science or new developments, are expected to be successful in contributing to achieve the general as well as specific conservation objectives set for the [proposed] MPA.

4. Potential damage to the area by human activities *[CAVEAT: this section is subject to change based on views and information OSPAR may receive from other actors]*

Human uses of [proposed] MPA

Due to its remote location in an area beyond national jurisdiction and in very deep, open, ocean, the [proposed] MPA is not easily accessible. The waters within and surrounding the [proposed] MPA are therefore only exposed to a limited range of human uses at present. The main human uses for the wider region surrounding the [proposed] MPA include fishing, shipping and activities associated with extractive industries such as oil and gas. The activities could potentially be causing damage to the [proposed] area and the seabirds using it as foraging grounds. The specific actions that are known to occur within the [proposed] area and the surrounding North Atlantic region are described below.

Human activities known to occur in the [proposed] MPA

Fishing

There is a lack of information on the exact extent of fishing effort within the boundaries of the [proposed] area available to the experts that have drafted the proforma thus far. The specific fishing gears that are operating within the [proposed] MPA and the target species and the seasonality of activity are not clearly understood.

Broadly fishing activities within the North Atlantic region includes pelagic longlining targeting tuna, swordfish and tuna-like species, and demersal fishing for non-tuna species. Tuna fishing activities are managed under the International Commission for the Conservation of Atlantic Tunas (ICCAT). Fishing activity appears to be lower than other regions in the North East Atlantic, however the areas immediately surrounding the [proposed] MPA, to the west (Grand Banks), east, and south appear to be intensively fished. The remoteness of the proposed [MPA] could be a reason for the apparent lower fishing activity in the region, but with the depletion of fisheries elsewhere and the high value species found in the area (e.g., tuna), these resources have the potential to be targeted in the future.

In relation to multi-taxa bycatch from fishing vessels and fishing gears, there remains a major gap in knowledge for the North East Atlantic on bycatch rates and spatial-temporal occurrence. Pelagic longline fishing gears targeting tuna and tuna-like species are known to result in bycatch of shark, turtles and seabirds, including within the Atlantic (Anderson et al. 2011; Lewison et al. 2004; Queiroz et al. 2016; Ramos et al. 2013). In relation to seabird bycatch, most analysis has focused on bycatch of Albatross species in the South Atlantic (e.g., Yeh et al. 2013), although some studies (e.g., Ramos et al. 2013) examined the bycatch risk to Cory's Shearwaters which are known to be caught by pelagic longline vessels. Other seabird species, including the larger shearwaters (e.g., Great Shearwaters and Sooty Shearwaters) could also be caught in these gears. Since there is no systematic reporting of seabird bycatch in the North Atlantic it is difficult to fully assess the potential damage to the populations, and a systematic collection of seabird bycatch data is needed.

In relation to demersal longline fishing gear the knowledge gap on seabird bycatch is still larger. In the case of demersal longlining, the hooks are much smaller, and so pose a threat to smaller seabird species - potentially catching species such as Black-legged Kittiwake, Audubon's Shearwater, Atlantic Puffin and the smaller Petrel species. Demersal fisheries operating in the shelf waters off Ireland are known to catch Great Shearwaters and Northern Fulmar and Black-legged Kittiwake, potentially in very large numbers (Anderson et al. 2011; Dunn 2007; Reid et al. 2008). If similar effort is occurring within the [proposed] MPA or in the area surrounding it, then potentially large numbers of birds could be exposed to the threat of bycatch.

In relation to gillnet fisheries, almost nothing is known of the fishing effort, the placement of gears in the water column (depth of setting) and the potential interaction with seabirds. Diving seabird species, including Alcids (Puffin, Razorbill, Common and Thick-billed Murre) as well as plunge diving species are all particularly susceptible to bycatch in gillnets (Žydelis et al. 2013). Further work is needed to determine if this fishing gear is operational in the deep, pelagic environments surrounding the [proposed] MPA and if seabird bycatch is occurring.

Fishing activities can also pose an indirect threat on seabirds, particularly small petrels, due to light pollution.

Shipping/transport routes

The [proposed] area is situated within the great circle shipping route between Canada, the USA and Europe. The southern section of the [proposed] MPA is quite intensively crossed by vessel traffic (Figure 4), particularly in the south-eastern sector as ships move into and out of the Gulf of St Lawrence on their way across the Atlantic.

Shipping activities can cause disturbance to seabirds through displacement from foraging grounds and resting habitats (e.g., Schwemmer et al. 2011). Light pollution on ships at night can cause seabirds to collide with vessels (e.g., Merkel and Johansen 2011). Vessel collision is also a potential threat to cetacean species. There is also a higher risk of marine pollution in shipping lanes, both from accidental spills and operational discharges, which can pose a large risk to seabirds.

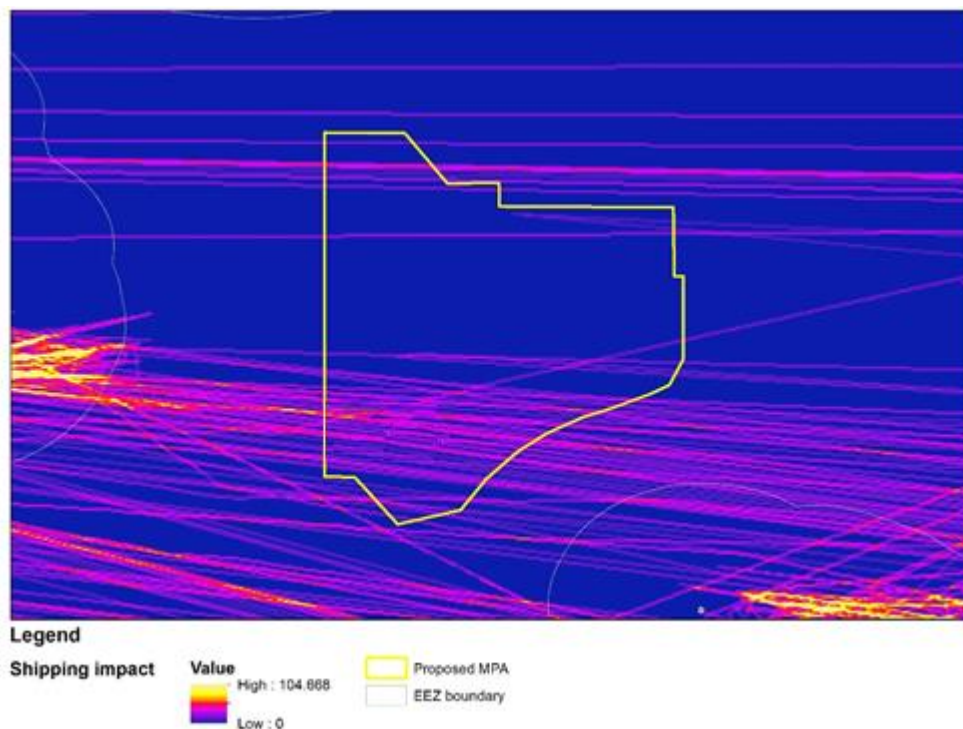


Figure 4. Shipping activity within the [proposed] MPA. Shipping data from Halpern et al. 2015.

Extractive industries

The [proposed] MPA does not overlap any current direct oil and gas activity or extractive mining activities, or current exploration licenses (Figure 4). The Jeanne d'Arc Basin off the Newfoundland coast contains the Hibernia oil field, with the Hebron oil platform currently operational⁷. The oil field is located in close proximity to the Flemish Cap, which itself is not distant from the western boundary of the [proposed] MPA. The complex oceanography of this region means that any oil spill occurring on the Grand Banks and Flemish Cap could potentially move quickly into the [proposed] MPA.

⁷ Jeanne d'Arc Region: Significant Discovery Areas <http://www.cnlopb.ca/pdfs/maps/jdasda.pdf?lbisphreq=1>

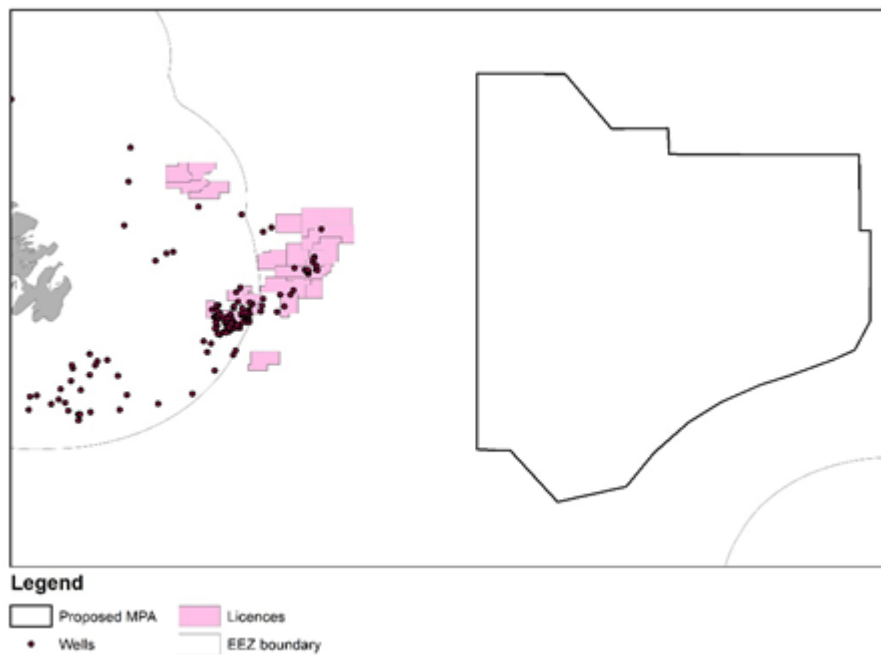


Figure 5. Oil and gas licences and wells off Newfoundland and Labrador, Canada to the west of the [proposed] MPA boundary. Data source: Canada-Newfoundland and Labrador Offshore Petroleum Board <http://www.cnlopb.ca/information/shapefiles.php>

5. Scientific value

The [proposed] MPA is a unique site in the North East Atlantic, oceanographically as well as ecologically. It demonstrates a high abundance and diversity of seabirds, and also is also an important area for other non-seabird taxa, including cetaceans, turtles, elasmobranchs and fish. It also encompasses important foraging areas for threatened species.

The [proposed] MPA encloses a globally unique location; a region of year-round vigorous horizontal and vertical mixing where waters from the tropical/subtropical Atlantic encounter water from the subpolar Atlantic and from the Arctic Ocean, promoting enhanced primary productivity and diversity.

The interaction between the unique oceanographic setting, the deep bathymetry and the ecology- from benthic, mesopelagic and pelagic species- remains poorly understood, and offers excellent opportunities for innovative scientific research.

Due to the knowledge gaps associated with the area, a Research and Monitoring Plan (see section C) is proposed to enable an evaluation of the attributes of the [proposed] MPA relative to its specific objectives, and to improve understanding of these attributes. In addition, it could include identification of a number of elements for scientific research consistent with the objectives of the [proposed] MPA, and a monitoring plan that will help evaluate the extent to which these objectives are being achieved.

C. Proposed management and protection status

1. Proposed management

The MPA shall be based on the best possible scientific foundation, seeking a sound balance between use and preservation, respecting that any protective measures shall not prevent sustainable use, provided that this is not contrary to the conservation objectives.

With respect to the three OSPAR listed seabird species using the [proposed] site, a number of measures that refer to the designation of a MPA and proposed management actions have been agreed by OSPAR through adoption of OSPAR Recommendations.

The 'OSPAR Recommendation 2011/5 on furthering the protection and conservation of the Black-legged kittiwake' notes among other issues that the species is particularly sensitive to decline in the availability of key prey species and recommends management action to be taken by each Contracting Party and measures to be taken by Contracting Parties acting collectively within the framework of the OSPAR Commission. Measures of relevance in relation to the proposed conservation objectives referred to in this nomination proforma include:

- §3.1 c. consider whether any sites within its jurisdiction justify selection as Marine Protected Areas for the protection of populations of and critical habitats for the Black-legged kittiwake;
- §3.1 d. in accordance with OSPAR Recommendation 2003/3 as amended by OSPAR Recommendation 2010/2, report to the OSPAR Commission on sites selected for inclusion as components of the OSPAR Network of Marine Protected Areas and develop appropriate management plans and measures that include the conservation of the Black-legged kittiwake;
- §3.1 e. promote monitoring and assessment programmes for the Black-legged kittiwake and contribute to the development of a data collation strategy;
- §3.1 f. raise awareness of the status and threats to the Black-legged kittiwake among management authorities, users of the marine environment and the general public;
- §3.2 c. bring to the attention of relevant competent authorities the status of and threats to the Black-legged kittiwake.

The 'OSPAR Recommendation 2011/3 on furthering the protection and conservation of the Little shearwater' notes among other issues the significant loss of suitable breeding habitat in Region V for the species, and recommends management action to be taken by each Contracting Party and measures to be taken by Contracting Parties acting collectively within the framework of the OSPAR Commission. Measures of relevance in relation to the proposed conservation objectives referred to in this nomination proforma include:

- §3.1 c. consider whether any sites within its jurisdiction justify selection as Marine Protected Areas for the protection of populations of and critical habitats for the Little shearwater;
- §3.1 d. in accordance with OSPAR Recommendation 2003/3 as amended by OSPAR Recommendation 2001/2, report to the OSPAR Commission on sites selected for inclusion as components of the OSPAR Network of Marine Protected Areas and develop appropriate management plans and measures that include the conservation of the Little shearwater;

- §3.1 e. promote monitoring and assessment programmes for the Little shearwater and contribute to the development of a data collation strategy;
- §3.2 a. (i) regular reporting at-sea sightings in the Bay of Biscay and ore northern waters, including any information on identification of main feeding areas where possible;
- §3.2 c. bring to the attention of relevant competent authorities the status of and threats to the Little shearwater, and the need for (ii) further research on possible effects of light pollution.

The 'OSPAR Recommendation 2011/7 on furthering the protection and conservation of the Thick-billed murre' notes among other issues the significant decline suffered by the species and its particular vulnerability to climate change, and recommends management action to be taken by each Contracting Party and measures to be taken by Contracting Parties acting collectively within the framework of the OSPAR Commission. Measures of relevance in relation to the proposed conservation objectives referred to in this nomination proforma include:

- §3.1 c. consider whether any sites within its jurisdiction justify selection as Marine Protected Areas for the protection of populations of and critical habitats for the Thick-billed murre;
- §3.1 d. in accordance with OSPAR Recommendation 2003/3 as amended by OSPAR Recommendation 2010/2, report to the OSPAR Commission on sites selected for inclusion as components of the OSPAR Network of Marine Protected Areas and develop appropriate management plans and measures that include the conservation of the Thick-billed murre;
- §3.1 e. promote monitoring and assessment programmes for the Thick-billed murre and contribute to the development of a data collation strategy;
- §3.1 g. support, promote and cooperate with the Arctic Council Conservation of Arctic Flora and Fauna (CAFF) 'Circumpolar Murre Banding Programme';
- §3.2 a. develop and implement a monitoring and assessment strategy and data collection tools to promote and coordinate the collection of information on distribution, status of, threats to and impacts on the species ... (iii) regular reporting on mortality of this species through fisheries bycatch (including where possible data on geographical location of bycatch, and types of gear involved), oil pollution and hunting.

In addition, the Arctic Council has an International Murre Conservation Strategy and Action Plan, which includes this species (CAFF 1996). The CAFF Action Plan and the OSPAR recommended measures include the identification and designation of MPAs for this species (CAFF 1996; OSPAR 2009c).

Human Pressures

The following actual or potential pressures and human activities within the boundary of the [proposed] MPA or the broader region will or might need regulation through a management plan and collaboration with relevant organisation and fora:

- a. Deep sea and high seas fishing using fixed and mobile gears (both at the seabed and in the water column)
- b. Vessel traffic, discharging and depositing
- c. Seabed mining or other resource exploitation
- d. Marine scientific research
- e. Cable laying

f. Underwater noise

A Research and Monitoring plan could be established which would identify scientific research and monitoring activities to inform and support the management of the [proposed] North Atlantic Current and Evlanov Seamount High Seas MPA.

Research and monitoring activities would include:

1. Scientific research pursuant to MPA objectives
 - a. To evaluate the attributes of the MPA relative to its specific objectives, and to enhance understanding of these attributes
2. Long-term monitoring to determine the degree to which specific MPA objectives are being met
 - a. To inform the management of the MPA and management activities undertaken within the MPA
3. Other research consistent with the specific MPA objectives
 - a. To provide new information about the features within the MPA

A Research and Monitoring Plan for the [proposed] North Atlantic Current and Evlanov Seamount High Seas MPA could include a multi-disciplinary research cruise to the area once every five years, with activities to include: monitoring of oceanography and/climatic changes; collection of information on trophic dynamics and predator/prey distribution; monitoring of both adult and non-breeding seabirds (tagging); Ongoing monitoring of multi-taxa bycatch in fisheries (through on-board observer programmes and log book reporting) would also provide information on potential interactions between pelagic species and fisheries within the region.

2. Any existing or proposed legal status

- I National legal status (e.g., nature reserve, national park): Not applicable as the [proposed] area is beyond national jurisdiction.
- II Other international legal status (e.g., NATURA 2000, Ramsar): None
-

Presented by

Contracting Party: xxx

Date: xx/xx/2019

References

- Acha E.M., Piola A., Iribarne O., Mianzan H. (2015) *Ecological processes at marine fronts: oases in the ocean*. Springer.
- Anderson O.R., Small C.J., Croxall J.P. *et al.* (2011) Global seabird bycatch in longline fisheries. *Endangered Species Research* **14**, 91-106.
- Augé A.A., Lascelles B., Dias M. (2015) Marine Spatial Planning for the Falkland Islands. *Methodology for identification of important areas for marine megafauna'workshop report* South Atlantic Environmental Research Institute, Stanley, Falkland Islands.
- Azetsu-Scott K., Petrie B., Yeats P., Lee C. (2012) Composition and fluxes of freshwater through Davis Strait using multiple chemical tracers. *Journal of Geophysical Research: Oceans* **117**.
- Beaugrand G., Ibañez F., Lindley J.A., Reid P.C. (2002) Diversity of calanoid copepods in the North Atlantic and adjacent seas: species associations and biogeography. *Marine Ecology Progress Series* **232**, 179-195.
- Bennison A., Jessopp M. (2015) At-sea surveys confirm a North Atlantic biodiversity hotspot. *Bird Study* **62**, 262-266.
- BirdLife International. (2015) European Red List of Birds. Office for Official Publications of the European Communities, Luxembourg.
- BirdLife International. (2016a) IUCN Red List for birds.
- Birdlife International. (2016b) Seabird Tracking Database.
- Boertmann D. (2014) Birds off SE and S Greenland, October 2011. *Dansk Ornitologisk Forenings Tidsskrift* **108**, 199-206.
- Boertmann D., Mosbech A. (1998) Distribution of little auk (*Alle alle*) breeding colonies in Thule District, northwest Greenland. *Polar Biology* **19**, 206-210.
- Bogdanova M.I., Daunt F., Newell M., Phillips R.A., Harris M.P., Wanless S. (2011) Seasonal interactions in the black-legged kittiwake, *Rissa tridactyla*: links between breeding performance and winter distribution. *Proceedings of the Royal Society of London B: Biological Sciences*, rspb20102601.
- Bost C.-A., Cotté C., Bailleul F. *et al.* (2009) The importance of oceanographic fronts to marine birds and mammals of the southern oceans. *Journal of Marine Systems* **78**, 363-376.
- Bower A.S., Lozier M.S., Gary S.F., Böning C.W. (2009) Interior pathways of the North Atlantic meridional overturning circulation. *Nature* **459**, 243-247.
- Bower A.S., von Appen W.-J. (2008) Interannual variability in the pathways of the North Atlantic Current over the Mid-Atlantic Ridge and the impact of topography. *Journal of Physical Oceanography* **38**, 104-120.
- Brandt A., Gooday A.J., Brandão S.N. *et al.* (2007) First insights into the biodiversity and biogeography of the Southern Ocean deep sea. *Nature* **447**, 307-311.
- Brooks S. (1934) Oceanic currents and the migration of pelagic birds. *The Condor* **36**, 185-190.

- Burger J., Gochfeld M., Kirwan G.M., Christie D.A. (2013) Black-legged Kittiwake (*Rissa tridactyla*). in J. del Hoyo, A. Elliott, J. Sargatal, D.A. Christie, E. de Juana editors. *Handbook of the Birds of the World Alive*. Lynx Edicions, Barcelona, Spain.
- Burthe S., Daunt F., Butler A. *et al.* (2012) Phenological trends and trophic mismatch across multiple levels of a North Sea pelagic food web. *Marine Ecology Progress Series* **454**, 119-133.
- Butchart S.H., Clarke M., Smith R.J. *et al.* (2015) Shortfalls and solutions for meeting national and global conservation area targets. *Conservation Letters* **8**, 329-337.
- CAFF. (1996) International Murre Conservation Strategy and Action Plan. in C.I. Secretariat editor. Canadian Wildlife Service, Ottawa, Ontario, Canada.
- Cailliet G.M., Cavanagh R.D., Kulka D.W. *et al.* (2009) *Isurus oxyrinchus*. *The IUCN Red List of Threatened Species* 2009: eT39341A10207466. <http://dx.doi.org/10.2305/IUCN.UK.2009-2.RLTS.T39341A10207466.en>.
- Carboneras C., Jutglar F., Kirwan G.M. (2016) Audubon's Shearwater (*Puffinus lherminieri*). in J. del Hoyo, A. Elliott, J. Sargatal, D.A. Christie, E. de Juana editors. *Handbook of the Birds of the World Alive* Lynx Edicions, Barcelona, Spain.
- Clark M.R., Schlacher T.A., Rowden A.A., Stocks K.I., Consalvey M. (2012) Science priorities for seamounts: research links to conservation and management. *PLoS one* **7**, e29232.
- Cordes L.S., Hedworth H.E., Cabot D., Cassidy M., Thompson P.M. (2015) Parallel declines in survival of adult Northern Fulmars *Fulmarus glacialis* at colonies in Scotland and Ireland. *Ibis* **157**, 631-636.
- Croll D.A., Gaston A.J., Burger A.E., Konnoff D. (1992) Foraging behavior and physiological adaptation for diving in thick-billed murre. *Ecology* **73**, 344-356.
- Croxall J.P., Butchart S.H., Lascelles B. *et al.* (2012) Seabird conservation status, threats and priority actions: a global assessment. *Bird Conservation International* **22**, 1-34.
- Daniault N., Mercier H., Lherminier P. *et al.* (2016) The northern North Atlantic Ocean mean circulation in the early 21st century. *Progress in Oceanography* **146**, 142-158.
- Danovaro R., Company J.B., Corinaldesi C. *et al.* (2010) Deep-Sea Biodiversity in the Mediterranean Sea: The Known, the Unknown, and the Unknowable. *PLOS ONE* **5**, e11832.
- Danovaro R., Gambi C., Dell'Anno A. *et al.* (2008) Exponential decline of deep-sea ecosystem functioning linked to benthic biodiversity loss. *Current Biology* **18**, 1-8.
- Daunt F., Afanasyev V., Silk J., Wanless S. (2006) Extrinsic and intrinsic determinants of winter foraging and breeding phenology in a temperate seabird. *Behavioral Ecology and Sociobiology* **59**, 381-388.
- De Korte J. (1985) Ecology of the Long-tailed Skua, *Stercorarius longicaudus* Vieillot, 1819, at Scoresby Sund, East Greenland. Part three: clutch size, laying date and incubation in relation to energy reserves. *Beaufortia* **35**, 93-127.
- Den Hartog J., Clarke M. (1996) A study of stomach contents of Cory's Shearwater, *Calonectris diomedea borealis* (Cory, 1881)(Aves: Procellariidae), from the Macaronesian Islands. *Zoologische Mededeelingen* **70**, 117-133.

- Descamps S., Strøm H., Steen H. (2013) Decline of an arctic top predator: synchrony in colony size fluctuations, risk of extinction and the subpolar gyre. *Oecologia* **173**, 1271-1282.
- Dias M., Granadeiro J., Catry P. (2012a) Do Seabirds Differ from Other Migrants in Their Travel Arrangements? On Route Strategies of Cory's Shearwater during Its Trans-Equatorial Journey. *PLOS ONE* **7**, e49376.
- Dias M.P., Alho M., Granadeiro J.P., Catry P. (2015) Wanderer of the deepest seas: migratory behaviour and distribution of the highly pelagic Bulwer's petrel. *Journal of ornithology* **156**, 955-962.
- Dias M.P., Granadeiro J.P., Catry P. (2012b) Working the day or the night shift? Foraging schedules of Cory's shearwaters vary according to marine habitat. *Marine Ecology Progress Series* **467**, 245-252.
- Dias M.P., Granadeiro J.P., Phillips R.A., Alonso H., Catry P. (2011) Breaking the routine: individual Cory's shearwaters shift winter destinations between hemispheres and across ocean basins. *Proceedings of the Royal Society of London B: Biological Sciences* **278**, 1786-1793.
- Dias M.P., Oppel S., Bond A.L. *et al.* (2017) Using globally threatened pelagic birds to identify priority sites for marine conservation in the South Atlantic Ocean. *Biological Conservation* **211**, 76-84.
- Dias M.P., Romero J., Granadeiro J.P., Catry T., Pollet I.L., Catry P. (2016) Distribution and at-sea activity of a nocturnal seabird, the Bulwer's petrel *Bulweria bulwerii*, during the incubation period. *Deep Sea Research Part I: Oceanographic Research Papers* **113**, 49-56.
- Dickson R., Rudels B., Dye S., Karcher M., Meincke J., Yashayaev I. (2007) Current estimates of freshwater flux through Arctic and subarctic seas. *Progress in Oceanography* **73**, 210-230.
- Dinter W. (2001) *Biogeography of the OSPAR maritime area: a synopsis and synthesis of biogeographical distribution patterns described for the North East Atlantic*. German Federal Agency for Nature Conservation, Bonn, Germany
- Doksæter L., Olsen E., Nøttestad L., Fernö A. (2008) Distribution and feeding ecology of dolphins along the Mid-Atlantic Ridge between Iceland and the Azores. *Deep Sea Research Part II: Topical Studies in Oceanography* **55**, 243-253.
- Dunn E. (2007) The case for a Community Plan of Action for reducing incidental catch of seabirds in longline fisheries. BirdLife International, Cambridge, UK.
- Durant J.M., Anker-Nilssen T., Stenseth N.C. (2003) Trophic interactions under climate fluctuations: the Atlantic puffin as an example. *Proceedings of the Royal Society of London B: Biological Sciences* **270**, 1461-1466.
- Dutkiewicz S., Rothstein L., Rossby T. (2001) Pathways of cross-frontal exchange in the North Atlantic Current. *Journal of Geophysical Research: Oceans* **106**, 26917-26928.
- Eckert S.A. (2006) High-use oceanic areas for Atlantic leatherback sea turtles (*Dermochelys coriacea*) as identified using satellite telemetered location and dive information. *Marine Biology* **149**, 1257-1267.
- Edwards E.W., Quinn L.R., Thompson P.M. (2016) State-space modelling of geolocation data reveals sex differences in the use of management areas by breeding northern fulmars. *Journal of Applied Ecology* **53**, 1880-1889.

- Egevang C., Stenhouse I.J., Phillips R.A., Petersen A., Fox J.W., Silk J.R. (2010) Tracking of Arctic terns *Sterna paradisaea* reveals longest animal migration. *Proceedings of the National Academy of Sciences* **107**, 2078-2081.
- Einoder L.D. (2009) A review of the use of seabirds as indicators in fisheries and ecosystem management. *Fisheries Research* **95**, 6-13.
- Fagundes A.I., Ramos J.A., Ramos U., Medeiros R., Paiva V.H. (2016) Breeding biology of a winter-breeding procellariiform in the North Atlantic, the Macaronesian shearwater *Puffinus lherminieri baroli*. *Zoology* **119**, 421-429.
- Falk K., Durinck J. (1993) The winter diet of thick-billed murre, *Uria lomvia*, in western Greenland, 1988–1989. *Canadian journal of zoology* **71**, 264-272.
- Falk K., Jensen J.-K., Kampp K. (1992) Winter diet of Atlantic puffins (*Fratercula arctica*) in the northeast Atlantic. *Colonial Waterbirds*, 230-235.
- FAO. (2009) International guidelines for the management of deep-sea fisheries in the high seas. Food and Agriculture Organization of the United Nations. , Rome, Italy.
- Fauchald P., Anker-Nilssen T., Barrett R. *et al.* (2015) The status and trends of seabirds breeding in Norway and Svalbard. *NINA Report 1151* Norwegian Institute for Nature Research, Trondheim, NORWAY.
- Fayet A.L., Freeman R., Shoji A. *et al.* (2016) Drivers and fitness consequences of dispersive migration in a pelagic seabird. *Behavioral Ecology* **27**, 1061-1072.
- Fort J., Beaugrand G., Grémillet D., Phillips R.A. (2012) Biologging, remotely-sensed oceanography and the continuous plankton recorder reveal the environmental determinants of a seabird wintering hotspot. *Plos One* **7**, e41194.
- Fort J., Cherel Y., Harding A.M. *et al.* (2010a) The feeding ecology of little auks raises questions about winter zooplankton stocks in North Atlantic surface waters. *Biology letters* **6**, 682-684.
- Fort J., Cherel Y., Harding A.M. *et al.* (2010b) Geographic and seasonal variability in the isotopic niche of little auks. *Marine Ecology Progress Series* **414**, 293-302.
- Fort J., Lacoue-Labarthe T., Nguyen H.L., Boué A., Spitz J., Bustamante P. (2015) Mercury in wintering seabirds, an aggravating factor to winter wrecks? *Science of the Total Environment* **527**, 448-454.
- Fort J., Porter W.P., Grémillet D. (2009) Thermodynamic modelling predicts energetic bottleneck for seabirds wintering in the northwest Atlantic. *Journal of Experimental Biology* **212**, 2483-2490.
- Fort J., Steen H., Strøm H. *et al.* (2013) Energetic consequences of contrasting winter migratory strategies in a sympatric Arctic seabird duet. *Journal of avian biology* **44**, 255-262.
- Fossette S., Girard C., López-Mendilaharsu M. *et al.* (2010) Atlantic leatherback migratory paths and temporary residence areas. *PLoS One* **5**, e13908.
- Fowler S.L. (2005) *Cetorhinus maximus*. . *The IUCN Red List of Threatened Species 2005*: eT4292A10763893 <http://dx.doi.org/10.2305/IUCN.UK.2005.RLTS.T4292A10763893.en>.

- Fratantoni P.S., McCartney M.S. (2010) Freshwater export from the Labrador Current to the North Atlantic Current at the Tail of the Grand Banks of Newfoundland. *Deep Sea Research Part I: Oceanographic Research Papers* **57**, 258-283.
- Frederiksen M., Anker-Nilssen T., Beaugrand G., Wanless S. (2013) Climate, copepods and seabirds in the boreal Northeast Atlantic—current state and future outlook. *Global Change Biology* **19**, 364-372.
- Frederiksen M., Descamps S., Erikstad K.E. *et al.* (2016) Migration and wintering of a declining seabird, the thick-billed murre *Uria lomvia*, on an ocean basin scale: Conservation implications. *Biological Conservation* **200**, 26-35.
- Frederiksen M., Moe B., Daunt F. *et al.* (2012) Multicolony tracking reveals the winter distribution of a pelagic seabird on an ocean basin scale. *Diversity and Distributions* **18**, 530-542.
- Furness R.W., Camphuysen K. (1997) Seabirds as monitors of the marine environment. *ICES Journal of marine Science* **54**, 726-737.
- Gaard E., Gislason A., Falkenhaus T. *et al.* (2008) Horizontal and vertical copepod distribution and abundance on the Mid-Atlantic Ridge in June 2004. *Deep Sea Research Part II: Topical Studies in Oceanography* **55**, 59-71.
- Game E.T., Grantham H.S., Hobday A.J. *et al.* (2009) Pelagic protected areas: the missing dimension in ocean conservation. *Trends in ecology & evolution* **24**, 360-369.
- Garðarsson A., Guðmundsson G.A., Lilliendahl K. (2016) Svartfugl í íslenskum fuglabjörgum 2006-2008. (Numbers of Murres (*Uria aalge* and *U. lomvia*) and Razorbills (*Alca torda*) in Iceland in 2006-2008). *Bliki* **33**.
- Gaston A.J. (1985) The diet of Thick-billed Murre chicks in the eastern Canadian Arctic. *The Auk*, 727-734.
- Gaston A.J., Smith P.A., Tranquilla L.M. *et al.* (2011) Movements and wintering areas of breeding age Thick-billed Murre *Uria lomvia* from two colonies in Nunavut, Canada. *Marine biology* **158**, 1929-1941.
- Gilg O., Moe B., Hanssen S.A. *et al.* (2013) Trans-equatorial migration routes, staging sites and wintering areas of a high-arctic avian predator: the long-tailed skua (*Stercorarius longicaudus*). *PloS one* **8**, e64614.
- Gjøsaeter J., Kawaguchi K. (1980) A review of the world resources of mesopelagic fish. pp. 193-199. *FAO Fisheries Technical Paper 193* Food & Agriculture Organisation, Rome, Italy.
- Godø O.R., Samuelsen A., Macaulay G.J. *et al.* (2012) Mesoscale eddies are oases for higher trophic marine life. *PloS one* **7**, e30161.
- Gore M.A., Rowat D., Hall J., Gell F.R., Ormond R.F. (2008) Transatlantic migration and deep mid-ocean diving by basking shark. *Biology letters* **4**, 395-398.
- Granadeiro J.P., Monteiro L.R., Furness R.W. (1998) Diet and feeding ecology of Cory's shearwater *Calonectris diomedea* in the Azores, north-east Atlantic. *Marine Ecology Progress Series*, 267-276.
- Granadeiro J.P., Monteiro L.R., Silva M.C., Furness R.W. (2002) Diet of common terns in the Azores, Northeast Atlantic. *Waterbirds* **25**, 149-155.

- Grassle J.F. (1996) Deep-ocean Biodiversity pp. 104-106 in D. Castri, T. Younes editors. *Biodiversity Science and Development Towards a New Partnership* CAB International.
- Grecian W.J., Witt M.J., Attrill M.J. *et al.* (2016) Seabird diversity hotspot linked to ocean productivity in the Canary Current Large Marine Ecosystem. *Biology letters* **12**, 20160024.
- Grosbois V., Thompson P.M. (2005) North Atlantic climate variation influences survival in adult fulmars. *Oikos* **109**, 273-290.
- Guilford T., Meade J., Willis J. *et al.* (2009) Migration and stopover in a small pelagic seabird, the Manx shearwater *Puffinus puffinus*: insights from machine learning. *Proceedings of the Royal Society of London B: Biological Sciences*, rspb. 2008.1577.
- Haney J.C. (1986) Seabird segregation at Gulf Stream frontal eddies. *Marine Ecology Progress Series*, 279-285.
- Harding A.M., Piatt J.F., Sydeman W.J. (2006) Bibliography of literature on seabirds as indicators of the marine environment. *Science* **231**, 373-376.
- Harris M.P., Daunt F., Newell M., Phillips R.A., Wanless S. (2010) Wintering areas of adult Atlantic puffins *Fratercula arctica* from a North Sea colony as revealed by geolocation technology. *Marine Biology* **157**, 827-836.
- Harris M.P., Leopold M.F., Jensen J.K., Meesters E.H., Wanless S. (2015) The winter diet of the Atlantic Puffin *Fratercula arctica* around the Faroe Islands. *Ibis* **157**, 468-479.
- Hatch S.A. (2013) Kittiwake diets and chick production signal a 2008 regime shift in the Northeast Pacific. *Marine Ecology Progress Series* **477**, 271-284.
- Hays G.C., Houghton J.D., Myers A.E. (2004) Endangered species: pan-Atlantic leatherback turtle movements. *Nature* **429**, 522-522.
- Hedd A., Montevecchi W.A., Otley H., Phillips R.A., Fifield D.A. (2012) Trans-equatorial migration and habitat use by sooty shearwaters *Puffinus griseus* from the South Atlantic during the nonbreeding season. *Marine Ecology Progress Series* **449**, 277-290.
- Heezen B.C., Johnson G.L., Hollister C.D. (1969) The Northwest Atlantic mid-ocean canyon. *Canadian Journal of Earth Sciences* **6**, 1441-1453.
- Helaouët P., Beaugrand G. (2007) Macroecology of *Calanus finmarchicus* and *C. helgolandicus* in the North Atlantic Ocean and adjacent seas. *Marine Ecology Progress Series* **345**, 147-165.
- Hesse R., Chough S.K., Rakofsky A. (1987) The Northwest Atlantic Mid-Ocean Channel of the Labrador Sea. V. sedimentology of a giant deep-sea channel. *Canadian Journal of Earth Sciences* **24**, 1595-1624.
- Huettmann F., Diamond A. (2006) Large-scale effects on the spatial distribution of seabirds in the Northwest Atlantic. *Landscape Ecology* **21**, 1089-1108.
- Hyrenbach D.K., Veit R.R., Weimerskirch H., Metzl N., Hunt Jr G.L. (2007) Community structure across a large-scale ocean productivity gradient: Marine bird assemblages of the Southern Indian Ocean. *Deep Sea Research Part I: Oceanographic Research Papers* **54**, 1129-1145.

- Irons D.B., ANKER-NILSSEN T., Gaston A.J. *et al.* (2008) Fluctuations in circumpolar seabird populations linked to climate oscillations. *Global Change Biology* **14**, 1455-1463.
- Jespersen P. (1924) The frequency of birds over the high Atlantic Ocean. *Nature* **114**, 281-283.
- Jespersen P. (1930) *Ornithological Observations in the North Atlantic Ocean; with 19 Figures in the Text*. Gyldendal.
- JNCC. (2017) Marine SAC Selection Factsheet for Bottlenose Dolphin.
- Karnovsky N.J., Hobson K.A., Iverson S., Hunt Jr G.L. (2008) Seasonal changes in diets of seabirds in the North Water Polynya: a multiple-indicator approach. *Marine Ecology Progress Series* **357**, 291-299.
- Karnovsky N.J., Hunt G.L. (2002) Estimation of carbon flux to dovekeys (*Alle alle*) in the North Water. *Deep Sea Research Part II: Topical Studies in Oceanography* **49**, 5117-5130.
- Kim S.-S., Wessel P. (2011) New global seamount census from altimetry-derived gravity data. *Geophysical Journal International* **186**, 615-631.
- Kopp M., Peter H.-U., Mustafa O. *et al.* (2011) South polar skuas from a single breeding population overwinter in different oceans though show similar migration patterns. *Marine Ecology Progress Series* **435**, 263-267.
- Kukkala A., Santangeli A., Butchart S. *et al.* (2016) Coverage of vertebrate species distributions by Important Bird and Biodiversity Areas and Special Protection Areas in the European Union. *Biological Conservation* **202**, 1-9.
- Lascelles B.G., Langham G.M., Ronconi R.A., Reid J.B. (2012) From hotspots to site protection: Identifying Marine Protected Areas for seabirds around the globe. *Biological Conservation* **156**, 5-14.
- Lascelles B.G., Taylor P., Miller M. *et al.* (2016) Applying global criteria to tracking data to define important areas for marine conservation. *Diversity and Distributions* **22**, 422-431.
- Lazier J.R. (1994) Observations in the northwest corner of the North Atlantic Current. *Journal of Physical Oceanography* **24**, 1449-1463.
- Letessier T., Pond D.W., McGill R.A., Reid W.D., Brierley A.S. (2012) Trophic interaction of invertebrate zooplankton on either side of the Charlie Gibbs Fracture Zone/Subpolar Front of the Mid-Atlantic Ridge. *Journal of marine systems* **94**, 174-184.
- Letessier T.B., Falkenhaus T., Debes H., Bergstad O.A., Brierley A.S. (2011) Abundance patterns and species assemblages of euphausiids associated with the Mid-Atlantic Ridge, North Atlantic. *Journal of Plankton Research* **33**, 1510-1525.
- Lewison R.L., Freeman S.A., Crowder L.B. (2004) Quantifying the effects of fisheries on threatened species: the impact of pelagic longlines on loggerhead and leatherback sea turtles. *Ecology letters* **7**, 221-231.
- Longhurst A.R. (2010) *Ecological geography of the sea*. Academic Press, San Diego, USA.
- Madeiros J., Flood B., Zufelt K. (2013) Conservation and at-sea range of Bermuda Petrel (*Pterodroma cahow*).

- Magnusdottir E., Leat E.H., Bourgeon S. *et al.* (2012) Wintering areas of great skuas *Stercorarius skua* breeding in Scotland, Iceland and Norway. *Bird Study* **59**, 1-9.
- Mallory M.L., Gilchrist H.G., Braune B.M., Gaston A.J. (2006) Marine birds as indicators of Arctic marine ecosystem health: Linking the Northern Ecosystem Initiative to long-term studies. *Environmental Monitoring and Assessment* **113**, 31-48.
- McKittrick T. (1931) Occurrence, of Kittiwakes on North Atlantic Steamer-routes. *Ibis* **73**, 654-661.
- Mehlum F., Gabrielsen G. (1993) The diet of high-arctic seabirds in coastal and ice-covered, pelagic areas near the Svalbard archipelago. *Polar research* **12**, 1-20.
- Mehlum F., Gabrielsen G. (1995) Energy expenditure and food consumption by seabird populations in the Barents Sea region. pp. 457-470 in H.R. Skjoldal, C. Hopkins, K.E. Erikstad, H.P. Leinaas editors. *Ecology of fjords and coastal waters*. Elsevier, Amsterdam.
- Merkel F.R., Johansen K.L. (2011) Light-induced bird strikes on vessels in Southwest Greenland. *Marine pollution bulletin* **62**, 2330-2336.
- Miles W.T., Mavor R., Riddiford N.J. *et al.* (2015) Decline in an Atlantic Puffin Population: Evaluation of Magnitude and Mechanisms. *PloS one* **10**, e0131527.
- Morato T., Miller P.I., Dunn D.C., Nicol S.J., Bowcott J., Halpin P.N. (2016) A perspective on the importance of oceanic fronts in promoting aggregation of visitors to seamounts. *Fish and Fisheries* **17**, 1227-1233.
- Mosbech A., Johansen K.L., Bech N.I. *et al.* (2012) Inter-breeding movements of little auks *Alle alle* reveal a key post-breeding staging area in the Greenland Sea. *Polar Biology* **35**, 305-311.
- Neves V.C., Bried J., González-Solís J., Roscales J.L., Clarke M.R. (2012) Feeding ecology and movements of the Barolo shearwater *Puffinus baroli baroli* in the Azores, NE Atlantic. *Marine Ecology Progress Series* **452**, 269-285.
- Orben R.A. (2014) Comparative non-breeding foraging ecology of surface foraging kittiwakes (*Rissa sp.*) and deep diving thick-billed murre (*Uria lomvia*). University of California, Santa Cruz, USA.
- Orben R.A., Paredes R., Roby D.D., Irons D.B., Shaffer S.A. (2015) Body size affects individual winter foraging strategies of thick-billed murre in the Bering Sea. *Journal of Animal Ecology* **84**, 1589-1599.
- Oschlies A., Garçon V. (1998) Eddy-induced enhancement of primary production in a model of the North Atlantic Ocean. *Nature* **394**, 266-269.
- OSPAR. (2009a) Background Document for Black-legged kittiwakes *Rissa tridactyla* Biodiversity and Ecosystems Series. . The Convention for the Protection of the Marine Environment of the North-East Atlantic, London, United Kingdom.
- OSPAR. (2009b) Background Document for Little shearwater *Puffinus assimilis baroli*. *Biodiversity and Ecosystems Series*. The Convention for the Protection of the Marine Environment of the North-East Atlantic., London, United Kingdom.
- OSPAR. (2009c) Background Document for Thick-billed Murre *Uria lomvia*. *Biodiversity and Ecosystems Series* The Convention for the Protection of the Marine Environment of the North-East Atlantic, London, United Kingdom.

- OSPAR. (2010a) 10/23/1-E, Annex 34. *OSPAR Decision 2010/1 on the Establishment of the Milne Seamount Complex Marine Protected Area.*
- OSPAR. (2010b) 10/23/1-E, Annex 42. *Decision 2010/5 on the Establishment of the Josephine Seamount High Seas Marine Protected Area.*
- OSPAR. (2010c) Background Document for Blue whale *Balaenoptera musculus*. . *Biodiversity and Ecosystems Series* The Convention for the Protection of the Marine Environment of the North-East Atlantic, London, United Kingdom.
- OSPAR. (2010d) OSPAR 10/23/1-E, Annex 36. *OSPAR Decision 2010/2 on the establishment of the Charlie-Gibbs South Marine Protected Area.*
- OSPAR. (2010e) OSPAR 10/23/1-E, Annex 38. *OSPAR Decision 2010/3 on the Establishment of the Altair Seamount High Seas Marine Protected Area.*
- OSPAR. (2010f) OSPAR 10/23/1-E, Annex 40. *OSPAR Decision 2010/4 on the Establishment of the Antialtair Seamount High Seas Marine Protected Area.*
- OSPAR. (2010g) OSPAR 10/23/1-E, Annex 44. *OSPAR Decision 2010/6 on the Establishment of the MAR North of the Azores High Seas Marine Protected Area.*
- OSPAR. (2013) An assessment of the ecological coherence of the OSPAR Network of Marine Protected Areas in 2012. . in J. Ardron, D. Billet., T. Hooper, T. Mullier editors. The Convention for the Protection of the Marine Environment of the North-East Atlantic, London, United Kingdom. .
- OSPAR. (2014) Background Document for Atlantic Bluefin tuna. *Biodiversity and Ecosystems Series* The Convention for the Protection of the Marine Environment of the North-East Atlantic, London, United Kingdom.
- OSPAR. (2017) Online MPA datasheets. OSPAR Commission.
- Paiva V.H., Fagundes A.I., Romão V., Gouveia C., Ramos J.A. (2016) Population-scale foraging segregation in an apex predator of the North Atlantic. *PloS one* **11**, e0151340.
- Paredes R., Orben R.A., Suryan R.M. *et al.* (2014) Foraging responses of black-legged kittiwakes to prolonged food-shortages around colonies on the Bering Sea shelf. *PloS one* **9**, e92520.
- Pelegri J., Marrero-Díaz A., Ratsimandresy A. (2006) Nutrient irrigation of the North Atlantic. *Progress in Oceanography* **70**, 366-406.
- Petry M.V., da Silva Fonseca V.S., Krüger-Garcia L., da Cruz Piuco R., Brummelhaus J. (2008) Shearwater diet during migration along the coast of Rio Grande do Sul, Brazil. *Marine Biology* **154**, 613-621.
- Polovina J.J., Howell E., Kobayashi D.R., Seki M.P. (2001) The transition zone chlorophyll front, a dynamic global feature defining migration and forage habitat for marine resources. *Progress in Oceanography* **49**, 469-483.
- Priede I.G., Billett D.S., Brierley A.S. *et al.* (2013) The ecosystem of the Mid-Atlantic Ridge at the sub-polar front and Charlie–Gibbs Fracture Zone; ECO-MAR project strategy and description of the sampling programme 2007–2010. *Deep Sea Research Part II: Topical Studies in Oceanography* **98**, 220-230.

- Prieto R., Silva M.A., Waring G.T., Gonçalves J.M. (2014) Sei whale movements and behaviour in the North Atlantic inferred from satellite telemetry. *Endangered Species Research* **26**, 103-113.
- Queiroz N., Humphries N.E., Mucientes G. *et al.* (2016) Ocean-wide tracking of pelagic sharks reveals extent of overlap with longline fishing hotspots. *Proceedings of the National Academy of Sciences* **113**, 1582-1587.
- Ramirez-Llodra E., Tyler P.A., Baker M.C. *et al.* (2011) Man and the last great wilderness: human impact on the deep sea. *PLoS One* **6**, e22588.
- Ramírez I., Paiva V.H., Menezes D. *et al.* (2013) Year-round distribution and habitat preferences of the Bugio petrel. *Marine Ecology Progress Series* **476**, 269-284.
- Ramirez I., Tarzia M., Dias M. *et al.* (2017) How well is the EU protecting its seabirds? Progress in implementing the Birds Directive at sea. *Marine Policy* **81**, 179-184.
- Ramos R., Granadeiro J.P., Rodríguez B. *et al.* (2013) Meta-population feeding grounds of Cory's shearwater in the subtropical Atlantic Ocean: implications for the definition of marine protected areas based on tracking studies. *Diversity and Distributions* **19**, 1284-1298.
- Ramos R., Ramírez I., Paiva V.H. *et al.* (2016) Global spatial ecology of three closely-related gadfly petrels. *Scientific reports* **6**.
- Reid J.B., Anker-Nilssen. T., Arcos J. *et al.* (2008) Bycatch of seabirds on longlines in the north-east Atlantic and Mediterranean Sea. *ICES Working Group on Seabird Ecology (WGSE)*. ICES CM
- Reilly S.B., Bannister J.L., Best P.B. *et al.* (2013) *Balaenoptera physalus*. *The IUCN Red List of Threatened Species 2013*: eT2478A44210520
- Renner H.M., Mueter F., Drummond B.A., Warzybok J.A., Sinclair E.H. (2012) Patterns of change in diets of two piscivorous seabird species during 35 years in the Pribilof Islands. *Deep Sea Research Part II: Topical Studies in Oceanography* **65**, 273-291.
- Rhein M., Kieke D., Hüttel-Kabus S. *et al.* (2011) Deep water formation, the subpolar gyre, and the meridional overturning circulation in the subpolar North Atlantic. *Deep Sea Research Part II: Topical Studies in Oceanography* **58**, 1819-1832.
- Roessler A., Rhein M., Kieke D., Mertens C. (2015) Long-term observations of North Atlantic Current transport at the gateway between western and eastern Atlantic. *Journal of Geophysical Research: Oceans* **120**, 4003-4027.
- Ronconi R.A., Lascelles B.G., Langham G.M., Reid J.B., Oro D. (2012) The role of seabirds in Marine Protected Area identification, delineation, and monitoring: introduction and synthesis. Elsevier.
- Rosing-Asvid A., Hedeholm R., Arendt K., Fort J., Robertson G. (2013) Winter diet of the little auk (*Alle alle*) in the Northwest Atlantic. *Polar biology* **36**, 1601-1608.
- Rosby T. (1996) The North Atlantic Current and surrounding waters: At the crossroads. *Reviews of Geophysics* **34**, 463-481.
- Sage B.L. (1968) Ornithological transects in the North Atlantic. *Ibis* **110**, 1-16.

- Santos R.S., Tempera F., Menezes G., Porteiro F., Morato T. (2010) Sedlo Seamount. *Oceanography* **23**, 202-203.
- Scales K.L., Miller P.I., Hawkes L.A., Ingram S.N., Sims D.W., Votier S.C. (2014) On the Front Line: frontal zones as priority at-sea conservation areas for mobile marine vertebrates. *Journal of Applied Ecology* **51**, 1575-1583.
- Schreiber E.A., Burger J. (2001) *Biology of marine birds*. CRC Press.
- Schwemmer P., Mendel B., Sonntag N., Dierschke V., Garthe S. (2011) Effects of ship traffic on seabirds in offshore waters: implications for marine conservation and spatial planning. *Ecological Applications* **21**, 1851-1860.
- Silva M.A., Prieto R., Cascão I. *et al.* (2014) Spatial and temporal distribution of cetaceans in the mid-Atlantic waters around the Azores. *Marine Biology Research* **10**, 123-137.
- Silva M.A., Prieto R., Jonsen I., Baumgartner M.F., Santos R.S. (2013) North Atlantic blue and fin whales suspend their spring migration to forage in middle latitudes: building up energy reserves for the journey? *PLoS One* **8**, e76507.
- Silva M.A., Prieto R., Magalhães S. *et al.* (2003) Occurrence and distribution of cetaceans in the waters around the Azores (Portugal), Summer and Autumn 1999-2000. *Aquatic Mammals* **29**, 77-83.
- Sittler B., Aebischer A., Gilg O. (2011) Post-breeding migration of four Long-tailed Skuas (*Stercorarius longicaudus*) from North and East Greenland to West Africa. *Journal of Ornithology* **152**, 375-381.
- Skov H., Gunnlaugsson T., Budgell W. *et al.* (2008) Small-scale spatial variability of sperm and sei whales in relation to oceanographic and topographic features along the Mid-Atlantic Ridge. *Deep Sea Research Part II: Topical Studies in Oceanography* **55**, 254-268.
- Smith P.A., Gaston A.J. (2012) Environmental variation and the demography and diet of thick-billed murre. *Marine Ecology Progress Series* **454**, 237-249.
- Soanes L., Bright J., Carter D. *et al.* (2016) Important foraging areas of seabirds from Anguilla, Caribbean: Implications for marine spatial planning. *Marine Policy* **70**, 85-92.
- Spalding M.D., Agostini V.N., Rice J., Grant S.M. (2012) Pelagic provinces of the world: a biogeographic classification of the world's surface pelagic waters. *Ocean & coastal management* **60**, 19-30.
- Stempniewicz L. (2001) Alle alle little auk. *The Journal of the Birds of the Western Palearctic Oxford University Press BWP Update* **3**, 175-201.
- Sweetman C.J., Sutton T., Vecchione M., Latour R.J. (2013) Distribution of the biomass-dominant pelagic fish, *Bathylagus euryops* (Argentiniformes: Microstomatidae), along the northern Mid-Atlantic Ridge. *Deep Sea Research Part I: Oceanographic Research Papers* **78**, 16-23.
- Taylor J.R., Ferrari R. (2011) Ocean fronts trigger high latitude phytoplankton blooms. *Geophysical Research Letters* **38**.
- Thompson S.A., Sydeman W.J., Santora J.A. *et al.* (2012) Linking predators to seasonality of upwelling: using food web indicators and path analysis to infer trophic connections. *Progress in Oceanography* **101**, 106-120.

- Thorvaldsen R., Barrett R.T., Pedersen T. (2015) Black-legged Kittiwake *Rissa tridactyla* adults and chicks share the same diet in the southern Barents Sea. *Marine Ornithology* **43**, 95-100.
- Torres L.G., Sutton P.J.H., Thompson D.R. *et al.* (2015) Poor Transferability of Species Distribution Models for a Pelagic Predator, the Grey Petrel, Indicates Contrasting Habitat Preferences across Ocean Basins. *PLOS ONE* **10**, e0120014.
- van Bemmelen R., Moe B., Hanssen S.A. *et al.* (2017) Flexibility in otherwise consistent non-breeding movements of a long-distance migratory seabird, the long-tailed skua. *Marine Ecology Progress Series*, -.
- Vecchione M., Falkenhaus T., Sutton T. *et al.* (2015) The effect of the North Atlantic Subpolar Front as a boundary in pelagic biogeography decreases with increasing depth and organism size. *Progress in Oceanography* **138**, 105-115.
- Vecchione M., Young R.E., Piatkowski U. (2010) Cephalopods of the northern mid-Atlantic Ridge. *Marine Biology Research* **6**, 25-52.
- Volkov D.L. (2005) Interannual variability of the altimetry-derived eddy field and surface circulation in the extratropical North Atlantic Ocean in 1993–2001. *Journal of Physical Oceanography* **35**, 405-426.
- Waap S., Symondson W.O., Granadeiro J.P. *et al.* (2017) The diet of a nocturnal pelagic predator, the Bulwer's petrel, across the lunar cycle. *Scientific Reports* **7**.
- Wakefield E.D., Cleasby I.R., Bearhop S. *et al.* (2015) Long-term individual foraging site fidelity—why some gannets don't change their spots. *Ecology* **96**, 3058-3074.
- Wallace B.P., Tiwari M., Girondot M. (2013) *Dermochelys coriacea*. *The IUCN Red List of Threatened Species 2013*: eT6494A43526147. <http://dx.doi.org/10.2305/IUCN.UK.2013-2.RLTS.T6494A43526147.en>.
- Walli A., Teo S.L., Boustany A. *et al.* (2009) Seasonal movements, aggregations and diving behavior of Atlantic bluefin tuna (*Thunnus thynnus*) revealed with archival tags. *PLoS One* **4**, e6151.
- Wanless S., Harris M., Redman P., Speakman J. (2005) Low energy values of fish as a probable cause of a major seabird breeding failure in the North Sea. *Marine Ecology Progress Series* **294**, 1-8.
- Waring G.T., Nøttestad L., Olsen E., Skov H., Vikingsson G. (2008) Distribution and density estimates of cetaceans along the mid-Atlantic Ridge during summer 2004. *Journal of Cetacean Research and Management* **10**, 137-146.
- Weimerskirch H., Cherel Y., Delord K., Jaeger A., Patrick S.C., Riotte-Lambert L. (2014) Lifetime foraging patterns of the wandering albatross: life on the move! *Journal of Experimental Marine Biology and Ecology* **450**, 68-78.
- Weimerskirch H., Delord K., Guitteaud A., Phillips R.A., Pinet P. (2015) Extreme variation in migration strategies between and within wandering albatross populations during their sabbatical year, and their fitness consequences. *Scientific Reports* **5**, 8853.
- Weimerskirch H., Inchausti P., Guinet C., Barbraud C. (2003) Trends in bird and seal populations as indicators of a system shift in the Southern Ocean. *Antarctic Science* **15**, 249-256.
- Woolley S.N., Tittensor D.P., Dunstan P.K. *et al.* (2016) Deep-sea diversity patterns are shaped by energy availability. *Nature* **533**, 393-396.

- Wynne-Edwards V.C. (1935) On the habits and distribution of birds on the North Atlantic. Boston Society of Natural History.
- Yeh Y.M., Huang H.W., Dietrich K., Melvin E. (2013) Estimates of seabird incidental catch by pelagic longline fisheries in the South Atlantic Ocean. *Animal Conservation* **16**, 141-152.
- Young H.S., Maxwell S.M., Conners M.G., Shaffer S.A. (2015) Pelagic marine protected areas protect foraging habitat for multiple breeding seabirds in the central Pacific. *Biological Conservation* **181**, 226-235.
- Žydelis R., Small C., French G. (2013) The incidental catch of seabirds in gillnet fisheries: A global review. *Biological Conservation* **162**, 76-88.

DRAFT

Annexes of Draft nomination proforma for a “North Atlantic Current and Evlanov Seamount” MPA in the OSPAR Maritime Area (Region V, Wider Atlantic)

Contents:

ANNEX 1. LIST OF COLLABORATORS PARTICIPATING IN THE IDENTIFICATION OF THE [PROPOSED] MPA	6
ANNEX 2. GEOGRAPHIC COORDINATES OF [PROPOSED] MPA- BOUNDARY.....	10
ANNEX 3. METHODOLOGY.....	11
ANNEX 4. MAPS OF IMPORTANT FORAGING AREAS OF INDIVIDUAL SPECIES.....	47
ANNEX 5. COMBINED MAPS (RICHNESS AND DENSITY)	68
ANNEX 6. MAPS WITH THE ESTIMATED NUMBER OF INDIVIDUALS IN THE [PROPOSED] MPA.....	74
ANNEX 7. EVIDENCE OF USE OF [PROPOSED] MPA FROM PUBLISHED LITERATURE	95
ANNEX 8. BRIEF DESCRIPTION AND PRELIMINARY RESULTS OF THE OCEANOGRAPHIC CRUISE DY080	108

List of Figures:

Figure A3.1: Geographic area of focus for the analysis.....	12
Figure A3.2: Example of a quarterly density map (Black-legged Kittiwake).....	16
Figure A3.3: Quarterly density maps of all the species combined	17
Figure A3.4: Density map for all species and year quarters combined	17
Figure A3.5: Number of species occurring in each 0.2° cell in each year quarter (richness quarterly maps). .	19
Figure A3.6: Inflated richness map for all year quarters combined	19
Figure A3.7: Quarterly density and richness maps combined.....	20
Figure A3.8: Density and richness maps combined for all year quarters.....	21
Figure A3.9: 15% most important areas for seabirds for all year-quarters combined	22
Figure A3.10: Proposed MPA.....	22
Figure A4.1 Important foraging areas identified for Audubon's Shearwater <i>Puffinus lherminieri baroli</i>	47
Figure A4.2: Important foraging areas identified for Cory's Shearwater <i>Calonectris borealis</i>	48
Figure A4.3 Important foraging areas identified for Great Shearwater <i>Ardenna gravis</i>	49
Figure A4.4 Important foraging areas identified for Manx Shearwater <i>Puffinus puffinus</i>	50
Figure A4.5 Important foraging areas identified for Sooty Shearwater <i>Ardenna grisea</i>	51
Figure A4.6 Important foraging areas identified for Northern Fulmar <i>Fulmarus glacialis</i>	52
Figure A4.7 Important foraging areas identified for Bermuda's Petrel <i>Pterodroma cahow</i>	53
Figure A4.8 Important foraging areas identified for Bulwer's Petrel <i>Bulweria bulwerii</i>	54
Figure A4.9 Important foraging areas identified for Desertas Petrel <i>Pterodroma deserta</i>	55
Figure A4.10 Important foraging areas identified for Zino's Petrel <i>Pterodroma madeira</i>	56
Figure A4.11 Important foraging areas identified for Arctic Tern <i>Sterna paradisaea</i>	57
Figure A4.12 Important foraging areas identified for Black-legged Kittiwake <i>Rissa tridactyla</i>	58
Figure A4.13 Important foraging areas identified for Sabine's Gull <i>Xema sabini</i>	59
Figure A4.14 Important foraging areas identified for Great Skua <i>Stercorarius skua</i>	60
Figure A4.15 Important foraging areas identified for Long-tailed Jaeger <i>Stercorarius longicaudus</i>	61
Figure A4.16 Important foraging areas identified for South Polar Skua <i>Catharacta maccormicki</i>	62
Figure A4.17 Important foraging areas identified for Atlantic Puffin <i>Fratercula arctica</i>	63
Figure A4.18 Important foraging areas identified for Common Murre <i>Uria aalge</i>	64
Figure A4.19 Important foraging areas identified for Little Auk <i>Alle alle</i>	65
Figure A4.20 Important foraging areas identified for Razorbill <i>Alca torda</i>	66
Figure A4.21 Important foraging areas identified for Thick-billed Murre <i>Uria lomvia</i>	67
Figure A5.1 Map indicating seabird species density (usage) across the OSPAR ABNJ for each year quarter, with the boundary of the [proposed] MPA.	68
Figure A5.2. Map indicating seabird species density (usage), all year quarters combined , with the boundary of the [proposed] MPA.	69

Figure A5.3. Map indicating seabird species richness across the OSPAR ABNJ area for each year quarter , with the boundary of the [proposed] MPA.	70
Figure A5.4 Map indicating seabird species richness across the OSPAR ABNJ area, all year quarters combined , with the boundary of the [proposed] MPA.....	71
Figure A5.5 Map indicating the combined weighting of seabird species density (usage) and species richness for each year quarter , with the boundary of the [proposed] MPA.	72
Figure A5.6. Map indicating the combined weighting of seabird species density (usage) and species richness , all year quarters combined, with the boundary of the [proposed] MPA.....	73
Figure A6.1 Number of mature individuals of Audubon’s Shearwater <i>Puffinus lherminieri baroli</i> in the [proposed] MPA for each year quarter.	74
Figure A6.2 Number of mature individuals of Cory’s Shearwater <i>Calonectris borealis</i> in the [proposed] MPA for each year quarter.....	75
Figure A6.3 Number of mature individuals of Great Shearwater <i>Ardenna gravis</i> in the [proposed] MPA for each year quarter.	76
Figure A6.4 Number of mature individuals of Manx Shearwater <i>Puffinus puffinus</i> in the [proposed] MPA for each year quarter.	77
Figure A6.5 Number of mature individuals of Sooty Shearwater <i>Ardenna grisea</i> in the [proposed] MPA for each year quarter.	78
Figure A6.6. Number of mature individuals of Northen Fulmar <i>Fulmarus glacialis</i> in the [proposed] MPA for each year quarter	79
Figure A6.7 Number of mature individuals of Bermuda Petrel <i>Pterodroma cahow</i> in the [proposed] MPA for each year quarter.	80
Figure A6.8 Number of mature individuals of Bulwer’s Petrel <i>Bulweria bulwerii</i> in the [proposed] MPA for each year quarter.	81
Figure A6.9 Number of mature individuals of Desertas Petrel <i>Pterodroma deserta</i> in the [proposed] MPA for each year quarter.	82
Figure A6.10 Number of mature individuals of Zino’s Petrel <i>Pterodroma madeira</i> in the [proposed] MPA for each year quarter.	83
Figure A6.11 Number of mature individuals of Arctic Terns <i>Sterna paradisaea</i> in the [proposed] MPA for each year quarter.	84
Figure A6.12 Number of mature individuals of Black-legged Kittiwake <i>Rissa tridactyla</i> in the [proposed] MPA for each year quarter.....	85
Figure A6.13 Number of mature individuals of Sabine’s Gull <i>Xema sabini</i> in the [proposed] MPA for each year quarter.....	86
Figure A6.14 Number of mature individuals of Great Skua <i>Stercorarius skua</i> in the [proposed] MPA for each year quarter.....	87
Figure A6.15 Number of mature individuals of Long-tailed Jaeger <i>Stercorarius longicaudus</i> in the [proposed] MPA for each year quarter.....	88
Figure A6.16 Number of mature individuals of South Polar Skua <i>Catharacta maccormicki</i> in the [proposed] MPA for each year quarter.....	89
Figure A6.17 Number of mature individuals of Atlantic Puffin <i>Fratercula arctica</i> in the [proposed] MPA for each year quarter.	90

Figure A6.18 Number of mature individuals of Common Murre <i>Uria aalge</i> in the [proposed] MPA for each year quarter.....	91
Figure A6.19 Number of mature individuals of Little Auk <i>Alle alle</i> in the [proposed] MPA for each year quarter.....	92
Figure A6.20 Number of mature individuals of Razorbill <i>Alca torda</i> in the [proposed] MPA for each year quarter.....	93
Figure A6.21 Number of mature individuals of Thick-billed Murre <i>Uria lomvia</i> in the [proposed] MPA for each year quarter.	94
Figure A7.1 Atlantic Bluefin Tuna <i>Thunnus thynnus</i> (OSPAR-listed species; Global Red List Status: Endangered) foraging area hotspot analysis across seasons.	95
Figure A7.2. Maps showing the migratory movements of Manx Shearwater <i>Puffinus puffinus</i>	96
Figure A7.3. Maps showing the migratory movements of Cory's Shearwater <i>Calonectris borealis</i>	97
Figure A7.4. Kernel density distributions of wintering Sooty Shearwater <i>Ardenna grisea</i> , tracked from the Falkland Islands.	98
Figure A7.5. Foraging movements of Desertas Petrel <i>Pterodroma deserta</i> tracked from the colony located in Bugio (Desertas, Madeira), during the incubation period.....	99
Figure A7.6. Migratory movements of Arctic Tern <i>Sterna paradisaea</i>	100
Figure A7.7. Kernel density distribution estimated for the Long-tailed Jaeger <i>Stercorarius longicaudus</i> along the annual cycle.....	101
Figure A7.8. Wintering areas and migration routes of South Polar Skua <i>Catharacta maccormicki</i> tracked from the colonies located in King George Island (back dot).	102
Figure A7.9. Map showing the estimated number of adult Thick-billed Murre <i>Uria lomvia</i> (OSPAR-listed species) in different Atlantic sectors.	103
Figure A7.10. At sea survey in 2006 across [proposed] MPA area (dates 15-19 Sept).	104
Figure A7.11 Top left: Movements of Fin Whales <i>Balaenoptera physalus</i> and Blue Whales <i>Balaenoptera musculus</i> tagged in the Azores.....	105
Figure A7.12 Hierarchical switching state-space model-derived locations of Sei Whale <i>Balaenoptera borealis</i> showing inferred behavioural modes.....	106
Figure A7.13 High species-specific space-use areas calculated for A) Blue shark <i>Prionace glauca</i> and B) Shortfin Mako Shark <i>Isurus oxyrinchus</i>	107
Figure A8.1 Track of cruise DY080, June 6 th – July 2 nd 2017	109
Figure A8.2. Seabird visual survey effort during cruise DY080.	109
Figure A8.3 Cetacean visual survey effort during cruise DY080.....	110
Figure A8.4 Density of bird species along the transect.....	112
Figure A8.5. Movements of the Great Shearwaters <i>Ardenna gravis</i> caught at sea and tagged during the DY080 cruise.	117
Figure A8.6. Cetaceans sightings along the DY080 transect and within the [proposed] MPA.....	119

List of Tables:

Table A3.1. List of all datasets provided by the researchers.....	23
Table A3.2. Final list of species and LME considered, with an estimate of the number of birds.	27
Table A3.3: Breeding stages in each year quarter, for each species and LME (January-June).	31
Table A3.4: Breeding stages in each year quarter, for each species and LME (July-December).....	38
Table A8.1. Bird species recorded in the proposed MPA area during cruise DY080.....	111
Table A8.2. Cetacean sightings.....	117

Annex 1. List of collaborators participating in the identification of the [proposed] MPA

The list includes data providers, providers of technical advice & participants in 2016 BirdLife workshop in Reykjavik Iceland

Name	Affiliation	Country- affiliation of institute/organisation	Direct data providers	Attendance at workshop
Arnthor Gardarsson	University of Iceland	Iceland	*	*
Aevar Petersen	Independent researcher, affiliation with Aarhus University	Denmark	*	
Ana Bertoldi Carneiro	BirdLife International	UK		*
Anders Mosbech	National Environmental Research Institute, Department of Arctic Environment	Denmark	*	
Andrew Westgate	University of North Carolina Wilmington	US	*	
Antony Gaston	National Wildlife Research Centre (Ottawa, ON)	Canada	*	
Annette Fayet	University of Oxford	UK	*	
April Hedd	Memorial University of Newfoundland	Canada	*	
Ben Lascelles	BirdLife International	UK		
Benjamin Metzger	BirdLife Malta	Malta	*	
Bergur Olsen	Faroe Marine Research Institute	Faroe Islands	*	
Børge Moe	Norwegian Institute for Polar Research	Norway	*	*
Bruna Campos	BirdLife International	Belgium		*
Carsten Egevang	Greenland Institute of Natural Resources	Greenland/Denmark	*	
Carolina Hazin	BirdLife International	UK		*
Claire Lacey	SMRU	UK	*	
David Gremillet	Centre d'Ecologie Fonctionnelle et Evolutive - CNRS	France	*	
David Simms	Marine Biological Association of the United Kingdom	UK	*	
Deryk Shaw	Fair Isle Bird Observatory	UK	*	
Ellen Magnusdottir	University of Iceland	Iceland	*	
Erpur Snær Hansen	South Iceland Nature Research Centre	Iceland	*	*
Euan Dunn	Royal Society for Protection of Birds	UK		*
Ewan Wakefield	University of Glasgow	UK	*	*
Flemming Merkel	Aarhus University	Denmark	*	
Francis Daunt	Centre for Ecology & Hydrology, NERC	UK	*	

Name	Affiliation	Country- affiliation of institute/organisation	Direct data providers	Attendance at workshop
Francis Zino		Portugal	*	
Greg Robertson	Environment Canada Centre	Canada	*	
Guilherme Bortolotto De Oliveira	SMRU	UK	*	
H. Grant Gilchrist	National Wildlife Research Centre in Ottawa (Environment Canada)	Canada	*	
Hallvard Strøm	Norwegian Institute for Polar Research	Norway		
Hans-Ulrich Peter	Friedrich Schiller University Jena Institute of Ecology	Germany	*	
Hólmfríður Arnardóttir	Fuglavernd (BL Iceland)	Iceland		*
Ib K Petersen	Aarhus University	Denmark		
Ingvar Sigurosson	South Iceland Nature Research Centre	Iceland	*	
Iain Stenhouse	Biodiversity Research Institute	USA	*	
Ian Cleasby	University of Sheffield	UK	*	
Ivan Ramirez	BirdLife International	UK	*	
Jacob González-Solís	University of Barcelona	Spain	*	
Jaime Albino Ramos	University of Coimbra	Portugal	*	
Jan Esefeld	Friedrich Schiller University Jena	Germany	*	
Jannie Fries Linnebjerg	Lund University	Sweden	*	
Janos Hennicke	NABU (BirdLife Germany)	Germany		*
Jeremy Madeiros	Department	Bermuda/UK	*	
Jerome Fort	LIENSs - CNRS UMR	France	*	
Jez Blackburn	British Trust for Ornithology	UK	*	
Joel Bried	University of the Azores	Azores/Portugal	*	
Johannes Krietsch	Max Planck Institute for Ornithology	Germany	*	
Johannes Lang	Institut für Tierökologie und Naturbildung	Germany	*	
Jóhannis Danielsen	University of the Faroe Islands	Faroe Islands		*
Jonathan Green	University of Liverpool	UK	*	
Jose Manuel Arcos	SEO/BirdLife, Spain	Spain	*	
Jose Pedro Granadeiro	Department of Animal Biology, University of Lisbon	Portugal	*	*
Justine Dossa	BirdLife International	Senegal	*	
Keith C. Hamer	University of Leeds	UK	*	
Laura McFarlane Tranquilla	Memorial University of Newfoundland	Canada	*	
Lorraine Chivers	Independent research	UK	*	
Louise Soanes	University of Liverpool	UK	*	
Mandy Shailer	Department of Environment and Natural Resources, Bermuda Government	Bermuda/UK	*	

Draft OSPAR NACES MPA nomination proforma Annexes
CAVEAT: the nomination proforma text and MPA delineation is subject to change

Name	Affiliation	Country- affiliation of institute/organisation	Direct data providers	Attendance at workshop
Manuel Biscoito	Museu de História Natural do Funchal	Portugal	*	
Marguerite Tarzia	BirdLife International	UK		*
Maria Bogdanova	Centre for Ecology & Hydrology, NERC	UK	*	
Maria Dias	BirdLife International	UK	*	*
Mark Jessopp	University College Cork	Ireland	*	
Mark Mallory	Acadia University	Canada	*	
Matthias Kopp	FSU Jena	Germany	*	
Michael P. Harris	Centre for Ecology & Hydrology	UK	*	
Mike James	Department of Fisheries & Oceans, Canada	Canada	*	
Morten Frederiksen	Aarhus University	Denmark	*	*
Nadya Ramirez-Martinez	SMRU	UK	*	
Niels Martin Schmidt	Aarhus University	Denmark	*	
Nuno Quieroz	Marine Biological Association of the United Kingdom	UK	*	
Nuno Simão	University of Durham	UK		
Oliver Padget	University of Oxford	UK	*	
Olivier Gilg	University of Bourgogne, CNRS	France	*	
Paloma Carvalho	University of Manitoba	Canada		
Paul Thompson	University of Aberdeen	UK	*	
Paulo Catry	ISPA, Instituto Universitário	Portugal	*	
Peter Ryan	Percy FitzPatrick Institute of African Ornithology, University of Cape Town	South Africa	*	
Penny Holliday	National Oceanography Centre	UK		
Phil Atkinson	British Trust for Ornithology	UK	*	
Rachel Davies	School of Biology, University of Leeds	UK	*	
Richard Cuthbert	Royal Society for the Protection of Birds (RSPB)	UK	*	
Richard Phillips	British Antarctic Survey	UK	*	
Robert W Furness	University of Glasgow	UK	*	
Robert van Bemmelen	Wageningen University	Netherlands	*	
Robert Ronconi	Acadia University, Nova Scotia	Canada	*	
Robin Freeman	School of Biology, University of Leeds	UK	*	
Rui Prieto	University of the Azores	Portugal	*	
Roland Gauvain	Alderney Wildlife Trust	UK	*	
Sarah Wanless	Centre for Ecology & Hydrology, NERC	UK	*	
Signe Christensen-Dalsgaard	Norwegian University of Science and Technology	Norway	*	
Scott Eckert	Principia College	US	*	

Draft OSPAR NACES MPA nomination proforma Annexes
CAVEAT: the nomination proforma text and MPA delineation is subject to change

Name	Affiliation	Country- affiliation of institute/organisation	Direct data providers	Attendance at workshop
Porkell Lindberg Þórarinnsson	Northeast Iceland Nature Research Centre	Iceland	*	*
Thierry Boulinier	CNRS	France	*	
Tim Guilford	University of Oxford	UK	*	*
Tycho Anker-Nilssen	Norwegian Institute for Nature Research (NINA)	Norway		
Vegard Brathen	Norwegian Institute for Nature Research (NINA)	Norway	*	
Veronica Neves	University of the Azores	Azores/Portugal	*	
Vitor Paiva	MARE - Marine and Environmental Sciences Centre, University of Coimbra	Portugal	*	*
William Montevecchi	Memorial University of Newfoundland	Canada	*	
Yann Kolbeinnsson	Northeast Iceland Nature Research Centre	Iceland	*	
Yuri Krasnov	Murmansk Marine Biological Institute, Russian Academy of Science	Russia	*	

Annex 2. Geographic coordinates of [proposed] MPA- boundary

Point	Latitude	Longitude
1	53.09898	-39.7
2	51.66368	-38.4802
3	51.68322	-37
4	51	-36.9865
5	50.98471	-32
6	49	-31.9829
7	49	-31.7113
8	46.62547	-31.7183
9	45.87748	-32.1202
10	45.62378	-32.6716
11	45.21634	-33.7927
12	44.96546	-34.5874
13	44.50761	-35.6184
14	43.98592	-36.461
15	43.19159	-37.3677
16	42.29898	-38.1
17	41.89898	-39.9
18	43.24642	-41.1372
19	43.26582	-42
20	44.17853	-42
21	44.17871	-39.1
22	45.2948	-39.1
23	45.29437	-42
24	53.11828	-42
25	53.09898	-39.7

Annex 3. Methodology

Identification of the most important areas for seabirds is OSPAR high-seas region

Prepared by: Ana Carneiro and Maria Dias, BirdLife International.

August 2017

This document presents the methodological steps undertaken to identify the boundaries of marine Important Bird and Biodiversity Areas (IBAs) as candidate sites for a Marine Protected Area within the OSPAR Maritime Area that are beyond the Exclusive Economic Zones (EEZ) of Contracting Parties (i.e. beyond 200 nautical miles). A marine IBA is any area that meets the criteria to be considered of key conservation importance as foraging ground, resting area or migratory corridor for a [seabird species](#) (Fishpool & Evans 2001, Lascelles et al. 2016). Examples of marine IBAs are foraging and rafting areas around breeding colonies, non-breeding concentrations, migratory bottlenecks and feeding areas for pelagic species (BirdLife International 2010). Within the area of analysis (the OSPAR ABNJ), the latter three are of particular relevance.

The possible criteria that can be applied to identify marine IBAs are:

- Global Criterion A1: Sites known or thought regularly to hold significant numbers of a globally threatened species, or other species of global conservation concern (i.e. classified as Vulnerable, Endangered or Critically Endangered; BirdLife International 2017);
- Global Criterion A4: Sites holding >1% of the global or, in some cases, biogeographic population of a seabird. For European species, the 1% was calculated based on the total number of mature individuals breeding in Europe (BirdLife International 2015). For species breeding outside of Europe (e.g. Sooty Shearwater, Great Shearwater, Bermuda Petrel), the 1% was based on the global population.
- European Criterion B1: The site is known or thought to hold $\geq 1\%$ of a distinct population of a seabird species.
- European Criterion B2. Species with an unfavourable conservation status in Europe. The site is one of the most important for a species with an unfavourable conservation status in Europe and for which the site-protection approach is thought to be appropriate.

- European Criterion B3. Species with a favourable conservation status in Europe. The site is one of the most important in the country for a species with a favourable conservation status in Europe but concentrated in Europe and for which the site-protection approach is thought to be appropriate.

Definitions:

Quarter 1 (Q1): Jan-Mar, Quarter 2 (Q2): Apr-Jun, Quarter 3 (Q3): Jul-Sep, Quarter 4 (Q4): Oct-Dec.

Resolution for the spatial analyses: 0.2 degrees.

Area of analysis: The geographic area of focus for the analysis was the OSPAR Maritime Area that are Beyond National Jurisdiction (ABNJ). The final boundaries of the proposed MPA, however, were delimited by excluding areas located within current extended continental shelf claims and areas overlapping existent MPAs (e.g. Charlie-Gibbs North High Seas MPA, Charlie-Gibbs South High Seas MPA, Milne Seamount Complex MPA, and Altair Seamount High Seas MPA) (Figure A0.1).

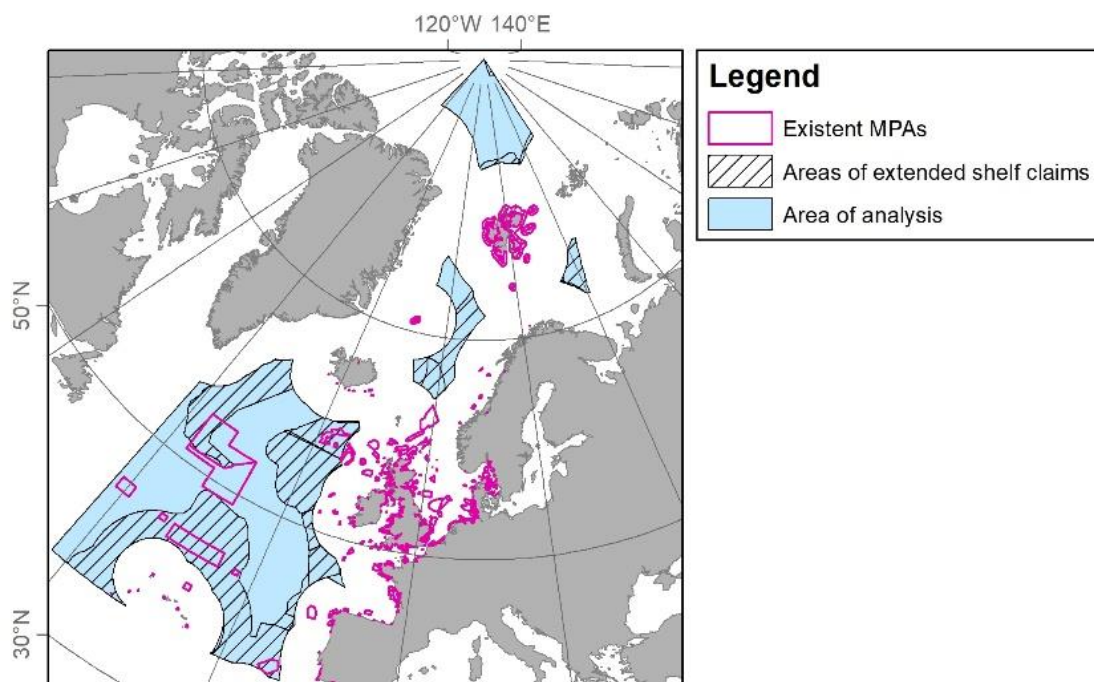


Figure A0.1: Geographic area of focus for the analysis
(OSPAR Maritime Area beyond the Exclusive Economic Zones of Contracting Parties).

1. Data compilation

The identification of IBAs requires the compilation of information about the distribution of the species and their abundance. For IBAs located in pelagic seas, the main sources of data are: 1) tracking data (i.e., locations of birds collected by tracking their movements with bird-borne devices - GPS, PTT or GLS) and 2) colonies' location and abundance¹.

An extensive search was conducted in order to identify and compile all potentially relevant tracking datasets (i.e., those potentially overlapping with the area of analysis) (Table 1). Many different researcher teams, working across many seabird colonies, were contacted and invited to upload their tracking data into the BirdLife International's Seabird Tracking Database (<http://www.seabird.org/>), or to provide authorization to use the data previously stored in the database. All the data were therefore formatted following the procedures required by the Seabird Tracking Database (details [here](#)). The Table 1 lists all tracking datasets which were available for the present analysis, and the percentage of overlap of the tracking positions and the area of analysis. Data for 23 species from 105 colonies were compiled, corresponding to 2188 individual birds (collected by 66 seabird researchers; Table A0.1). Species overlapping less than 2% with the studied area were excluded from further analyses (Northern Gannet *Morus bassanus* and Scopoli's Shearwater *Calonectris diomedea*).

Following advices from the scientific community after a workshop held in June in Reykjavik, Iceland, it was decided to combine data from individual colonies into Large Marine Ecosystems (LME; <http://www.lme.noaa.gov/>). Population size for LME were obtained directly from scientists, literature review, European Red List of Birds Assessment (BirdLife International 2015), or IBA factsheets. To meet the IBA criteria, tracked birds of non-threatened species were checked against the 1% threshold (i.e. LME represents $\geq 1\%$ of the global [for species breeding outside Europe] or biogeographic population [EU number of mature individuals for European species]; Table A0.2). For Black-legged Kittiwakes *Rissa tridactyla* and Thick-billed Murres *Uria lomvia* a modified version of the LME classification was used, following (Frederiksen et al. 2012; Frederiksen et al. 2016). For Long-tailed Jaegers, Norwegian Sea and Barents Sea LMEs had to be combined in order to obtain more accurate population estimates.

2. Data analysis per species

The analyses followed the procedures described in Lascelles et al. (2016) and are summarized in the following paragraphs. All the analyses were carried out using R (R Core Team 2016) and the scripts provided by Lascelles et al. (2016) as well as customized scripts.

¹ Note- at sea survey data is used when available to help support the identification of sites.

- 2.1 The data were combined in data groups, i.e., unique combinations of species/LME/ breeding stages (e.g. Atlantic Puffin *Fratercula arctica* from Iceland Shelf and Sea during incubation). Breeding stages were provided by scientists or obtained from literature (Table A0.3). The next steps were carried out for each data group individually.
- 2.2 The “core use area” of each individual bird was estimated by doing a kernel density analysis (KDE) and selecting the 50% utilization distribution (UD) area (step *batchUD* in Lascelles et. all 2016). For PTT and GPS data, the smoothing factor (*h* value) used in the kernel analysis was calculated specifically for each data group combination to reflect the scale of the interaction of the birds with the environment, based on a First Passage Time Analysis; for GLS data, a value of 186 km was used, which corresponds approximately to the accuracy of the device.
- 2.3 The proportion of the tracked birds using each 0.2°cell was estimated by counting the overlap of all individual kernels estimated in 2.2 (step *polyCount* in Lascelles et al. 2016).
- 2.4 The total number of birds using each 0.2°cell was estimated by multiplying the size of the overall LME population (Table 2) by the proportion of the tracked population which had a core-use area in this grid cell. For example, we estimated that a cell overlapping with the core area of 20% of the birds tracked from an LME containing 10 000 birds, would be used by 2 000 birds.

3. Combination of usage maps of several species

3.1. Creation of density maps:

- 1) One of the outputs from the IBA script (Lascelles et al. 2016; see point 2.) is a kernel density map, representing the percentage of a species’ population of each LME using the area, during a given breeding stage. These maps were exported as raster images and resampled in order to obtain compatible extents between data groups (resolution was already the same: 0.2°);
- 2) In order to standardise the different breeding stages (incubation, chick-rearing, winter, etc.) for the different species during the annual cycle, breeding stages were associated to year quarters. Each year quarter was represented by 6 fortnights. The final “species/LME/quarter” raster maps were

estimated as a weighted average of the bird distribution during the breeding stages associated with its respective year quarter (see Table A0.3). For example, if during Q1 (Jan-Mar) four fortnights were coded as “winter” and two as “pre-breed”, the final raster would be the result of the equation: $(\text{raster winter} \times 4 + \text{raster pre-breed} \times 2) / 6$. If more than 50% of the year quarter was represented by a breeding stage that did not overlap with the area of analysis or when there was no available tracking data to produce density distributions, the whole year quarter for the respective species was considered non-existent (i.e. non-existent quarters can be a result of lack of data but also lack of overlap);

3) A set of maps were then produced revealing the density use by the seabird community:

- Quarterly density maps of each species: raster images of each species during each year quarter, after combining all the maps for each LME that overlapped with the area of analysis. The combination was done by weighing the percentage of the population in each LME (i.e. LME population size). An example of this map is provided in Figure A0.2.

- Quarterly density maps for all species combined. All single species raster-maps for each year quarter (after combining populations from different LMEs) were combined (i.e., summed up) and divided by the total number of species occurring in the area of analysis during the respective year quarter, to create a weighted average of the proportion of the populations expected to be found in each cell (Figure A0.3).

- Density map for all species and year quarters combined: all single species raster-maps (independent of year quarter, and after combining populations from different LMEs) were combined and divided by the total number of species occurring in the area of analysis (Figure A0.4).

Black-legged Kittiwake – LMEs:

(Q1, Q3, Q4): Barents Sea (0.282), Faroe Plateau (0.084), Iceland Shelf and Sea (0.304), Norwegian Sea (0.042), West Spitsbergen (0.061), North Sea (0.163) and Celtic-Biscay Shelf (0.064)

(Q2): Barents Sea (0.301), Faroe Plateau (0.089), Iceland Shelf and Sea (0.324), Norwegian Sea (0.045), North Sea (0.173) and Celtic-Biscay Shelf (0.068)

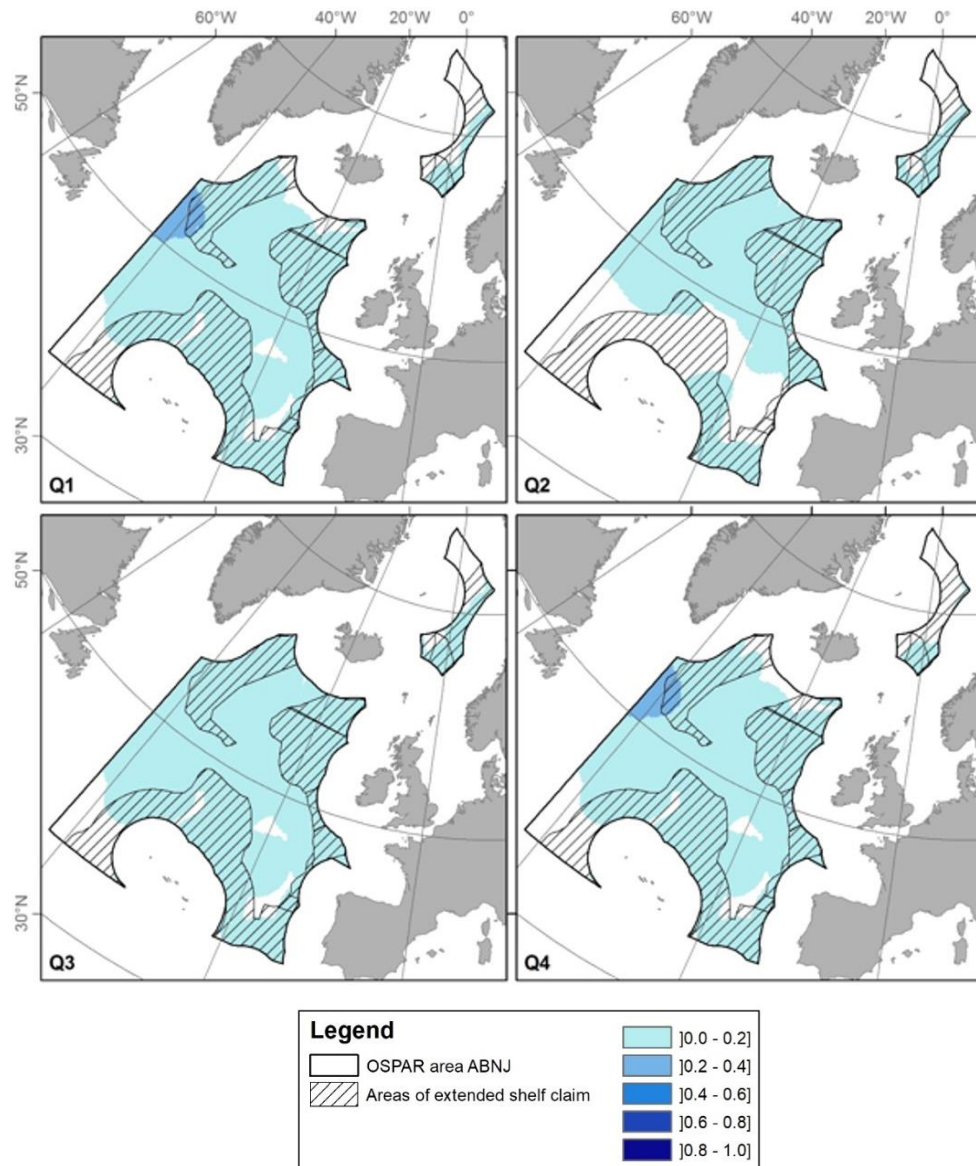


Figure A0.2: Example of a quarterly density map (Black-legged Kittiwake).
 Values represent percentage of birds (total population – i.e., all LME combined) using each 0.2° cell.

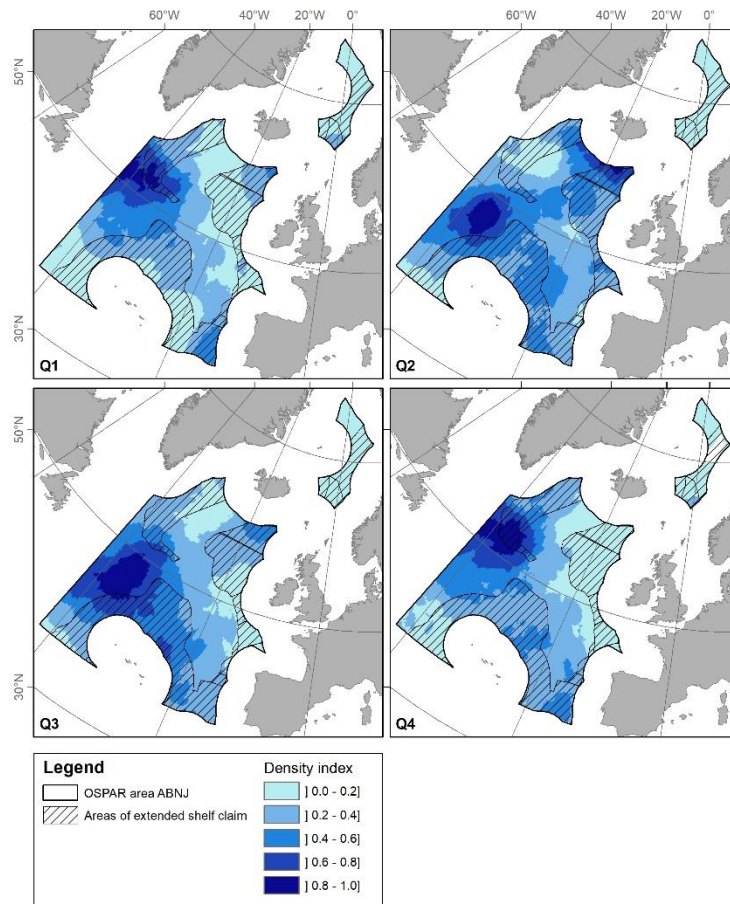


Figure A0.3: Quarterly density maps of all the species combined (in order to facilitate the comparison of the relative importance of the areas within each quarter, and only for mapping purposes, the average densities were standardized to obtain values varying between 0 and 1, by dividing by the maximum value of each quarter)

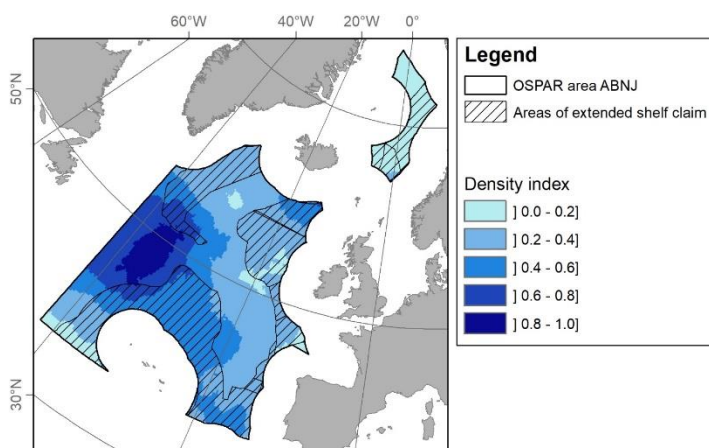


Figure A0.4: Density map for all species and year quarters combined (in order to facilitate the comparison of the relative importance of the areas, and only for mapping purposes, the average density index values were standardized to obtain values varying between 0 and 1, by dividing by the maximum value)

3.2. Creation of richness maps:

In the same manner as for the density maps, a series of maps reflecting the richness of the area (number of seabird species) were produced:

- Richness quarterly maps: computed using the kernel density maps returned from the IBA scripts, following the resampling and standardization of the different breeding stages (see details in Density maps section). Single species maps (independent of LME of origin) were converted into a presence/absence raster by recoding all cells with values higher than 0 to value 1. Prioritisation was given to identifying an important area for OSPAR listed priority species or globally and European threatened species (i.e. classified as Vulnerable, Endangered or Critically Endangered; BirdLife International 2015, BirdLife International 2017). Therefore, a higher weight was given to OSPAR species (3x, i.e., the presence of an OSPAR species contributed 3x to the final map) and globally or European threatened species (2x). For all the other species a value of 1 was assumed (i.e. presence). Finally, all single species maps were overlapped using the function sum, returning a raster image per quarter with the total sum (inflated number of species; higher weights to OSPAR listed priority species or globally and European threatened species) occurring in each cell (Figure A0.5).
- Richness map for all year quarters combined. All single species maps (independent of LME of origin and year quarter) were combined into a single map, and cells with values higher than 0 were recoded to value 1. A higher weight was given to OSPAR species (3x) and globally or European threatened species (2x). For all the other species a value of 1 was assumed (i.e. presence). In a second step, single species maps were overlapped using the function sum, returning a raster image with the total sum (inflated number of species; higher weights to OSPAR listed priority species or globally and European threatened species) occurring in each cell (Figure A0.6).

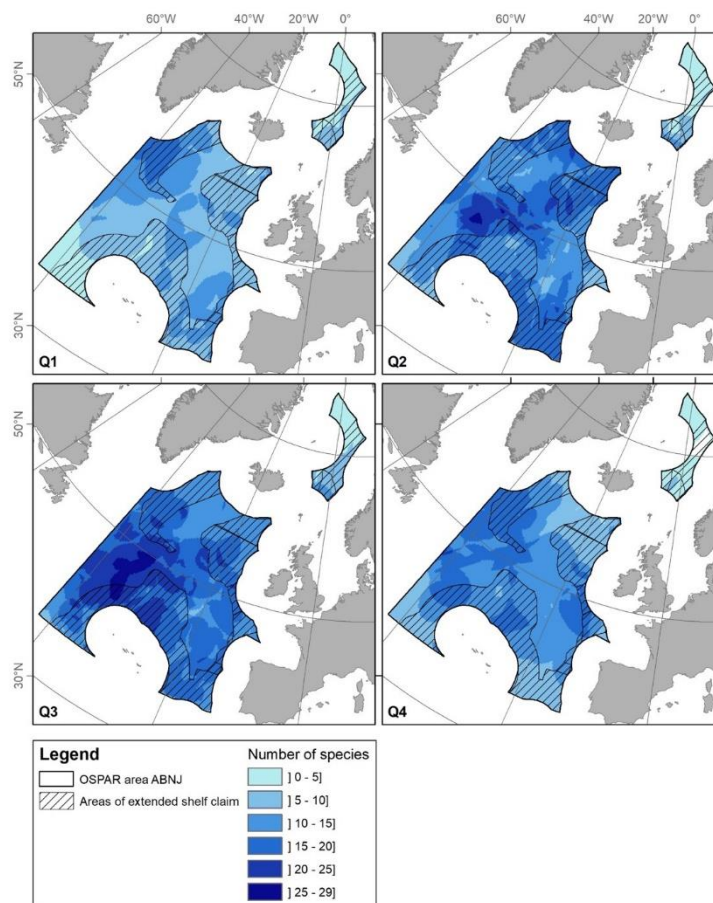


Figure A0.5: Number of species occurring in each 0.2° cell in each year quarter (richness quarterly maps). Note that values correspond to “inflated numbers (i.e. OSPAR and threatened species count 3x and 2x for the count, respectively; see methods above)

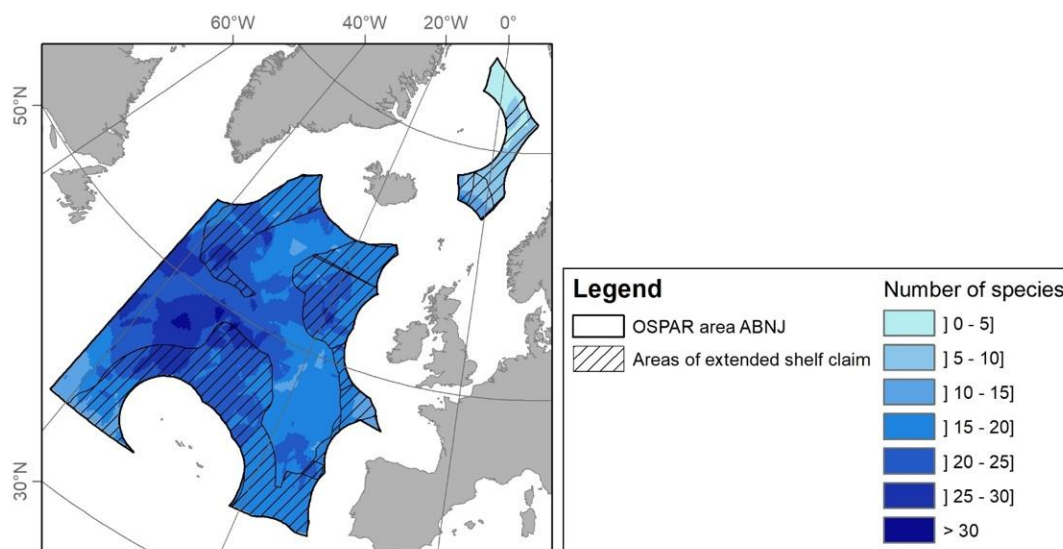


Figure A0.6: Inflated richness map for all year quarters combined

3.3. Final maps

The identification of the most relevant sites for seabirds in the OSPAR ABNJ was done by combining the maps reflecting the density of use (see 3.1) and richness (3.2). The final raster maps reflect thus an index of specie's use*richness, in which the presence of OSPAR priority listed species or globally and European threatened species (European Red List of Birds) accounted more for the final result (i.e. a higher weight to OSPAR species (3x) and globally or European threatened species (2x)).

- Density and richness quarterly maps. Quarterly density and richness (i.e. inflated richness) raster-maps were multiplied and then standardized to obtain values varying between 0 and 1 (by dividing by the maximum value) (Figure A0.7).

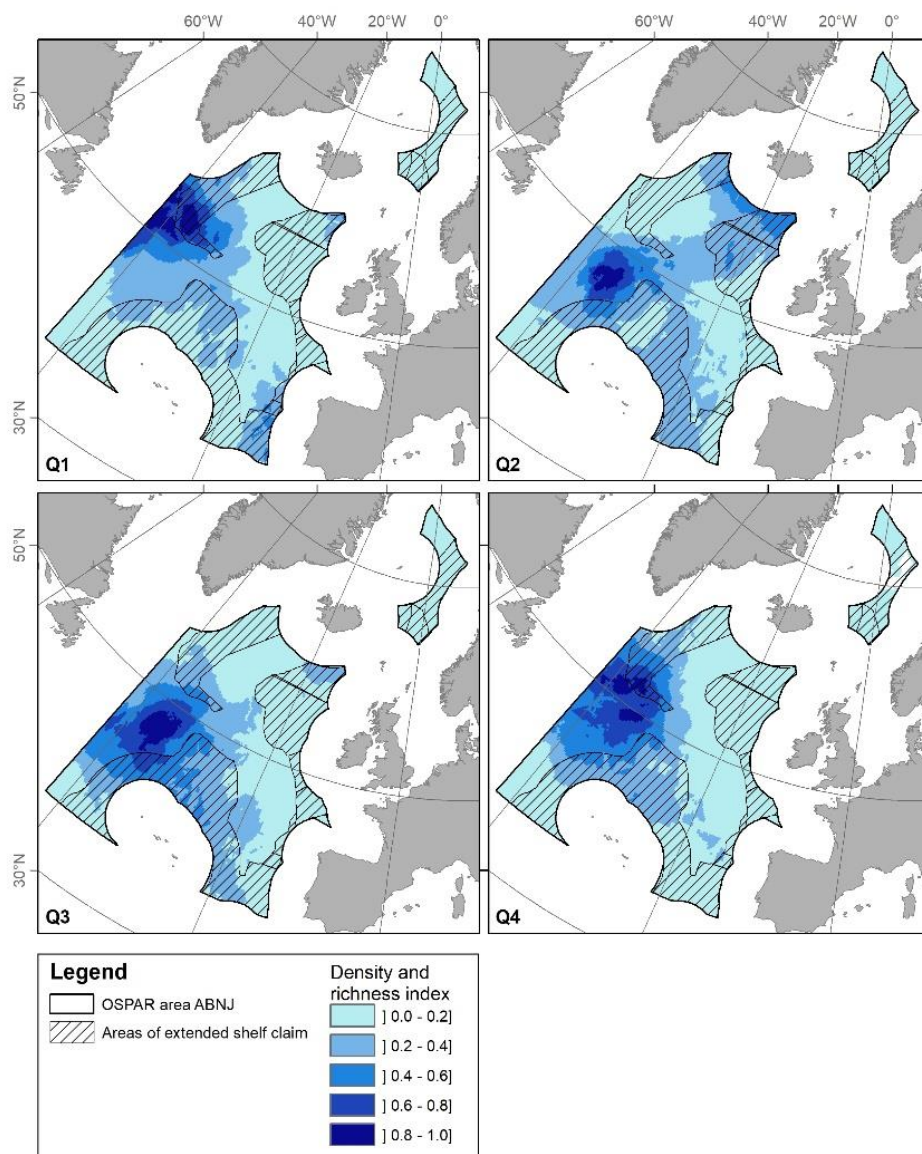


Figure A0.7: Quarterly density and richness maps combined

- Density and richness for all year quarters combined. The density map for all species and year quarters combined and the richness map (i.e. inflated richness) for all year quarters combined were multiplied and then standardised to obtain values varying between 0 and 1 (by dividing by the maximum value (Figure A0.8)).

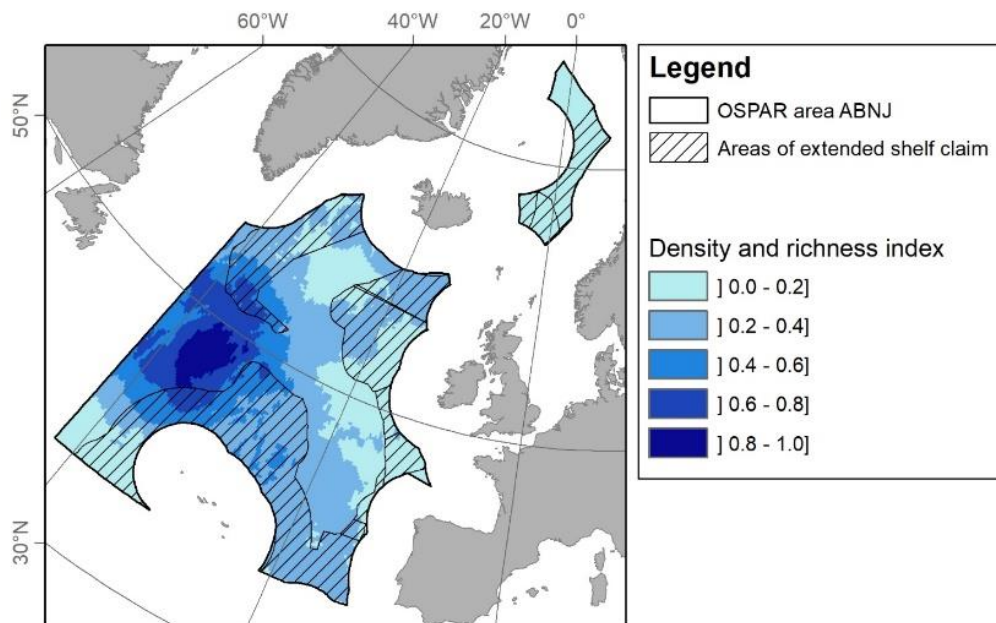


Figure A0.8: Density and richness maps combined for all year quarters

Finally, the boundary of the 15% highest values were identified and exported as shapefiles (Figure A0.9). This boundary encompasses the 15% most important area for seabirds within the area of analysis.

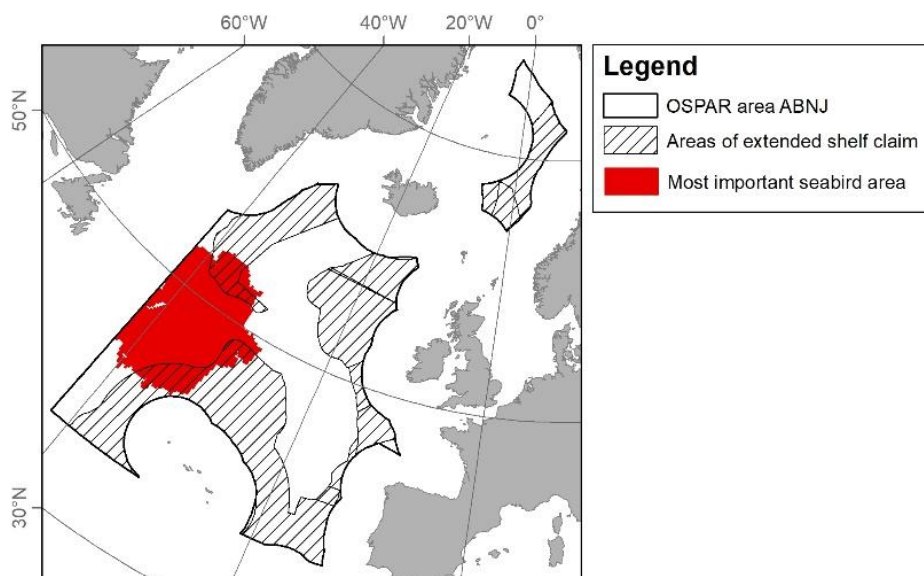


Figure A0.9: 15% most important areas for seabirds for all year-quarters combined

3.4. Proposed MPA

The final boundary was defined by simplifying the borders of the shapefile obtained in the previous step (to reduce the number of vertices) and excluding the areas that overlapped extended shelf claims. The area of the [proposed] MPA was estimated after projecting the map in the European Lambert Conformal Conic projection (Figure A0.10).

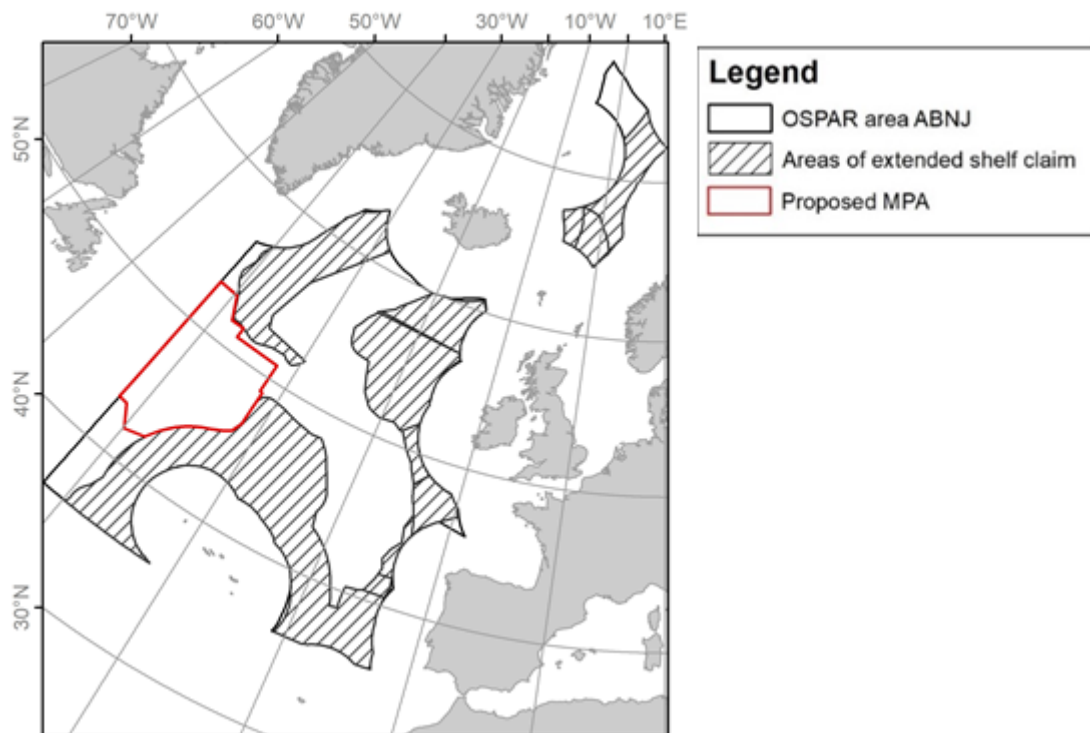


Figure A0.10: Proposed MPA

Table A0.1. List of all datasets provided by the researchers (more details in <http://seabirdtracking.org/>), and respective LME where each dataset was included (See table 2), type of device used (GPS, PTT or GLS), sample sizes and percentage of overlap with the OSPAR ABNJ region.

Species	Country	Colony	LME	Device	N birds	% overlap	Tracking data contributors
Arctic Tern <i>Sterna paradisaea</i>	Greenland	Sand Island	Greenland Sea	GLS	9	14.80	Carsten Egevang
	Iceland	Flatey	Iceland Shelf and Sea	GLS	6	36.66	Aevar E Petersen
	Iceland	Grimsey	Iceland Shelf and Sea	GLS	15	21.16	Erpur S. Hansen , Thorkell Lindberg Thorarinsson, Vegard Brathen
	Iceland	Heimaey	Iceland Shelf and Sea	GLS	1	46.50	Erpur S. Hansen , Thorkell Lindberg Thorarinsson
Atlantic Puffin <i>Fratercula arctica</i>	Iceland	Papey	Iceland Shelf and Sea	GLS	6	35.99	Erpur S. Hansen , Thorkell Lindberg Thorarinsson, Vegard Brathen
	Iceland	Storhofdi	Iceland Shelf and Sea	GLS	7	55.40	Aevar E Petersen
	Ireland	Skellig Michael	Celtic-Biscay Shelf	GLS	30	39.30	Mark Jessopp
	United Kingdom	Isle of May	North Sea	GLS	40	1.40	Sarah Wanless, Francis Daunt
	United Kingdom	Skomer	Celtic-Biscay Shelf	GLS	41	22.69	Annette Fayet, Tim Guilford
	Portugal	Vila	Azores	GLS	4	52.70	Veronica Rodrigues Costa Neves, Jacob González-Solís
Audubon's Shearwater <i>Puffinus lherminieri</i>	Cape Verde	Ilheu de Cima	Cape Verde	GLS	21	0.10	Jacob González-Solís
	Portugal	Cima Islet	Canary Current	GLS	14	28.00	Vitor Paiva
	Portugal	Selvagens	Canary Current	GLS	9	8.70	Vitor Paiva
	Cape Verde	Raso	Cape Verde	GLS	9	0.30	Jacob González-Solís
Bermuda Petrel <i>Pterodroma cahow</i>	Bermuda	Nonsuch Island	Bermuda	GLS	11	16.30	Jeremy Lee Madeiros, Mandy Shailer
	Canada	Prince Leopold Island	Arctic Canada	GLS	2	2.60	Morten Frederiksen
	Norway	Bear Island	Barents Sea	GLS	17	17.30	Morten Frederiksen
	Russian Federation	Cape Krutik	Barents Sea	GLS	11	18.00	Morten Frederiksen
Black-legged Kittiwake <i>Rissa tridactyla</i>	Norway	Hjelmsøya	Barents Sea	GLS	3	6.40	Morten Frederiksen
	Norway	Hornøya	Barents Sea	GLS	20	10.80	Morten Frederiksen
	United Kingdom	Rathlin	Celtic-Biscay Shelf	GLS	5	9.10	Morten Frederiksen
	Faroe Islands	Faroe Islands	Faroe Plateau	GLS	10	12.10	Morten Frederiksen
	Greenland	Kippaku	West Greenland Shelf	GLS	25	0.60	Morten Frederiksen
	Iceland	Hafnarholmi	Iceland Shelf and Sea	GLS	14	13.90	Morten Frederiksen

Species	Country	Colony	LME	Device	N birds	% overlap	Tracking data contributors
	Denmark	Bulbjerg	North Sea	GLS	13	6.90	Morten Frederiksen
	United Kingdom	Fair Isle	North Sea	GLS	15	3.80	Morten Frederiksen
	United Kingdom	Isle of May	North Sea	GLS	48	8.70	Morten Frederiksen, Francis Daunt, Michael P. Harris, Sarah Wanless
	Norway	Anda	Norwegian Sea	GLS	12	9.70	Morten Frederiksen
	Norway	Halten	Norwegian Sea	GLS	8	15.10	Morten Frederiksen
	Norway	Rost	Norwegian Sea	GLS	46	6.60	Morten Frederiksen
	United Kingdom	Skomer	Celtic-Biscay Shelf	GLS	7	5.90	Morten Frederiksen
	Norway	Grumant	West Spitsbergen	GLS	16	32.30	Morten Frederiksen
	Norway	Kongsfjorden	West Spitsbergen	GLS	30	30.60	Morten Frederiksen
Bulwer's Petrel <i>Bulweria bulwerii</i>	Portugal	Vila	Azores	GLS	12	0.70	Jacob González-Solís
	Spain	M Clara	Canary Current	GLS	33	0.90	Jacob González-Solís
	Cape Verde	Ilheu de Cima	Cape Verde	GLS	15	0.00	Jacob González-Solís
	Portugal	Selvagens	Canary Current	GLS	15	6.02	Francis Zino, Manuel Biscoito
	Cape Verde	Raso	Cape Verde	GLS	12	0.30	Jacob González-Solís
Common Murre <i>Uria aalge</i>	Canada	Funk Island	Labrador - Newfoundland	GLS	17	0.00	Laura McFarlane Tranquilla, Greg Robertson, April Hedd, William Montevecchi
	Canada	Gannet Islands	Labrador - Newfoundland	GLS	16	0.00	Laura McFarlane Tranquilla, Greg Robertson, April Hedd, William Montevecchi
	Canada	Gull Island	Labrador - Newfoundland	GLS	15	0.00	Laura McFarlane Tranquilla, Greg Robertson, April Hedd, William Montevecchi
	Iceland	Grimsey	Iceland Shelf and Sea	GLS	10	6.60	Thorkell Lindberg Thórarinnsson, Yann Kolbeinnsson
	Iceland	Langanes	Iceland Shelf and Sea	GLS	3	0.90	Thorkell Lindberg Thórarinnsson, Yann Kolbeinnsson
	Iceland	Latrabjarg	Iceland Shelf and Sea	GLS	7	20.60	Thorkell Lindberg Thórarinnsson, Yann Kolbeinnsson
Cory's Shearwater <i>Calonectris borealis</i>	Portugal	Corvo	Azores	GPS	73	23.30	Vitor Paiva, Ivan Ramirez, Jaime Ramos
	Portugal	Vila	Azores	GLS	27	21.40	Jacob González-Solís
	Spain	M Clara	Canary Current	GLS	20	1.60	Jacob González-Solís
	Spain	Veneguera	Canary Current	GLS	98	3.20	Jacob González-Solís
	Portugal	Cima Islet	Canary Current	GPS	28	9.10	Vitor Paiva, Jaime Ramos
	Portugal	Selvagens	Canary Current	GLS	103	4.50	Paulo Catry, Jose Pedro Granadeiro, Maria Ana Dias
	Portugal	Berlengas	Iberian Coastal	GLS	23	10.40	Paulo Catry, Jose Pedro Granadeiro, Vitor Paiva, Jaime Ramos
	Portugal	Berlengas	Iberian Coastal	GPS	101	8.50	Vitor Paiva, Jaime Ramos, Ivan Ramirez

Draft OSPAR NACES MPA nomination proforma Annexes
CAVEAT: the nomination proforma text and MPA delineation is subject to change

Species	Country	Colony	LME	Device	N birds	% overlap	Tracking data contributors
Desertas Petrel <i>Pterodroma deserta</i>	Portugal	Bugio	Canary Current	GLS	39	13.40	Ivan Ramirez, Vitor Paiva, Francis Zino, Manuel Biscoito
Great Shearwater <i>Ardena gravis</i>	High Seas	At-Sea	Tristan Gough	PTT	24	2.50	Robert Alfredo Ronconi
	Saint Helena, Ascension and Tristan da Cunha	Gough Island	Tristan Gough	GLS	32	14.20	Jacob González-Solís, Peter Ryan, Richard Cuthbert
	Saint Helena, Ascension and Tristan da Cunha	Inaccessible Island	Tristan Gough	PTT	16	5.00	Robert Alfredo Ronconi
Great Skua <i>Catharacta skua</i>	Iceland	Breidamerkursandur	Iceland Shelf and Sea	GLS	11	19.30	Robert W Furness, Aevor E Petersen, Ellen Magnúsdóttir
	Norway	Bear Island	Barents Sea	GLS	5	23.30	Robert W Furness, Aevor E Petersen, Ellen Magnúsdóttir
	United Kingdom	Foula	North Sea	GLS	4	5.80	Robert W Furness, Aevor E Petersen, Ellen Magnúsdóttir
Little Auk <i>Alle alle</i>	Greenland (to Denmark)	Kap Hoegh	Greenland Sea	GLS	18	30.49	David Gremillet, Jerome Fort
	Greenland (to Denmark)	Thule	Canadian Eastern Arctic - West Greenland	GLS	17	0.04	Anders Mosbech
Long-tailed Jaeger <i>Stercorarius longicaudus</i>	Sweden	Ammarnas	Norwegian Sea + Barents Sea	GLS	23	14.40	Rob van Bemmelen
	Greenland (to Denmark)	Hochstetter Forland	Greenland Sea	GLS	1	9.80	Rob van Bemmelen, Olivier Gilg
	Greenland (to Denmark)	Karupelv	Greenland Sea	GLS	2	13.80	Johannes Lang
	Greenland	North East Greenland	Greenland Sea	PTT	4	16.70	Olivier Gilg
	Greenland (to Denmark)	Zackenbergl	Greenland Sea	GLS	5	14.60	Niels Martin Schmidt
	Norway	Kongsfjorden	Norwegian Sea + Barents Sea	GLS	7	9.70	Borge Moe
Manx Shearwater <i>Puffinus puffinus</i>	United Kingdom	Lundy	Celtic-Biscay Shelf	GLS	24	3.90	Oliver Padget, Tim Guilford
	Iceland	Heimaey	Iceland Shelf and Sea	GLS	21	15.50	Jacob González-Solís
	United Kingdom	Copeland	Celtic-Biscay Shelf	GLS	33	5.00	Oliver Padget, Tim Guilford
	United Kingdom	Rum	Celtic-Biscay Shelf	GLS	14	8.70	Oliver Padget, Tim Guilford
	United Kingdom	Ramsey	Celtic-Biscay Shelf	GLS	11	4.10	Oliver Padget, Tim Guilford
	United Kingdom	Skomer	Celtic-Biscay Shelf	GLS	78	4.10	Oliver Padget, Tim Guilford
Northern Fulmar <i>Fulmarus glacialis</i>	United Kingdom	Eynehallow	North Sea	GLS	72	13.10	Paul Thomson
Northern Gannet <i>Morus bassanus</i>	France	Ile Rouzic	Celtic-Biscay Shelf	GLS	20	0.50	David Gremillet, Justine Dossa
	France	Ile Rouzic	Celtic-Biscay Shelf	GPS	21	0.00	David Gremillet
	United Kingdom	Les Etacs	Celtic-Biscay Shelf	GPS	17	0.00	Louise Soanes, Jonathan Green, Phil Atkinson, Roland Gauvain
	United Kingdom	Bass Rock	North Sea	GPS	78	0.00	Keith Hamer, Ewan Wakefield, Rachel Davies, Ian Cleasby

Draft OSPAR NACES MPA nomination proforma Annexes
CAVEAT: the nomination proforma text and MPA delineation is subject to change

Species	Country	Colony	LME	Device	N birds	% overlap	Tracking data contributors
Razorbill <i>Alca torda</i>	United Kingdom	Ailsa Craig	Celtic-Biscay Shelf	GPS	16	0.00	Keith Hamer, Ewan Wakefield
	United Kingdom	Sule Skerry	North Sea	GPS	2	0.00	Keith Hamer, Jez Blackburn
	Iceland	Grimsey	Iceland Shelf and Sea	GLS	4	1.60	Thorkell Lindberg Thórarinnsson, Yann Kolbeinnsson
	Iceland	Langanes	Iceland Shelf and Sea	GLS	10	1.80	Thorkell Lindberg Thórarinnsson, Yann Kolbeinnsson
	Iceland	Latrabjarg	Iceland Shelf and Sea	GLS	6	2.20	Thorkell Lindberg Thórarinnsson, Yann Kolbeinnsson
	Greenland (to Denmark)	Sand Island	Greenland Sea	GLS	8	5.80	Iain Stenhouse, Carsten Egevang
Scopoli's Shearwater <i>Calonectris diomedea</i>	Spain	Pantaleu	Mediterranean Sea	GLS	24	1.40	Jacob González-SolísJacob González-Solís
	Spain	Chafarinas	Mediterranean Sea	GLS	1	0.20	Jacob González-SolísJacob González-Solís
	Spain	Chafarinas	Mediterranean Sea	PTT	9	0.10	Jose Manuel Arcos
	Malta	Filfla	Mediterranean Sea	GLS	10	1.40	Benjamin Metzger
	Malta	Gharb	Mediterranean Sea	GLS	4	1.90	Benjamin Metzger
	Malta	Hal Far	Mediterranean Sea	GLS	12	1.00	Benjamin Metzger
Sooty Shearwater <i>Ardenna grisea</i>	Falkland Islands (Malvinas)	Kidney Island	Patagonian Shelf	GLS	18	20.00	April Hedd, William Montevecchi
South Polar Skua <i>Stercorarius maccormicki</i>	Antarctica	King George Island	South Shetland Islands	GLS	32	14.50	Hans-Ulrich Peter, Jan Esefeld, Johannes Krietsch, Matthias Kopp
Thick-billed Murre <i>Uria lomvia</i>	Canada	Prince Leopold Island	Arctic Canada	GLS	19	0.10	Laura McFarlane Tranquilla, H. Grant Gilchrist, Mark Mallory, William Montevecchi
	Canada	Coats Island	Hudson Bay Complex	GLS	21	0.00	Laura McFarlane Tranquilla, H. Grant Gilchrist, Mark Mallory, William Montevecchi
	Canada	Digges Islands	Hudson Bay Complex	GLS	10	0.50	Laura McFarlane Tranquilla, H. Grant Gilchrist, Mark Mallory, William Montevecchi
	Canada	Gannet Islands	Atlantic Canada	GLS	11	2.60	Laura McFarlane Tranquilla, H. Grant Gilchrist, Mark Mallory, William Montevecchi
	Greenland (to Denmark)	Innaq	NW Greenland Shelf	GLS	7	4.10	Flemming Merkel
	Greenland (to Denmark)	Kippaku	NW Greenland Shelf	GLS	71	2.30	Morten Frederiksen
	Greenland (to Denmark)	Kitsissut Avaaliit	SW Greenland Shelf	GLS	7	1.40	Jannie Fries Linnebjerg, Morten Frederiksen
	Greenland (to Denmark)	Parker Snow Bay	NW Greenland Shelf	GLS	3	0.00	Anders Mosbech
	Greenland (to Denmark)	Saunders Island	NW Greenland Shelf	GLS	19	0.00	Anders Mosbech
	Iceland	Grimsey	Iceland Shelf and Sea	GLS	9	6.30	Thorkell Lindberg Thórarinnsson, Yann Kolbeinnsson

Species	Country	Colony	LME	Device	N birds	% overlap	Tracking data contributors
	Iceland	Langanes	Iceland Shelf and Sea	GLS	3	1.70	Thorkell Lindberg Thórarinnsson, Yann Kolbeinnsson
	Iceland	Latrabjarg	Iceland Shelf and Sea	GLS	6	3.30	Thorkell Lindberg Thórarinnsson, Yann Kolbeinnsson
	Canada	Minarets	Arctic Canada	GLS	14	7.40	H. Grant Gilchrist, Laura McFarlane Tranquilla, Mark Mallory, William Montevecchi
Zino's Petrel <i>Pterodroma madeira</i>	Portugal	Madeira	Canary Current	GLS	12	26.20	Frank Zino, Manuel Bischoito

Table A0.2. Final list of species and LME considered, with an estimate of the number of birds.

The analysis was performed only when the LME population size (i.e. LME N mature individuals) accounted for more than 1% of the biogeographic (EU mature individuals) or global population estimates and when the number of birds (i.e. N birds) in the LME was higher than 5.

Species	N birds	LME	LME N mature individuals	EU mature individuals ¹	EU Red List Status ¹	1%th	more1%th	Reference s for population estimates
Arctic Tern	9	Greenland Sea	165000	1470000	LC	14700	1.00	European Red List (value for all Greenland: 65000-100000)
Atlantic Puffin	71	Celtic-Biscay Shelf	559496	10575000	EN	105750	1.00	Harris and Wanless 2011; checked by Sarah Wanless
Atlantic Puffin	33	Iceland Shelf and Sea	3920000	10575000	EN	105750	1.00	checked by Erpur Hansen
Atlantic Puffin	40	North Sea	642116	10575000	EN	105750	1.00	Harris and Wanless 2011; checked by Sarah Wanless
Audubon's Shearwater	4	Azores	2636	6750	NT	67.5	1.00	European Red List
Audubon's Shearwater	23	Canary Current	4084	6750	NT	67.5	1.00	European Red List
Bermuda Petrel	11	Bermuda	142	142	EN	1.42	1.00	BirdLife International 2016
Black-legged Kittiwake	14	Iceland Shelf and Sea	1161808	3935000	VU	39350	1.00	Garðarsson et al. (2013)
Black-legged Kittiwake	76	North Sea	622580	3935000	VU	39350	1.00	Frederiksen et al. (2012)
Black-legged Kittiwake	66	Norwegian Sea	160000	3935000	VU	39350	1.00	Frederiksen et al. (2012)
Black-legged Kittiwake	51	Barents Sea	1079800	3935000	VU	39350	1.00	Frederiksen et al. (2012)
Black-legged Kittiwake	10	Faroe Plateau West	320000	3935000	VU	39350	1.00	Frederiksen et al. (2012)
Black-legged Kittiwake	46	Spitsbergen West	234000	3935000	VU	39350	1.00	Frederiksen et al. (2012)
Black-legged Kittiwake	25	Greenland Shelf	206696	3935000	VU	39350	1.00	Frederiksen et al. (2012)
Black-legged Kittiwake	2	Arctic Canada	242000	3935000	VU	39350	1.00	Frederiksen et al. (2012)

Species	N birds	LME	LME N mature individuals	EU mature individuals ¹	EU Red List Status ¹	1%th	more1%th	Reference s for population estimates
Black-legged Kittiwake	12	Celtic-Biscay Shelf	244694	3935000	VU	39350	1.00	Frederiksen et al. (2012)
Bulwer's Petrel	37	Cape Verde	6000	102200	LC	1022	1.00	Ramos et al. 2015; Catry et al. 2015 assumed 45000 pairs in Deserta (http://www.spea.pt/fotos/editor2/2_airo23.pdf) and numbers from European Red List (5000 in Madeira, 1000 in Canaries)
Bulwer's Petrel	59	Canary Current	100000	102200	LC	1022	1.00	European Red List
Bulwer's Petrel	13	Azores	120	102200	LC	1022	0.00	
Common Murre	20	Iceland Shelf and Sea Labrador - Newfoundland	1392408	2705000	NT	27050	1.00	Garðarsson et al. 2016 (in press)
Common Murre	48		1392408	2705000	NT	27050	1.00	
Cory's Shearwater	100	Azores	376000	505500	LC	5055	1.00	European Red List. LME: checked by Maria Dias
Cory's Shearwater	249	Canary Current	127430	505500	LC	5055	1.00	Ramos et al. 2013 (DOI: 10.1111/ddi.12088). LME: checked by Maria Dias
Cory's Shearwater	124	Iberian Coastal Canary	2250	505500	LC	5055	0.00	Iberian Coast: 1025 in Berlenga (Lecoq et al. 2011) +100 in Galiza (Munilla et al. 2016; http://dx.doi.org/10.1371/journal.pone.0147222). LME: checked by Maria Dias.
Desertas Petrel	72	Current	340	340	VU	3.4	1.00	LME: checked by Vitor Paiva
Great Shearwater	72	Tristan Gough	8000000	8000000	LC	80000	1.00	Pers. Comm. Peter Ryan (under 2M each for Nightingale and Inaccessible, and 980000 for Gough)
Great Skua	5	Barents Sea	132	33550	LC	335.5	0.00	Furness 1987
Great Skua	11	Iceland Shelf and Sea	10800	33550	LC	335.5	1.00	European Red List
Great Skua	4	North Sea	14300	33550	LC	335.5	1.00	Furness 1987
Little Auk	18	Greenland Sea Canadian Eastern Arctic - West	7000000	45600000	LC	456000	1.00	Boertmann & Mosbech 1998
Little Auk	17	Greenland		45600000	LC	456000		
Long-tailed Jaeger	12	Greenland Sea Norwegian Sea	21000	72850	LC	728.5	1.00	European Red List. All Greenland combined - not only Greenland Sea (west part); 1000-20000
Long-tailed Jaeger	30	+ Barents Sea	51856	72850	LC	728.5	1.00	European Red List (values from Finland, Norway, Svalbard, Russia, Sweden)
Manx Shearwater	21	Iceland Shelf and Sea	20000	734500	LC	7345	1.00	Tim Guilford pers. comm. / checked by Erpur Hansen

Species	N birds	LME	LME N mature individuals	EU mature individuals ¹	EU Red List Status ¹	1%th	more1%th	Reference s for population estimates
Manx Shearwater	160	Celtic-Biscay Shelf	962510	734500	LC	7345	1.00	Tim Guilford pers. comm. for UK, plus European Red List values for Rep. Ireland and France
Northern Fulmar	72	North Sea	756210	6880000	EN	68800	1.00	Checked by Ewan Wakefield
Razorbill	20	Iceland Shelf and Sea	626944	999500	NT	9995	1.00	Garðarsson et al. 2016 (in press).
Sabine's Gull	8	Greenland Sea	3000	3100	LC	31	1.00	European Red List (value for all Greenland: 1000-2000)
Sooty Shearwater	18	Patagonian Shelf	600000	20000000	NT	200000	1.00	IBA factsheet (http://datazone.birdlife.org/site/factsheet/20858)
South Polar Skua	32	South Shetland Islands	1542	18000	LC	180	1.00	Ritz et al. (2006), Carneiro et al. (2016)
Thick-billed Murre	100	NW Greenland Shelf	856200	2380000	LC	23800	1.00	Frederiksen et al. (2016)
Thick-billed Murre	7	SW Greenland Shelf	37600	2380000	LC	23800	0.00	Frederiksen et al. (2016)
Thick-billed Murre	18	Iceland Shelf and Sea	653688	2380000	LC	23800	1.00	Garðarsson et al. 2016 (in press). Info supplied by him
Thick-billed Murre	33	Arctic Canada	1080000	2380000	LC	23800	1.00	Frederiksen et al. (2016)
Thick-billed Murre	45	Hudson Bay Complex	2000000	2380000	LC	23800	1.00	Frederiksen et al. (2016)
Thick-billed Murre	11	Atlantic Canada	16352	2380000	LC	23800	0.00	Frederiksen et al. (2016)
Zino's Petrel	12	Canary Current	160	145	EN	1.45	1.00	Checked by Frank Zino

^{1.} For species breeding in Europe; for all the other species, global population estimates and Global Red List classification were used

Table A0.3: Breeding stages in each year quarter, for each species and LME (January-June).

NA: data not available, NO: no overlap between data and target area.

Arctic Tern	<u>Q1</u>						<u>Q2</u>					
Greenland Sea	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	winter	winter	winter	winter	migration	migration	incubation	incubation
N locations	NO	NO	NO	NO	NO	NO	NO	NO	1508	1508	NA	NA
N birds	NO	NO	NO	NO	NO	NO	NO	NO	9	9	NA	NA
Atlantic Puffin	<u>Q1</u>						<u>Q2</u>					
Celtic-Biscay Shelf	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	pre-breed	pre-breed	incubation	incubation	incubation	chick-rearing	chick-rearing	chick-rearing
N locations	35669	35669	35669	35669	1195	1195	1074	1074	1074	3777	3777	3777
N birds	70	70	70	70	65	65	17	17	17	52	52	52
Atlantic Puffin	<u>Q1</u>						<u>Q2</u>					
North Sea	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	migration	pre-breed	pre-laying	incubation	incubation	incubation	chick-rearing	chick-rearing
N locations	10656	10656	10656	10656	2591	NA	NA	NA	NA	NA	1121	1121
N birds	40	40	40	40	40	NA	NA	NA	NA	NA	40	40
Atlantic Puffin	<u>Q1</u>						<u>Q2</u>					
Iceland Shelf & Sea	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	migration	migration	pre-breed	pre-breed	pre-breed	pre-laying	incubation	incubation
N locations	8618	8618	8618	8618	520	520	1700	1700	1700	73	179	179
N birds	34	34	34	34	21	21	22	22	22	8	12	12
Audubon's Shearwater	<u>Q1</u>						<u>Q2</u>					
Canary Current	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	pre-breed	incubation	incubation	incubation	incubation	chick-rearing	chick-rearing	chick-rearing	chick-rearing	chick-rearing	migration	winter
N locations	2238	1625	1625	1625	1625	2919	2919	2919	2919	2919	1240	4883
N birds	20	23	23	23	23	23	23	23	23	23	22	22
Bermuda Petrel	<u>Q1</u>						<u>Q2</u>					
Bermuda	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	incubation	incubation	incubation	incubation	incubation	chick-rearing	chick-rearing	chick-rearing	chick-rearing	chick-rearing	chick-rearing	chick-rearing
N locations	151	151	151	151	151	NO	NO	NO	NO	NO	NO	NO

Draft OSPAR NACES MPA nomination proforma Annexes
CAVEAT: the nomination proforma text and MPA delineation is subject to change

N birds	7	7	7	7	7	NO	NO	NO	NO	NO	NO	NO
Black-legged Kittiwake	<u>Q1</u>						<u>Q2</u>					
Faroe Plateau	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	winter	winter	pre-laying	pre-laying	pre-laying	incubation	incubation	chick-rearing
N locations	3314	3314	3314	3314	3314	3314	884	884	884	208	208	542
N birds	10	10	10	10	10	10	10	10	10	10	10	10
Black-legged Kittiwake	<u>Q1</u>						<u>Q2</u>					
Iceland Shelf & Sea	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	winter	winter	pre-laying	pre-laying	pre-laying	pre-laying	incubation	incubation
N locations	6119	6119	6119	6119	6119	6119	1706	1706	1706	1706	NA	NA
N birds	14	14	14	14	14	14	14	14	14	14	NA	NA
Black-legged Kittiwake	<u>Q1</u>						<u>Q2</u>					
Norwegian Sea	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	pre-laying	pre-laying	pre-laying	pre-laying	pre-laying	pre-laying	pre-laying	incubation	incubation	chick-rearing
N locations	20668	20668	9468	9468	9468	9468	9468	9468	9468	198	198	2350
N birds	66	66	65	65	65	65	65	65	65	10	10	60
Black-legged Kittiwake	<u>Q1</u>						<u>Q2</u>					
Barents Sea	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	winter	winter	winter	pre-laying	pre-laying	pre-laying	incubation	incubation
N locations	18332	18332	18332	18332	18332	18332	18332	1135	1135	1135	NA	NA
N birds	51	51	51	51	51	51	51	50	50	50	NA	NA
Black-legged Kittiwake	<u>Q1</u>						<u>Q2</u>					
North Sea	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	winter	winter	migration	pre-breeding	pre-laying	incubation	incubation	chick-rearing
N locations	22467	22467	22467	22467	22467	22467	6211	2307	2081	1702	1702	4873
N birds	76	76	76	76	76	76	76	76	76	48	48	76
Black-legged Kittiwake	<u>Q1</u>						<u>Q2</u>					
Celtic-Biscay Shelf	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	winter	winter	migration	pre-breeding	pre-laying	incubation	incubation	chick-rearing
N locations	3401	3401	3401	3401	3401	3401	944	300	300	267	267	607
N birds	12	12	12	12	12	12	12	10	10	10	10	12

Black-legged Kittiwake West Spitsbergen	<u>Q1</u>						<u>Q2</u>					
	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	winter	winter	winter	winter	pre-laying	pre-laying	pre-laying	incubation
N locations	14587	14587	14587	14587	14587	14587	14587	14587	NA	NA	NA	NA
N birds	46	46	46	46	46	46	46	46	NA	NA	NA	NA
Bulwer's Petrel Canary Current	<u>Q1</u>						<u>Q2</u>					
	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	winter	winter	winter	migration	pre-breed	pre-breed	incubation	incubation
N locations	NO	NO	NO	NO	NO	NO	NO	1356	2786	2786	3349	3349
N birds	NO	NO	NO	NO	NO	NO	NO	43	46	46	48	48
Common Murre Iceland Shelf & Sea	<u>Q1</u>						<u>Q2</u>					
	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	migration	pre-breed	pre-laying	incubation	incubation	incubation	chick-rearing	chick-rearing
N locations	5668	5668	5668	5668	301	NA	538	1415	1415	1415	228	228
N birds	20	20	20	20	20	NA	20	20	20	20	19	19
Cory's Shearwater Azores	<u>Q1</u>						<u>Q2</u>					
	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	migration	migration	pre-breed	pre-breed	pre-breed	pre-laying exodus	incubation	incubation
N locations	8190	8190	8190	8190	3047	3047	2851	2851	2851	1045	8322	8322
N birds	23	23	23	23	27	27	27	27	27	23	45	45
Cory's Shearwater Canary Current	<u>Q1</u>						<u>Q2</u>					
	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	migration	migration	pre-breed	pre-breed	pre-breed	pre-breed	pre-laying exodus	incubation
N locations	58244	58244	58244	58244	22081	22081	20081	20081	20081	20081	3777	10785
N birds	221	221	221	221	221	221	165	165	165	165	135	125
Desertas Petrel Canary Current	<u>Q1</u>						<u>Q2</u>					
	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd

Draft OSPAR NACES MPA nomination proforma Annexes
CAVEAT: the nomination proforma text and MPA delineation is subject to change

Stage	winter	winter	winter	winter	winter	winter	winter	winter	winter	winter	migration	pre-breed	pre-breed
N locations	17763	17763	17763	17763	17763	17763	17763	17763	17763	17763	3564	2403	2403
N birds	39	39	39	39	39	39	39	39	39	39	39	37	37

Great Shearwater	<u>Q1</u>						<u>Q2</u>					
Tristan Gough	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	incubation	chick-rearing	chick-rearing	chick-rearing	chick-rearing	chick-rearing	chick-rearing	migration	migration	migration	winter	winter
N locations	NO	NO	NO	NO	NO	NO	NO	13357	13357	13357	13357	13357
N birds	NO	NO	NO	NO	NO	NO	NO	69	69	69	54	54
Great Skua	<u>Q1</u>						<u>Q2</u>					
Iceland Shelf & Sea	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	migration	migration	migration	migration	incubation	incubation	chick-rearing	chick-rearing
N locations	3024	3024	3024	3024	1560	1560	1560	1560	600	600	1078	1078
N birds	11	11	11	11	11	11	11	11	11	11	11	11
Little Auk	<u>Q1</u>						<u>Q2</u>					
Greenland Sea	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	winter	winter	migration	migration	pre-laying	pre-laying	pre-laying	incubation
N locations	4470	4470	4470	4470	4470	4470	1664	1664	62	62	62	NA
N birds	18	18	18	18	18	18	18	18	12	12	12	NA
Long-tailed Jaeger	<u>Q1</u>						<u>Q2</u>					
Greenland Sea	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	winter	migration	migration	migration	migration	pre-breed	pre-breed	incubation
N locations	4361	4361	4361	4361	4361	1812	1812	1812	1812	164	164	NA
N birds	12	12	12	12	12	8	8	8	8	7	7	NA
Long-tailed Jaeger	<u>Q1</u>						<u>Q2</u>					
Norwegian + Barents	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	migration	migration	migration	migration	migration	migration	pre-breed	incubation	incubation
N locations	NO	NO	NO	13323	13323	13323	13323	13323	13323	679	NA	NA
N birds	30	30	30	30	30	30	30	30	30	19		
Manx Shearwater	<u>Q1</u>						<u>Q2</u>					

Draft OSPAR NACES MPA nomination proforma Annexes
CAVEAT: the nomination proforma text and MPA delineation is subject to change

Celtic-Biscay Shelf	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	winter	migration	pre-breed	pre-breed	exodus	incubation	incubation	incubation
N locations	NO	NO	NO	NO	NO	NO	8875	8875	7047	11184	11184	11184
N birds	NO	NO	NO	NO	NO	NO	144	144	139	148	148	148

Manx Shearwater Iceland Shelf & Sea	<u>Q1</u>						<u>Q2</u>					
	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	migration	migration	migration	pre-breed	pre-breed	pre-laying exodus	incubation	incubation
N locations	NO	NO	NO	NO	2279	2279	2279	1938	1938	725	1111	1111
N birds	NO	NO	NO	NO	21	21	21	20	20	19	21	21
Northern Fulmar North Sea	<u>Q1</u>						<u>Q2</u>					
	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	winter	winter	pre-breed	pre-laying exodus	pre-laying exodus	incubation	incubation	incubation
N locations	31438	31438	31438	31438	31438	31438	1044	3813	3813	3238	3238	3238
N birds	68	68	68	68	68	68	53	55	55	54	54	54
Razorbill Iceland Shelf & Sea	<u>Q1</u>						<u>Q2</u>					
	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	migration	migration	pre-breed	pre-breed	pre-breed	pre-laying	incubation	incubation
N locations	5059	5059	5059	5059	629	629	1734	1734	1734	NO	162	162
N birds	19	19	19	19	19	19	20	20	20	NO	16	16
Sabine's Gull Greenland Sea	<u>Q1</u>						<u>Q2</u>					
	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	winter	migration	migration	migration	staging	migration	incubation	incubation
N locations	NO	NO	NO	NO	NO	1029	1029	1029	NO	1029	NA	NA
N birds	NO	NO	NO	NO	NO	8	8	8	NO	8	NA	NA
Sooty Shearwater Patagonian Shelf	<u>Q1</u>						<u>Q2</u>					
	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	incubation	chick-rearing	chick-rearing	chick-rearing	chick-rearing	chick-rearing	migration	winter	winter	winter	winter	winter

Draft OSPAR NACES MPA nomination proforma Annexes
CAVEAT: the nomination proforma text and MPA delineation is subject to change

N locations	NO	NO	NO	NO	NO	NO	1007	4980	4980	4980	4980	4980
N birds	NO	NO	NO	NO	NO	NO	18	18	18	18	18	18
South Polar Skua	<u>Q1</u>						<u>Q2</u>					
South Shetland Is	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	breeding	breeding	breeding	breeding	breeding	breeding	migration	migration	migration	migration	winter	winter
N locations	NO	NO	NO	NO	NO	NO	4975	4975	4975	4975	5688	5688
N birds	NO	NO	NO	NO	NO	NO	32	32	32	32	32	32

Thick-billed Murre	<u>Q1</u>						<u>Q2</u>					
Arctic Canada	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	winter	winter	winter	winter	winter	pre-laying	pre-laying	pre-laying
N locations	10446	10446	10446	10446	10446	10446	10446	10446	10446	NO	NO	NO
N birds	32	32	32	32	32	32	32	32	32	NO	NO	NO
Thick-billed Murre	<u>Q1</u>						<u>Q2</u>					
NW Greenland Shelf	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	winter	winter	winter	winter	pre-laying	pre-laying	pre-laying	incubation
N locations	33455	33455	33455	33455	33455	33455	33455	33455	NO	NO	NO	NA
N birds	100	100	100	100	100	100	100	100	NO	NO	NO	NA
Thick-billed Murre	<u>Q1</u>						<u>Q2</u>					
Iceland Shelf & Sea	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	winter	winter	winter	winter	winter	winter	winter	winter	pre-laying	pre-laying	pre-laying	incubation
N locations	4762	4762	4762	4762	4762	4762	4762	4762	494	494	494	130
N birds	18	18	18	18	18	18	18	18	18	18	18	14
Zino's Petrel	<u>Q1</u>						<u>Q2</u>					
Canary Current	Jan_1st	Jan_2nd	Feb_1st	Feb_2nd	Mar_1st	Mar_2nd	Apr_1st	Apr_2nd	May_1st	May_2nd	Jun_1st	Jun_2nd
Stage	non-breeding	non-breeding	non-breeding	non-breeding	non-breeding	non-breeding	breeding	breeding	breeding	breeding	breeding	breeding
N locations	3278	3278	3278	3278	3278	3278	1764	1764	1764	1764	1764	1764
N birds	11	11	11	11	11	11	11	11	11	11	11	11

Table A0.4: Breeding stages in each year quarter, for each species and LME (July-December).

NA: data not available, NO: no overlap between data and target area.

Arctic Tern	<u>Q3</u>						<u>Q4</u>					
Greenland Sea	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	chick-rearing	chick-rearing	chick-rearing	migration	staging	migration	migration	migration	migration	winter	winter	winter
N locations	NA	NA	NA	1508	268	1508	1508	1508	1508	NO	NO	NO
N birds	NA	NA	NA	9	9	9	9	9	9	NO	NO	NO
Atlantic Puffin	<u>Q3</u>						<u>Q4</u>					
Celtic-Biscay Shelf	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	chick-rearing	chick-rearing	chick-rearing / exodus	exodus / winter	winter	winter	winter	winter	winter	winter	winter	winter
N locations	3777	3777	3400	3631	35669	35669	35669	35669	35669	35669	35669	35669
N birds	52	52	71	70	70	70	70	70	70	70	70	70
Atlantic Puffin	<u>Q3</u>						<u>Q4</u>					
North Sea	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	chick-rearing	chick-rearing	migration	migration	winter	winter	winter	winter	winter	winter	winter	winter
N locations	1121	1121	2591	2591	10656	10656	10656	10656	10656	10656	10656	10656
N birds	40	40	40	40	40	40	40	40	40	40	40	40
Atlantic Puffin	<u>Q3</u>						<u>Q4</u>					
Iceland Shelf & Sea	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	incubation	chick-rearing	chick-rearing	chick-rearing	chick-rearing	migration	migration	winter	winter	winter	winter	winter
N locations	179	3181	3181	3181	3181	520	520	8618	8618	8618	8618	8618
N birds	12	35	35	35	35	21	21	34	34	34	34	34
Audubon's Shearwater	<u>Q3</u>						<u>Q4</u>					
Canary Current	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	winter	winter	winter	winter	winter	winter	winter	winter	migration	pre-breed	pre-breed	pre-breed
N locations	4883	4883	4883	4883	4883	4883	4883	4883	4883	4883	4883	4883
N birds	22	22	22	22	22	22	22	22	22	22	22	22
Bermuda Petrel	<u>Q3</u>						<u>Q4</u>					
Bermuda	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	migration	migration	non-breeding	non-breeding	non-breeding	non-breeding	non-breeding	migration / pre-breed	pre-breed	pre-breed	pre-laying	pre-laying exodus

Draft OSPAR NACES MPA nomination proforma Annexes
CAVEAT: the nomination proforma text and MPA delineation is subject to change

N locations	1565	1565	1565	1565	1565	1565	1565	1565	500	500	500	500
N birds	11	11	11	11	11	11	11	11	9	9	9	9
Black-legged Kittiwake	<u>Q3</u>						<u>Q4</u>					
Faroe Plateau	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	chick-rearing	chick-rearing	chick-rearing	winter	winter	winter	winter	winter	winter	winter	winter	winter
N locations	542	542	542	3314	3314	3314	3314	3314	3314	3314	3314	3314
N birds	10	10	10	10	10	10	10	10	10	10	10	10
Black-legged Kittiwake	<u>Q3</u>						<u>Q4</u>					
Iceland Shelf & Sea	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	chick-rearing	chick-rearing	chick-rearing	winter	winter	winter	winter	winter	winter	winter	winter	winter
N locations	762	762	762	6119	6119	6119	6119	6119	6119	6119	6119	6119
N birds	14	14	14	14	14	14	14	14	14	14	14	14
Black-legged Kittiwake	<u>Q3</u>						<u>Q4</u>					
Norwegian Sea	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	chick-rearing	chick-rearing	chick-rearing	winter	winter	winter	winter	winter	winter	winter	winter	winter
N locations	2350	2350	2350	20668	20668	20668	20668	20668	20668	20668	20668	20668
N birds	60	60	60	66	66	66	66	66	66	66	66	66
Black-legged Kittiwake	<u>Q3</u>						<u>Q4</u>					
Barents Sea	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	chick-rearing	chick-rearing	chick-rearing	winter	winter	winter	winter	winter	winter	winter	winter	winter
N locations	129	129	129	18332	18332	18332	18332	18332	18332	18332	18332	18332
N birds	15	15	15	51	51	51	51	51	51	51	51	51
Black-legged Kittiwake	<u>Q3</u>						<u>Q4</u>					
North Sea	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	chick-rearing	chick-rearing	migration	migration	winter	winter	winter	winter	winter	winter	winter	winter
N locations	4873	4873	6211	6211	22467	22467	22467	22467	22467	22467	22467	22467
N birds	76	76	76	76	76	76	76	76	76	76	76	76
Black-legged Kittiwake	<u>Q3</u>						<u>Q4</u>					
Celtic-Biscay Shelf	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	chick-rearing	chick-rearing	migration	migration	winter	winter	winter	winter	winter	winter	winter	winter
N locations	607	607	944	944	3401	3401	3401	3401	3401	3401	3401	3401

Draft OSPAR NACES MPA nomination proforma Annexes
CAVEAT: the nomination proforma text and MPA delineation is subject to change

N birds	12	12	12	12	12	12	12	12	12	12	12	12
---------	----	----	----	----	----	----	----	----	----	----	----	----

Black-legged Kittiwake	<u>Q3</u>						<u>Q4</u>					
West Spitsbergen	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	incubation	chick-rearing	chick-rearing	winter	winter	winter	winter	winter	winter	winter	winter	winter
N locations	NA	NA	NA	14587	14587	14587	14587	14587	14587	14587	14587	14587
N birds	NA	NA	NA	46	46	46	46	46	46	46	46	46
Bulwer's Petrel	<u>Q3</u>						<u>Q4</u>					
Canary Current	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	incubation	chick-rearing	chick-rearing	chick-rearing	chick-rearing	migration	winter	winter	winter	winter	winter	winter
N locations	3349	4457	4457	4457	4457	1356	NO	NO	NO	NO	NO	NO
N birds	48	47	47	47	47	43	NO	NO	NO	NO	NO	NO
Common Murre	<u>Q3</u>						<u>Q4</u>					
Iceland Shelf & Sea	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	chick-rearing	migration	winter	winter	winter	winter	winter	winter	winter	winter	winter	winter
N locations	228	301	5668	5668	5668	5668	5668	5668	5668	5668	5668	5668
N birds	19	20	20	20	20	20	20	20	20	20	20	20
Cory's Shearwater	<u>Q3</u>						<u>Q4</u>					
Azores	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	incubation	incubation	chick-rearing	chick-rearing	chick-rearing	chick-rearing	chick-rearing	chick-rearing	migration	migration	winter	winter
N locations	8322	8322	152193	152193	152193	152193	152193	152193	3047	3047	8190	8190
N birds	45	45	86	86	86	86	86	86	27	27	23	23
Cory's Shearwater	<u>Q3</u>						<u>Q4</u>					
Canary Current	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	incubation	incubation	chick-rearing	chick-rearing	chick-rearing	chick-rearing	chick-rearing	chick-rearing	migration	migration	winter	winter
N locations	10785	10785	106058	106058	106058	106058	106058	106058	22081	22081	58244	58244
N birds	125	125	249	249	249	249	221 + 28	221 + 28	221	221	221	221
Desertas Petrel	<u>Q3</u>						<u>Q4</u>					
Canary Current	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd

Draft OSPAR NACES MPA nomination proforma Annexes
CAVEAT: the nomination proforma text and MPA delineation is subject to change

Stage	pre-laying exodus	incubation	incubation	incubation	incubation	chick-rearing	chick-rearing	chick-rearing	chick-rearing	migration	winter	winter
N locations	1424	5139	5139	5139	5139	4556	4556	4556	4556	3564	17763	17763
N birds	38	38	38	38	38	39	39	39	39	39	39	39

Great Shearwater	<u>Q3</u>						<u>Q4</u>					
Tristan Gough	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	winter	winter	winter	migration	migration	migration	pre-breeding	pre-breeding	pre-breeding	incubation	incubation	incubation
N locations	7764	7764	7764	13357	13357	13357	NO	NO	NO	NO	NO	NO
N birds	54	54	54	69	69	69	NO	NO	NO	NO	NO	NO
Great Skua	<u>Q3</u>						<u>Q4</u>					
Iceland Shelf & Sea	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	chick-rearing	chick-rearing	migration	migration	migration	migration	winter	winter	winter	winter	winter	winter
N locations	1078	1078	1560	1560	1560	1560	3024	3024	3024	3024	3024	3024
N birds	11	11	11	11	11	11	11	11	11	11	11	11
Little Auk	<u>Q3</u>						<u>Q4</u>					
Greenland Sea	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	incubation	chick-rearing	chick-rearing	moult	moult	moult	migration	migration	winter	winter	winter	winter
N locations	NA	NA	NA	285	285	285	1664	1664	4470	4470	4470	4470
N birds	NA	NA	NA	18	18	18	18	18	18	18	18	18
Long-tailed Jaeger	<u>Q3</u>						<u>Q4</u>					
Greenland Sea	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	incubation	chick-rearing	chick-rearing	migration	migration	migration	migration	winter	winter	winter	winter	winter
N locations	NA	226	226	1812	1812	1812	1812	4361	4361	4361	4361	4361
N birds	NA	6	6	8	8	8	8	12	12	12	12	12
Long-tailed Jaeger	<u>Q3</u>						<u>Q4</u>					
Norwegian + Barents	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	chick-rearing	chick-rearing	migration	migration	migration	winter	winter	winter	winter	winter	winter	winter
N locations	1150	1150	13323	13323	13323	NO	NO	NO	NO	NO	NO	NO
N birds	19	19	30	30	30	30	30	30	30	30	30	30

Draft OSPAR NACES MPA nomination proforma Annexes
CAVEAT: the nomination proforma text and MPA delineation is subject to change

Manx Shearwater Celtic-Biscay Shelf	<u>Q3</u>						<u>Q4</u>					
	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	chick-rearing	chick-rearing	chick-rearing	chick-rearing	chick-rearing	pre-migration	migration	winter	winter	winter	winter	winter
N locations	35293	35293	35293	35293	35293	NA	NO	NO	NO	NO	NO	NO
N birds	159	159	159	159	159	NA	NO	NO	NO	NO	NO	NO

Manx Shearwater Iceland Shelf & Sea	<u>Q3</u>						<u>Q4</u>					
	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	incubation	chick-rearing	chick-rearing	chick-rearing	chick-rearing	chick-rearing	migration	migration	winter	winter	winter	winter
N locations	1111	3146	3146	3146	3146	3146	2279	2279	NO	NO	NO	NO
N birds	21	21	21	21	21	21	21	21	NO	NO	NO	NO
Northern Fulmar North Sea	<u>Q3</u>						<u>Q4</u>					
	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	chick-rearing	chick-rearing	chick-rearing	chick-rearing	winter	winter	winter	winter	winter	winter	winter	winter
N locations	8418	8418	8418	8418	31438	31438	31438	31438	31438	31438	31438	31438
N birds	59	59	59	59	68	68	68	68	68	68	68	68
Razorbill Iceland Shelf & Sea	<u>Q3</u>						<u>Q4</u>					
	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	incubation	chick-rearing	chick-rearing	chick-rearing	chick-rearing	migration	migration	winter	winter	winter	winter	winter
N locations	162	NO	NO	NO	NO	629	629	5059	5059	5059	5059	5059
N birds	16	NO	NO	NO	NO	19	19	19	19	19	19	19
Sabine's Gull Greenland Sea	<u>Q3</u>						<u>Q4</u>					
	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	chick-rearing	chick-rearing	chick-rearing	migration	migration	staging	staging	migration	migration	winter	winter	winter
N locations	NA	NA	NA	1029	1029	NO	NO	1029	1029	NO	NO	NO
N birds	NA	NA	NA	8	8	NO	NO	8	8	NO	NO	NO
Sooty Shearwater Patagonian Shelf	<u>Q3</u>						<u>Q4</u>					
	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	winter	winter	winter	winter	migration	migration	pre-breeding	pre-breeding	pre-laying	incubation	incubation	incubation

Draft OSPAR NACES MPA nomination proforma Annexes
CAVEAT: the nomination proforma text and MPA delineation is subject to change

N locations	4980	4980	4980	4980	1007	1007	NO	NO	NO	NO	NO	NO
N birds	18	18	18	18	18	18	NO	NO	NO	NO	NO	NO
South Polar Skua	<u>Q3</u>						<u>Q4</u>					
South Shetland Is	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	winter	winter	winter	winter	migration	migration	migration	migration	breeding	breeding	breeding	breeding
N locations	5688	5688	5688	5688	4975	4975	4975	4975	NO	NO	NO	NO
N birds	32	32	32	32	32	32	32	32	NO	NO	NO	NO

Thick-billed Murre	<u>Q3</u>						<u>Q4</u>					
Arctic Canada	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	incubation	incubation	chick-rearing	chick-rearing	moult	moult	moult	winter	winter	winter	winter	winter
N locations	NA	NA	NO	NO	NO	NO	NO	10446	10446	10446	10446	10446
N birds	NA	NA	NO	NO	NO	NO	NO	32	32	32	32	32
Thick-billed Murre	<u>Q3</u>						<u>Q4</u>					
NW Greenland Shelf	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	incubation	chick-rearing	chick-rearing	moult	moult	moult	winter	winter	winter	winter	winter	winter
N locations	NA	NO	NO	NO	NO	NO	33455	33455	33455	33455	33455	33455
N birds	NA	NO	NO	NO	NO	NO	100	100	100	100	100	100
Thick-billed Murre	<u>Q3</u>						<u>Q4</u>					
Iceland Shelf & Sea	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	incubation	chick-rearing	chick-rearing	moult	moult	moult	winter	winter	winter	winter	winter	winter
N locations	130	596	596	577	577	577	4762	4762	4762	4762	4762	4762
N birds	14	18	18	18	18	18	18	18	18	18	18	18
Zino's Petrel	<u>Q3</u>						<u>Q4</u>					
Canary Current	Jul_1st	Jul_2nd	Aug_1st	Aug_2nd	Sep_1st	Sep_2nd	Oct_1st	Oct_2nd	Nov_1st	Nov_2nd	Dec_1st	Dec_2nd
Stage	breeding	breeding	breeding	breeding	breeding	breeding	non-breeding	non-breeding	non-breeding	non-breeding	non-breeding	non-breeding
N locations	1764	1764	1764	1764	1764	1764	3278	3278	3278	3278	3278	3278
N birds	11	11	11	11	11	11	11	11	11	11	11	11

4. References

- BirdLife International 2010. Marine Important Bird Areas toolkit: standardised techniques for identifying priority sites for the conservation of seabirds at sea. BirdLife International, Cambridge UK. Version 1.2: February 2011
- BirdLife International 2016 Important Bird Areas factsheet: Kidney Island Group. Downloaded from <http://www.birdlife.org> on 23/03/2016.
- BirdLife International 2017 IUCN Red List for birds. Downloaded from <http://www.birdlife.org> on 14/09/2017.
- BirdLife International 2015. European Red List of Birds. Luxembourg: Office for Official Publications of the European Communities
- Boertmann D, Mosbech A., 1998. Distribution of little auk (*Alle alle*) breeding colonies in Thule District, northwest Greenland. Polar Biology 19, 206–10. doi:10.1007/s003000050236
- Carneiro AP, Manica A, Phillips RA., 2016. Long-term changes in population size, distribution and productivity of skuas (*Stercorarius* spp.) at Signy Island, South Orkney Islands. Polar Biology 39, 617–25. doi:10.1007/s00300-015-1817-6
- Catry P, Dias MP, Catry T, Pedro P, Tenreiro P, & Menezes D., 2015. Bulwer's petrels breeding numbers on the Desertas Islands (Madeira): improved estimates indicate the NE Atlantic population to be much larger than previously thought. Airo 23, 10–14.
- Fishpool, L. D. C. and Evans, M. I., eds. 2001 Important Bird Areas in Africa and associated islands: Priority sites for conservation. Newbury and Cambridge, UK: Pisces Publications and BirdLife International. (BirdLife Conservation Series No. 11).,
- Frederiksen M, Descamps S, Erikstad KE, Gaston AJ, Gilchrist HG, et al., 2016. Migration and wintering of a declining seabird, the Thick-billed Murre *Uria lomvia*, on an ocean basin scale: Conservation implications. Biological Conservation 31, 26-35. doi:10.1016/j.biocon.2016.05.011
- Frederiksen, M., Moe, B., Daunt, F., Phillips, R.A., Barrett, R.T., et al., 2012. Multicolony tracking reveals the winter distribution of a pelagic seabird on an ocean basin scale. Diversity and Distributions 18, 530–542. doi:10.1111/j.1472-4642.2011.00864.x
- Furness RW., 1987. The Skuas. T and AD Poyser, Calton.
- Garðarsson A, Guðmundsson GA & Lilliendahl K., 2013. Framvinda íslenskra ritubyggða. (Numbers of Kittiwakes in Iceland in 2005-2009 and recent changes.). Bliki 32, 1-10.
- Garðarsson A, Guðmundsson GA & Lilliendahl K., 2016. Svartfugl í íslenskum fuglabjörgum 2006-2008. (Numbers of Murres (*Uria aalge* and *U. lomvia*) and Razorbills (*Alca torda*) in Iceland in 2006-2008.). Bliki 33, In press.
- Harris MP & Wanless S., 2011. The Puffin. London: T. & A.D. Poyser.

- Lascelles, B.G, Taylor, P., Miller, M., Dias, M.P., Oppel, S. et al., 2016. Applying global criteria to tracking data to define important areas for marine conservation. *Diversity & Distributions* 22: 422–431.
- Lecoq M, Ramírez I, Geraldés P & Andrade J., 2011. First complete census of Cory's Shearwaters *Calonectris diomedea borealis* breeding at Berlengas Islands (Portugal), including the small islets of the archipelago. *Airo* 21, 31–34.
- Munilla I, Genovart M, Paiva VH & Velando., 2016. A Colony Foundation in an Oceanic Seabird. *PloS ONE* 11(2):e0147222. doi:10.1371/journal.pone.0147222.
- R Core Team (2016). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>.
- Ramos R, Granadeiro JP, Rodríguez B, Navarro J, Paiva VH, et al., 2013. Meta-population feeding grounds of Cory's shearwater in the subtropical Atlantic Ocean: implications for the definition of marine protected areas based on tracking studies. *Diversity and Distributions* 19, 1284–98. doi:10.1111/ddi.12088
- Ramos R, Sanz V, Militão T, Bried J, Neves V.V, et al., 2015. Leapfrog migration and habitat preferences of a small oceanic seabird, Bulwer's petrel (*Bulweria bulwerii*). *Journal of Biogeography* 42, 1651–64. doi:10.1111/jbi.12541
- Ritz MS, Hahn S, Janicke T, Peter H-U., 2006. Hybridisation between south polar skua (*Catharacta maccormicki*) and brown skua (*C. antarctica lonnbergi*) in the Antarctic Peninsula region. *Polar Biology* 29, 153–159. doi:10.1007/s00300-005-0034-0

Annex 4. Maps of important foraging areas of individual species

Maps determined by analysis of tracking data. The proportion of birds in each LME is indicated when birds from more than one LME used the [proposed] area.

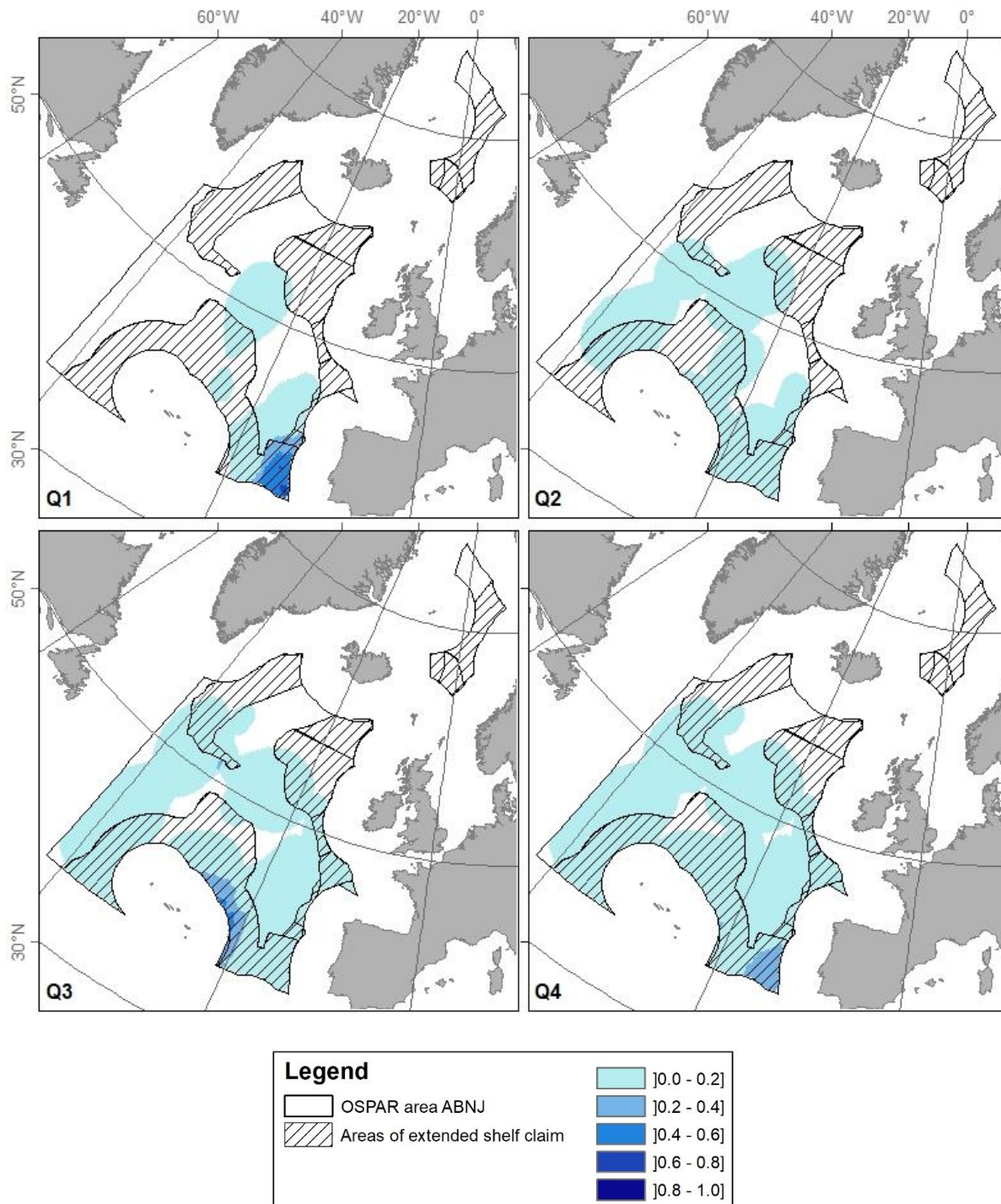


Figure A0.11 Important foraging areas identified for **Audubon's Shearwater** *Puffinus lherminieri baroli* (European Red List Status: Near Threatened. OSPAR Listed Species). Usage identified by year quarter, based on tracking data from the Canary Current Large Marine Ecosystem.

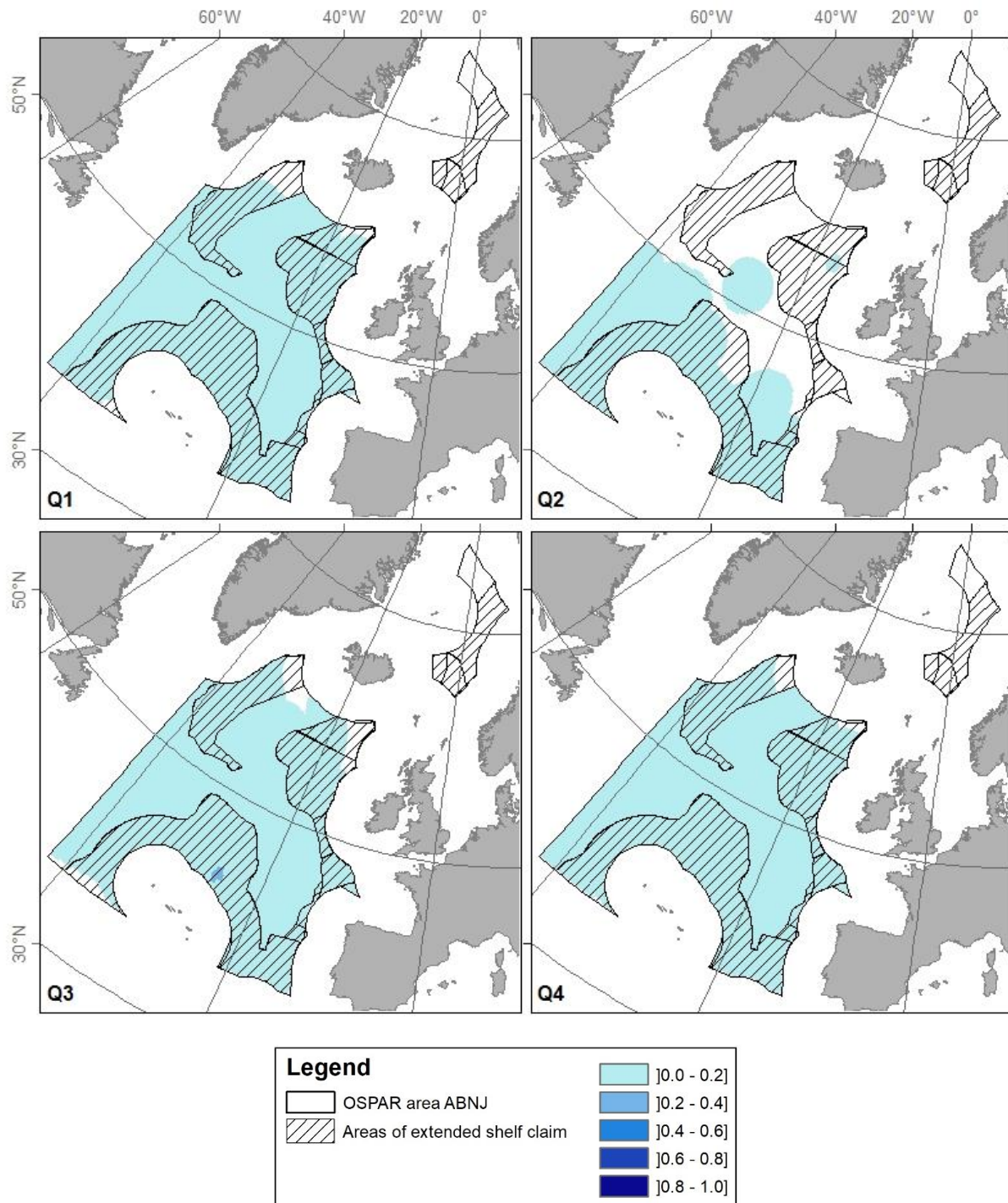


Figure A0.12: Important foraging areas identified for **Cory's Shearwater** *Calonectris borealis* (Global Red List Status: Least Concern). Usage identified by year quarter, based on tracking data from the Azores (0.747) and Canary Current (0.253) Large Marine ecosystems. Usage indicated by proportion of the LME populations using area.

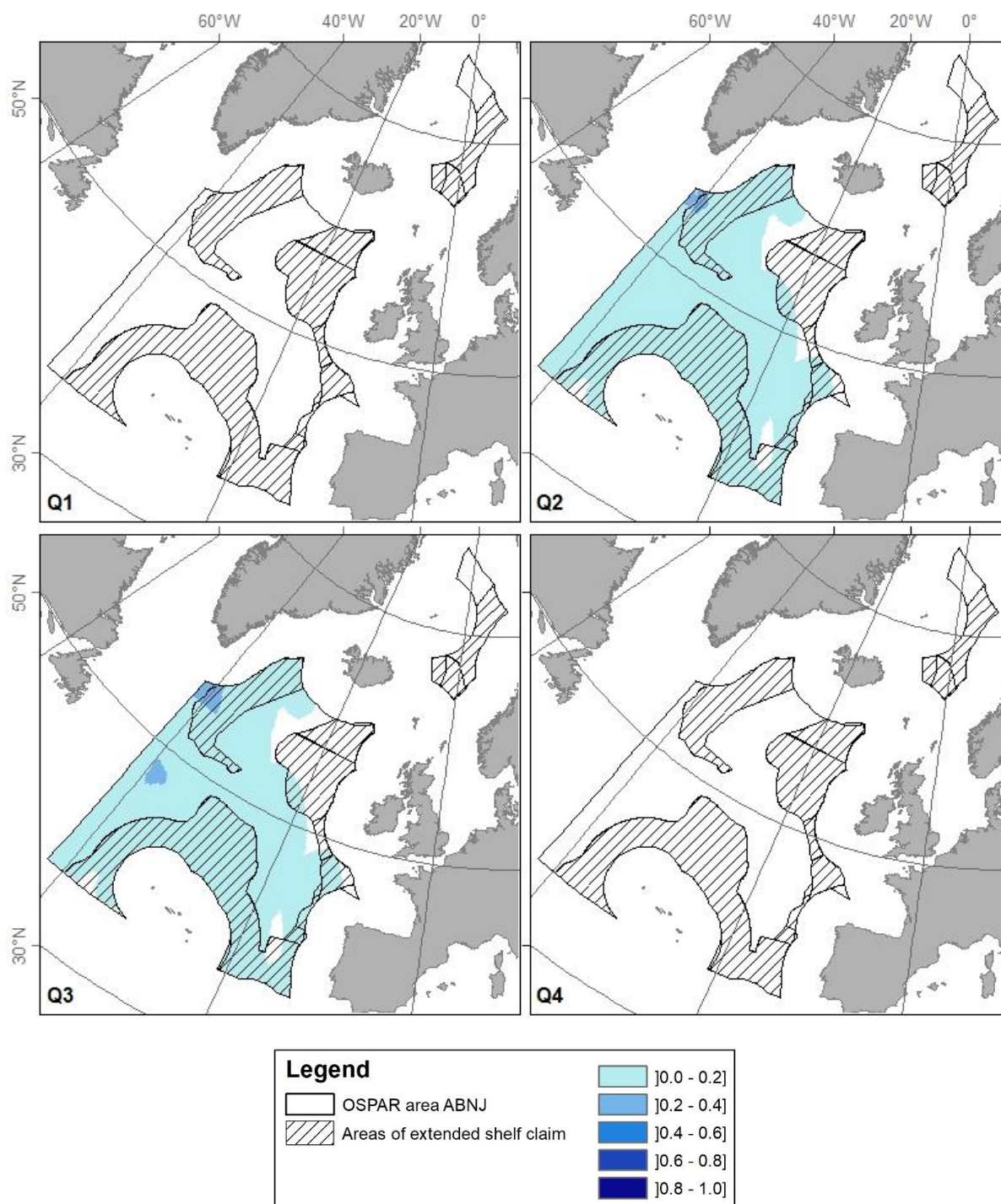


Figure A0.13 Important foraging areas identified for **Great Shearwater *Ardenna gravis*** (Global Red List Status: Least Concern). Usage identified by year quarter, based on tracking data from the Tristan Gough Large Marine Ecosystem.

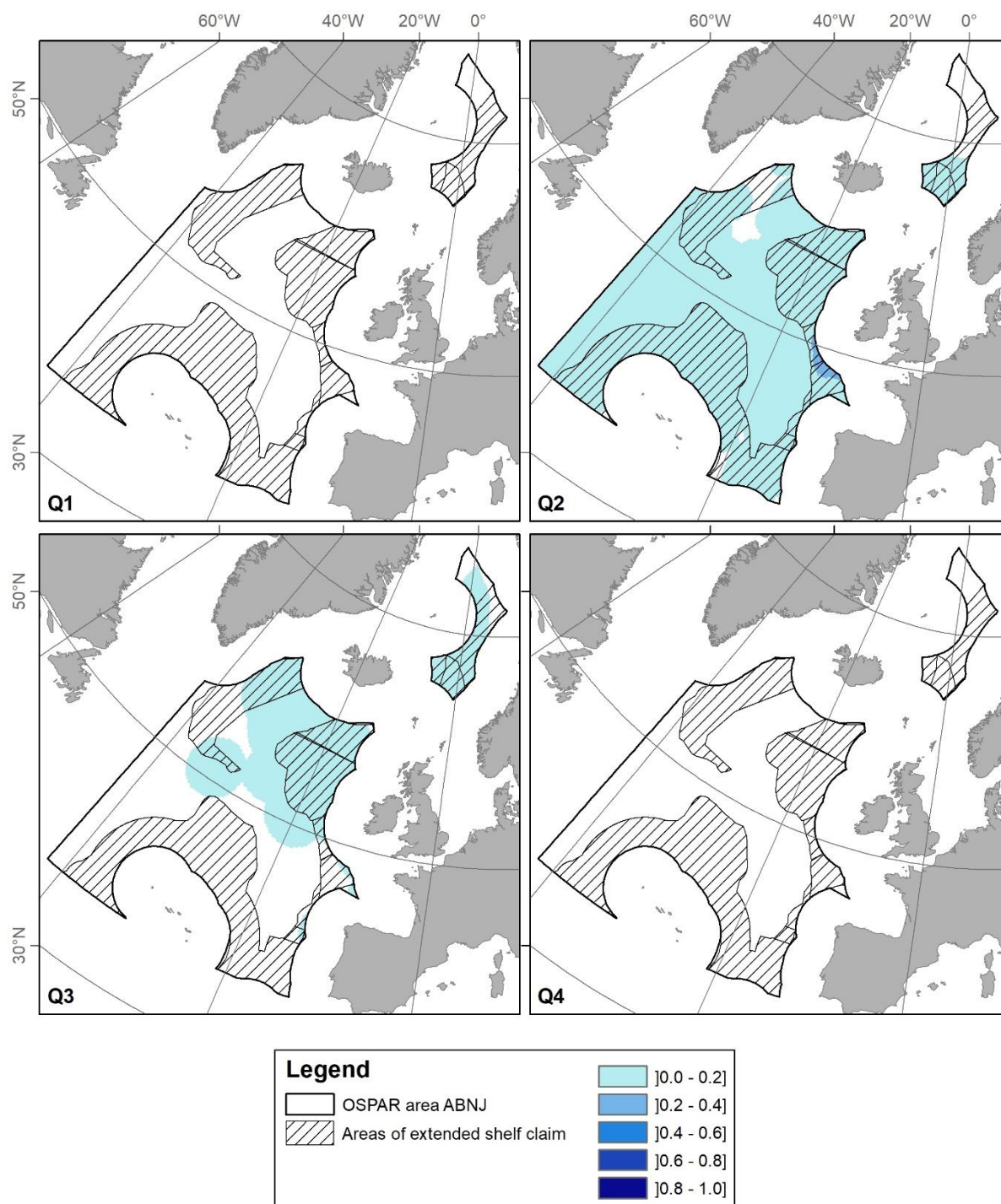


Figure A0.14 Important foraging areas identified for **Manx Shearwater *Puffinus puffinus*** (Global Red List Status: Least Concern). Usage identified by year quarter, based on tracking data from the Celtic-Biscay Shelf (0.980) and Iceland Shelf and Sea (0.020). Usage indicated by proportion of the LME populations using area.

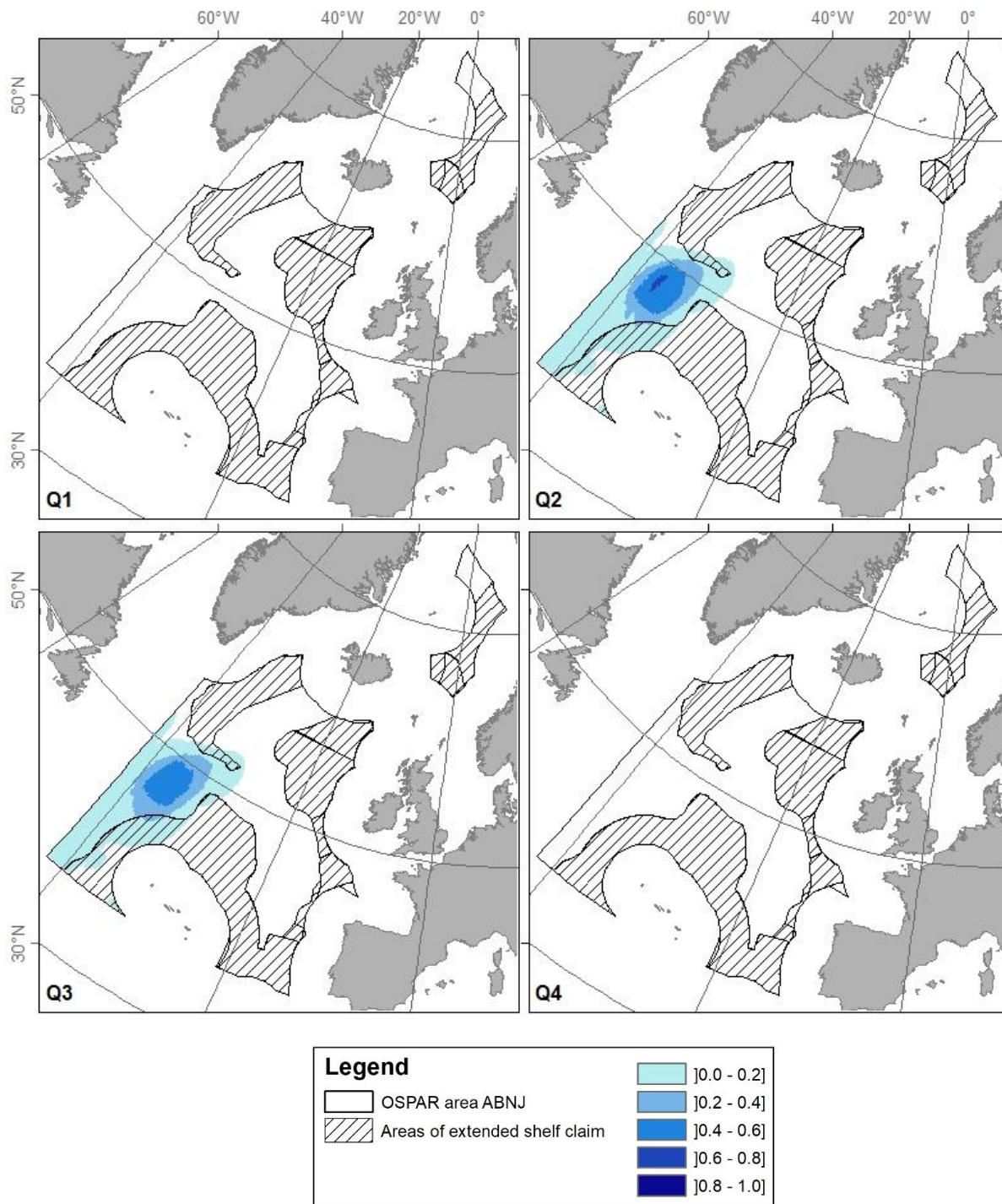


Figure A0.15 Important foraging areas identified for **Sooty Shearwater *Ardenna grisea*** (Global Red List Status: Near Threatened). Usage identified by year quarter, based on tracking data from the Patagonian Shelf Large Marine Ecosystem.

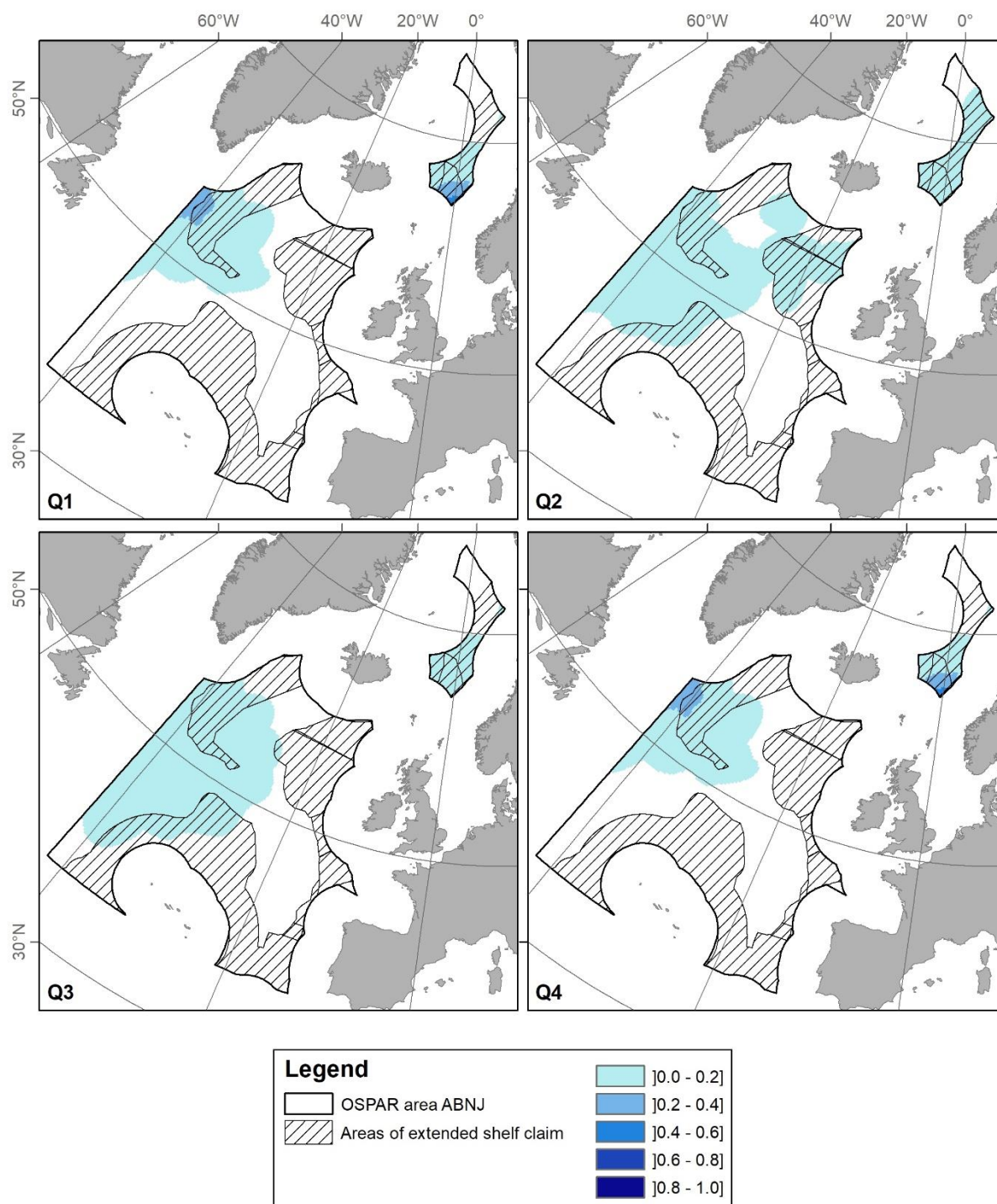


Figure A0.16 Important foraging areas identified for **Northern Fulmar *Fulmarus glacialis*** (European Red List Status: Endangered). Usage identified by year quarter, based on tracking data from the North Sea Large Marine Ecosystem.

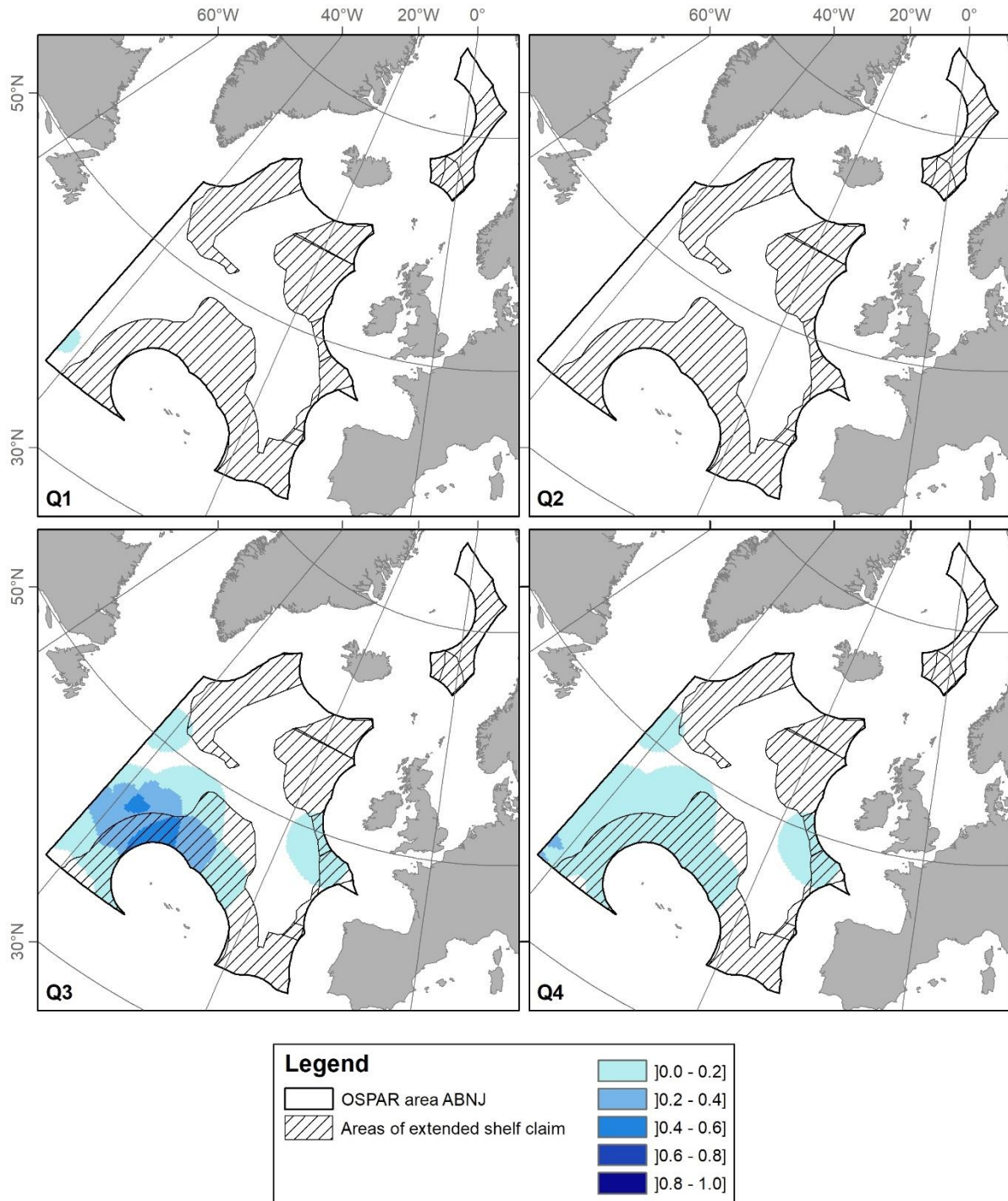


Figure A0.17 Important foraging areas identified for **Bermuda's Petrel *Pterodroma cahow*** (Global Red List Status: Endangered). Usage identified by year quarter, based on tracking data from the Bermuda Large Marine Ecosystem.

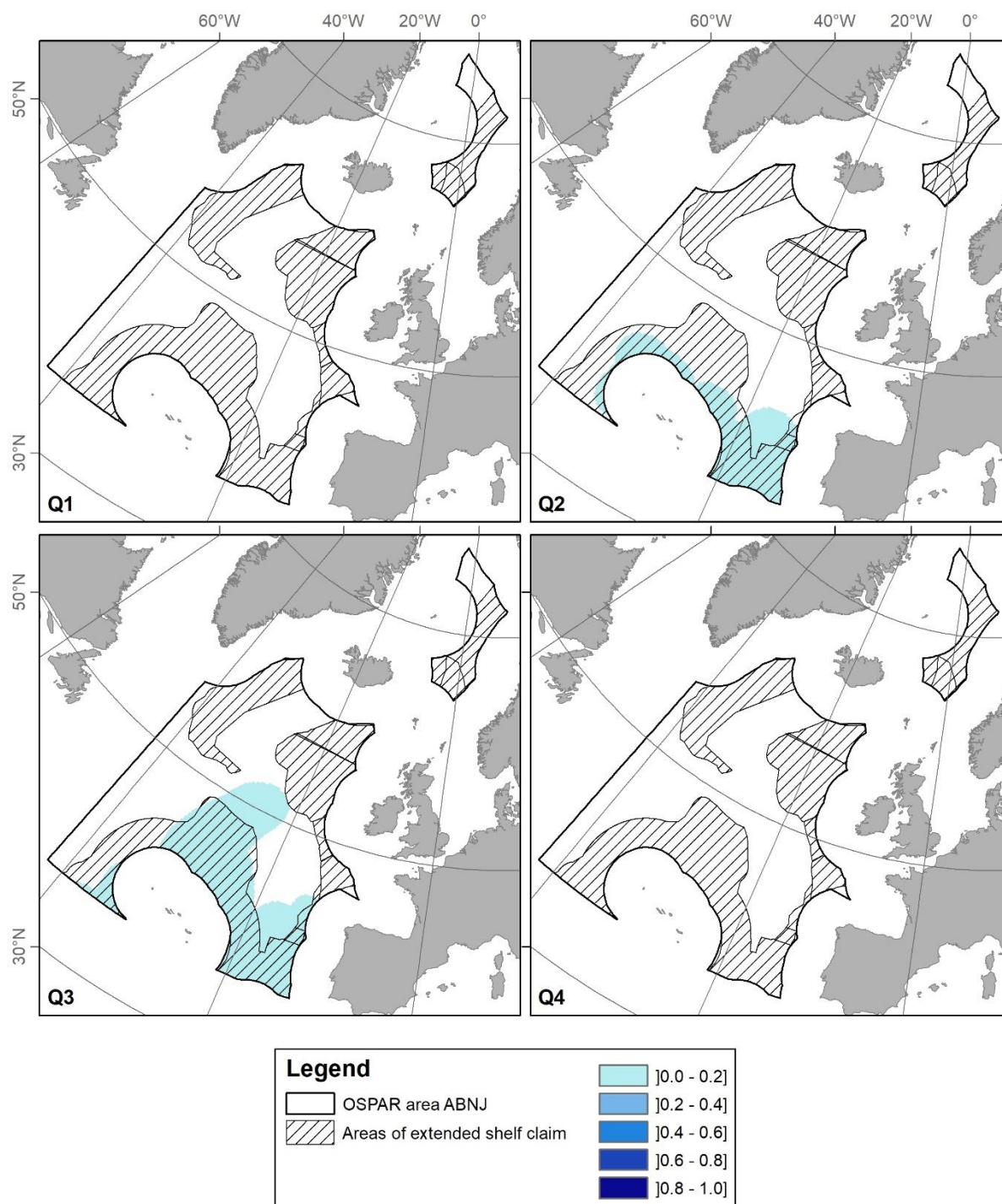


Figure A0.18 Important foraging areas identified for **Bulwer's Petrel *Bulweria bulwerii*** (Global Red List Status: Least Concern). Usage identified by year quarter, based on tracking data from the Canary Current Large Marine Ecosystem.

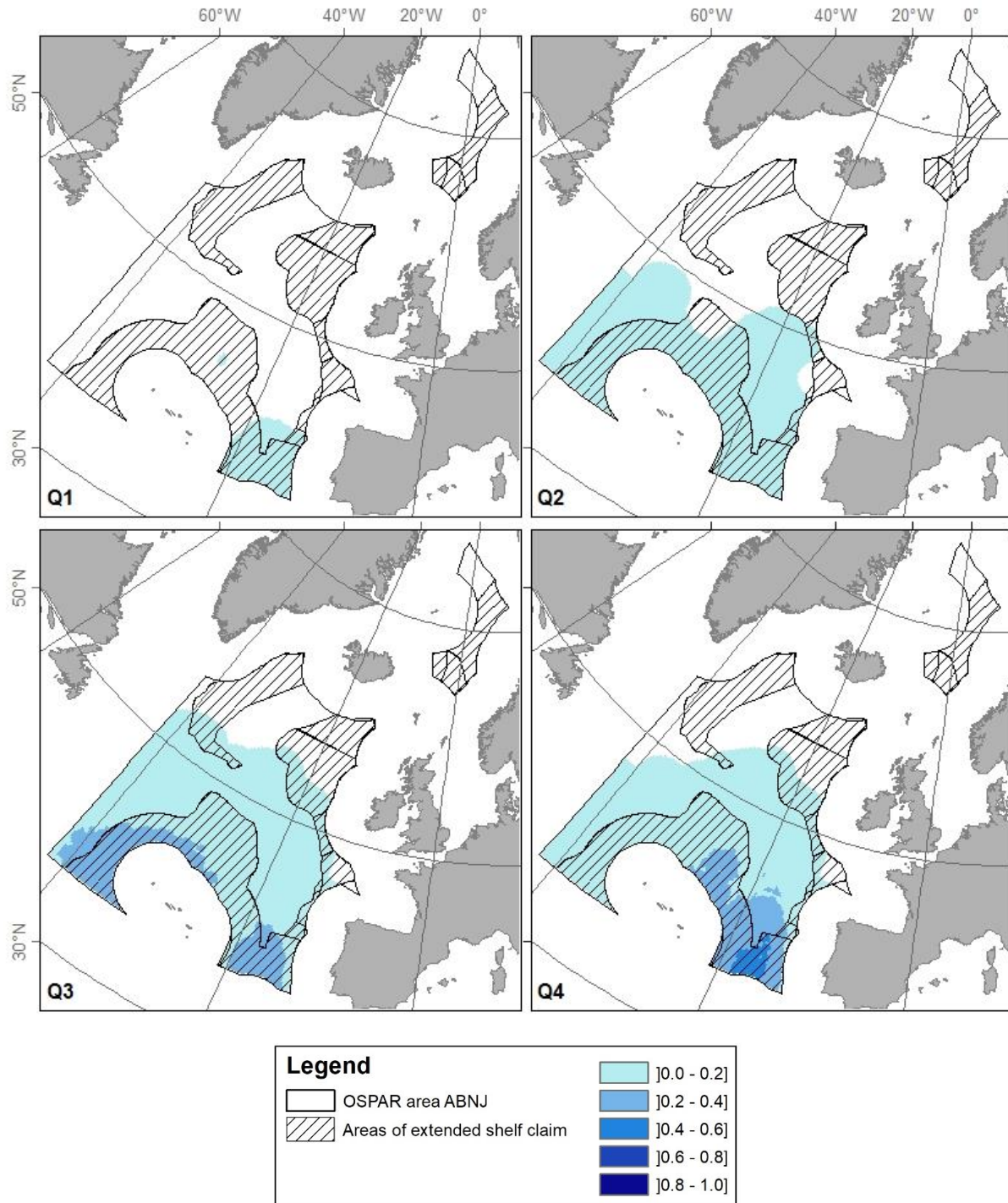


Figure A0.19 Important foraging areas identified for **Desertas Petrel *Pterodroma deserta*** (European Red List Status: Vulnerable). Usage identified by year quarter, based on tracking data from the Canary Current Large Marine Ecosystem.

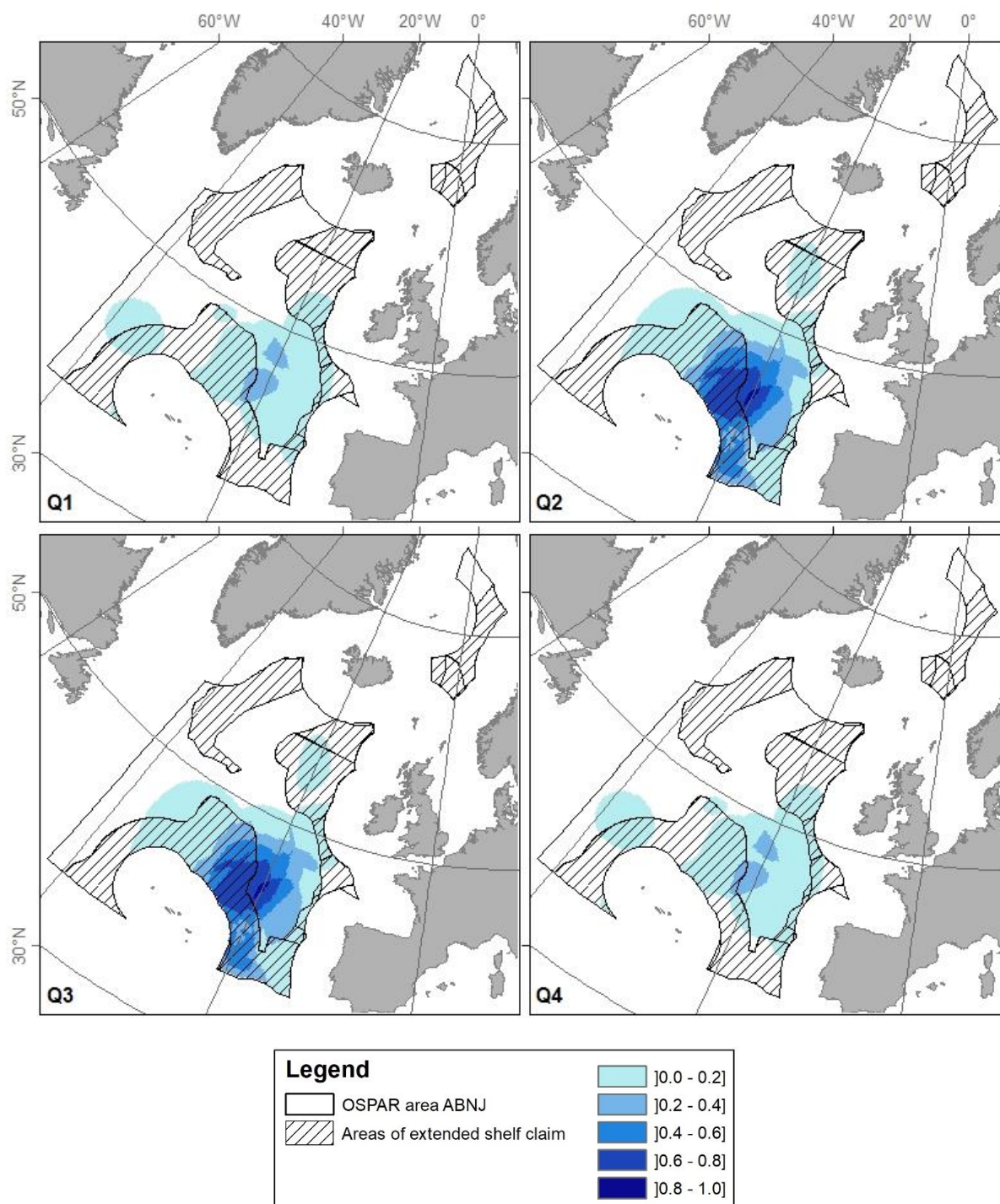


Figure A0.20 Important foraging areas identified for **Zino's Petrel** *Pterodroma madeira* (Global Red List Status: Endangered). Usage identified by year quarter, based on tracking data from the Canary Current Large Marine Ecosystem.

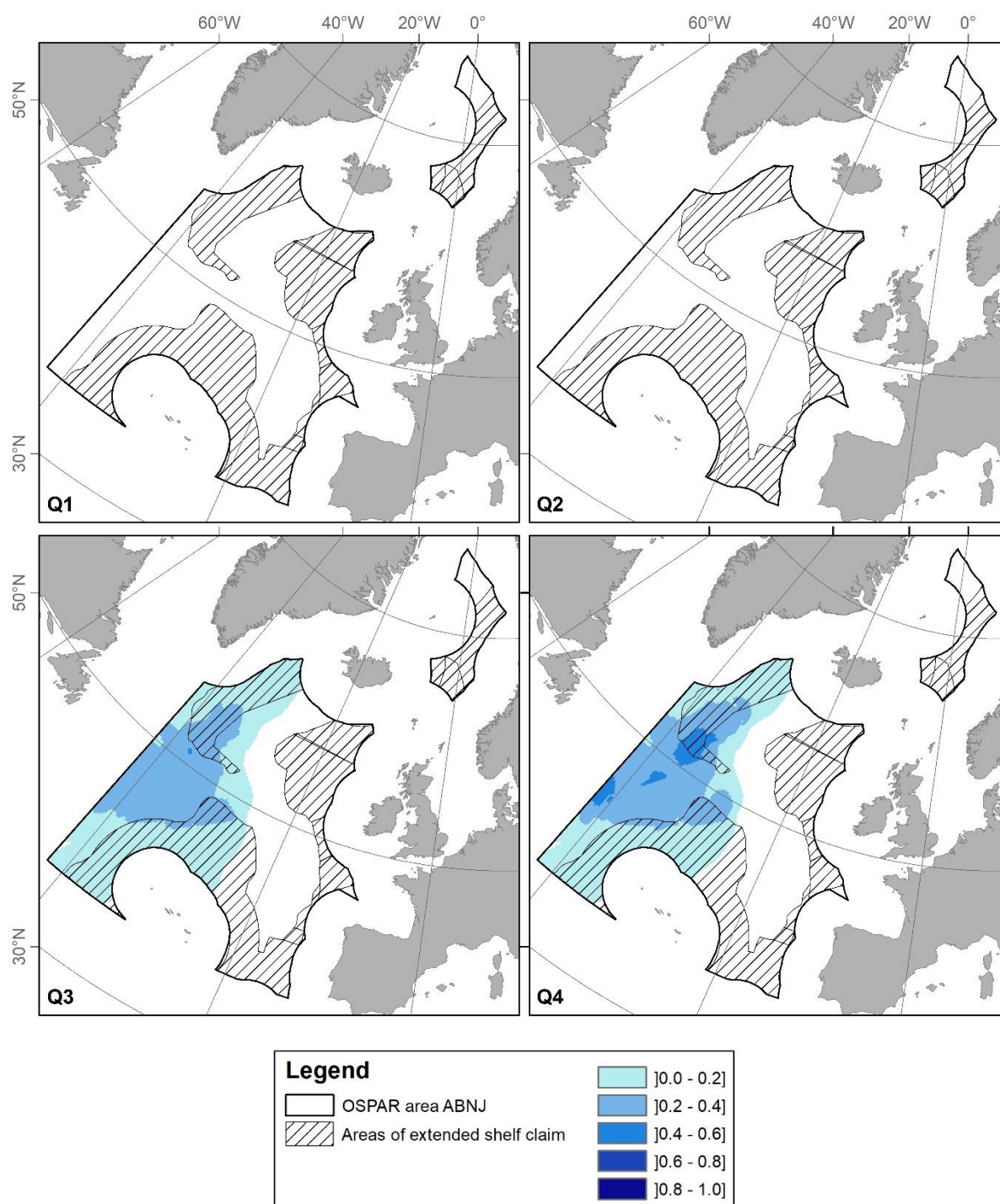


Figure A0.21 Important foraging areas identified for **Arctic Tern *Sterna paradisaea*** (Global Red List Status: Least Concern). Usage identified by year quarter, based on tracking data from the Greenland Large Marine Ecosystem.

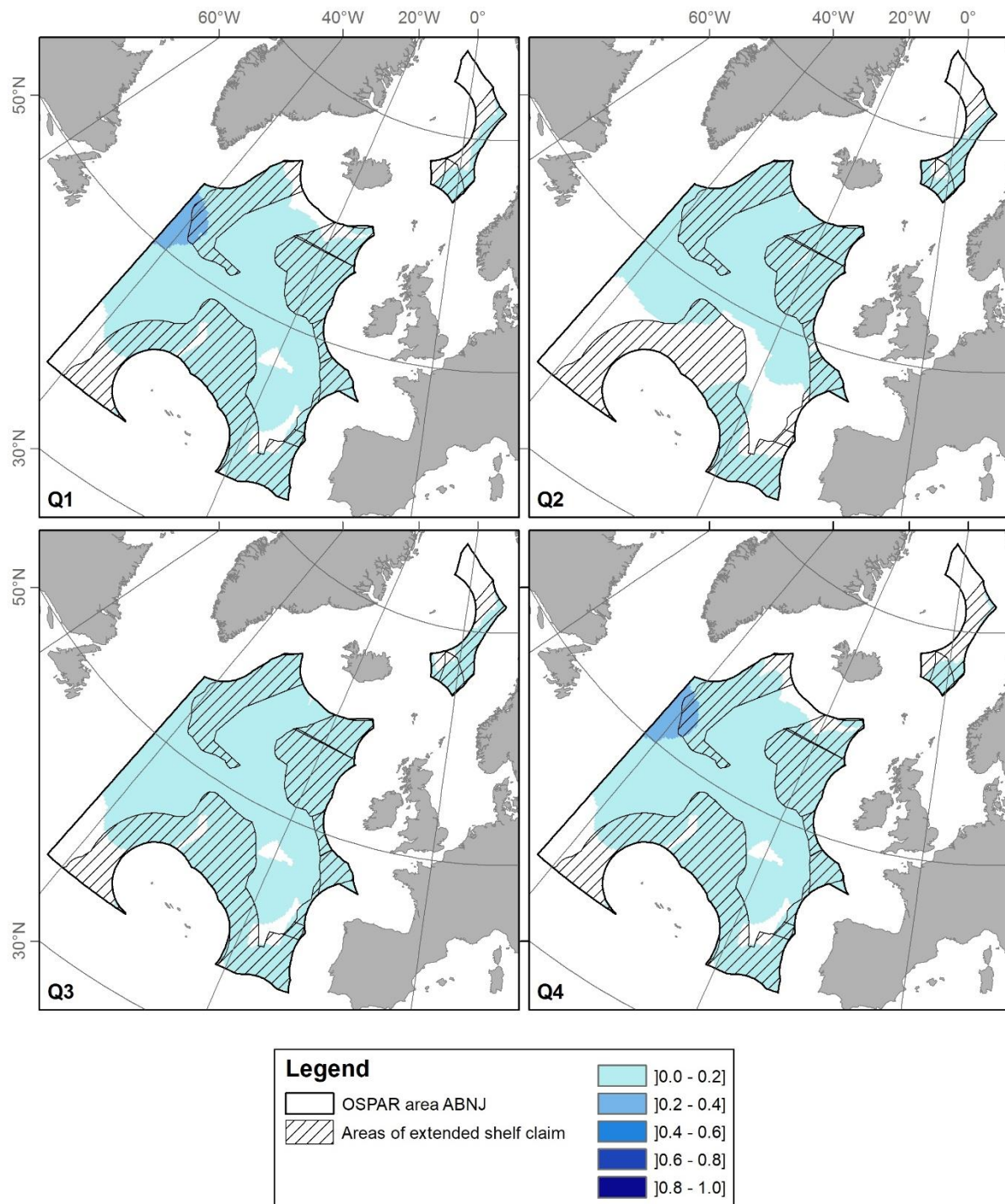


Figure A0.22 Important foraging areas identified for **Black-legged Kittiwake *Rissa tridactyla*** (European Red List status: Vulnerable. OSPAR Listed Species) Usage identified by year quarter, based on tracking data from the following Large Marine Ecosystems: (Quarters 1, 3 and 4) Barents Sea (0.282), Faroe Plateau (0.084), Iceland Shelf and Sea (0.304), Norwegian Sea (0.042), West Spitsbergen (0.061), North Sea (0.163) and Celtic-Biscay Shelf (0.064) (Q2) Barents Sea (0.301), Faroe Plateau (0.089), Iceland Shelf and Sea (0.324), Norwegian Sea (0.045), North Sea (0.173) and Celtic-Biscay Shelf (0.068). Usage indicated by proportion of the LME populations using area.

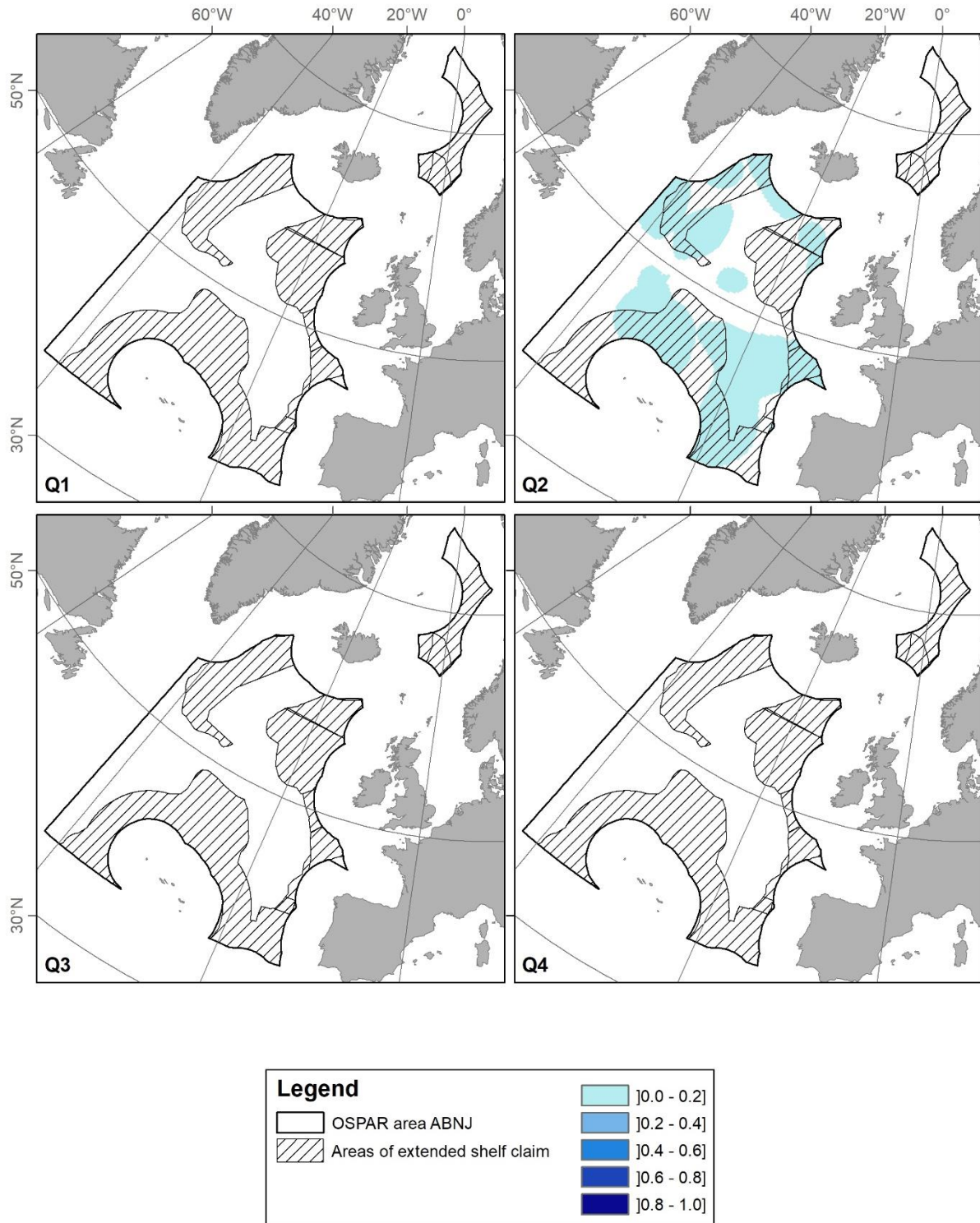


Figure A0.23 Important foraging areas identified for **Sabine's Gull *Xema sabini*** (Global Red List Status: Least Concern). Usage identified by year quarter, based on tracking data from the Greenland Sea Large Marine Ecosystem

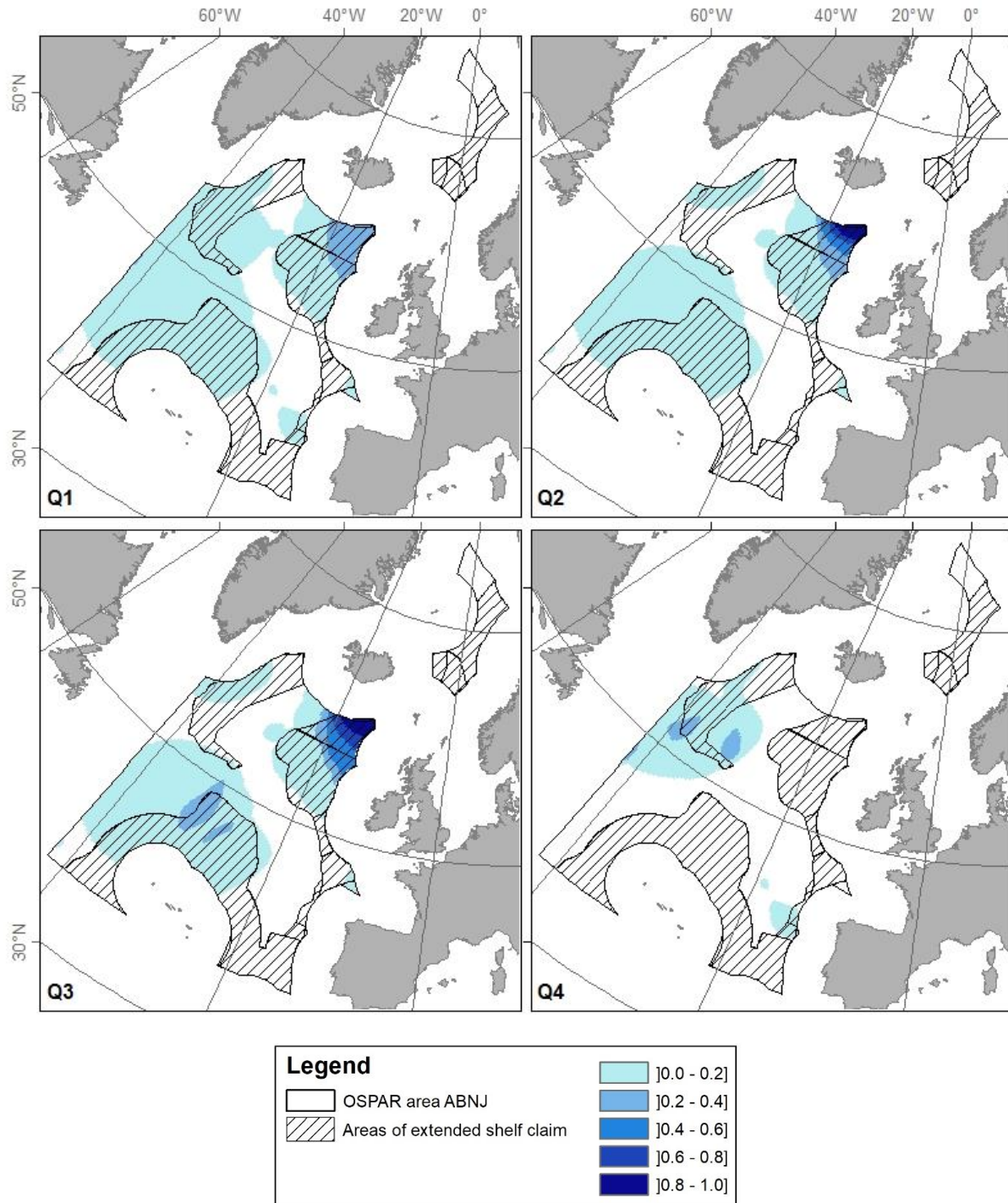


Figure A0.24 Important foraging areas identified for **Great Skua *Stercorarius skua*** (Global Red List Status: Least Concern). Usage identified by year quarter, based on tracking data from the Iceland Shelf and Sea.

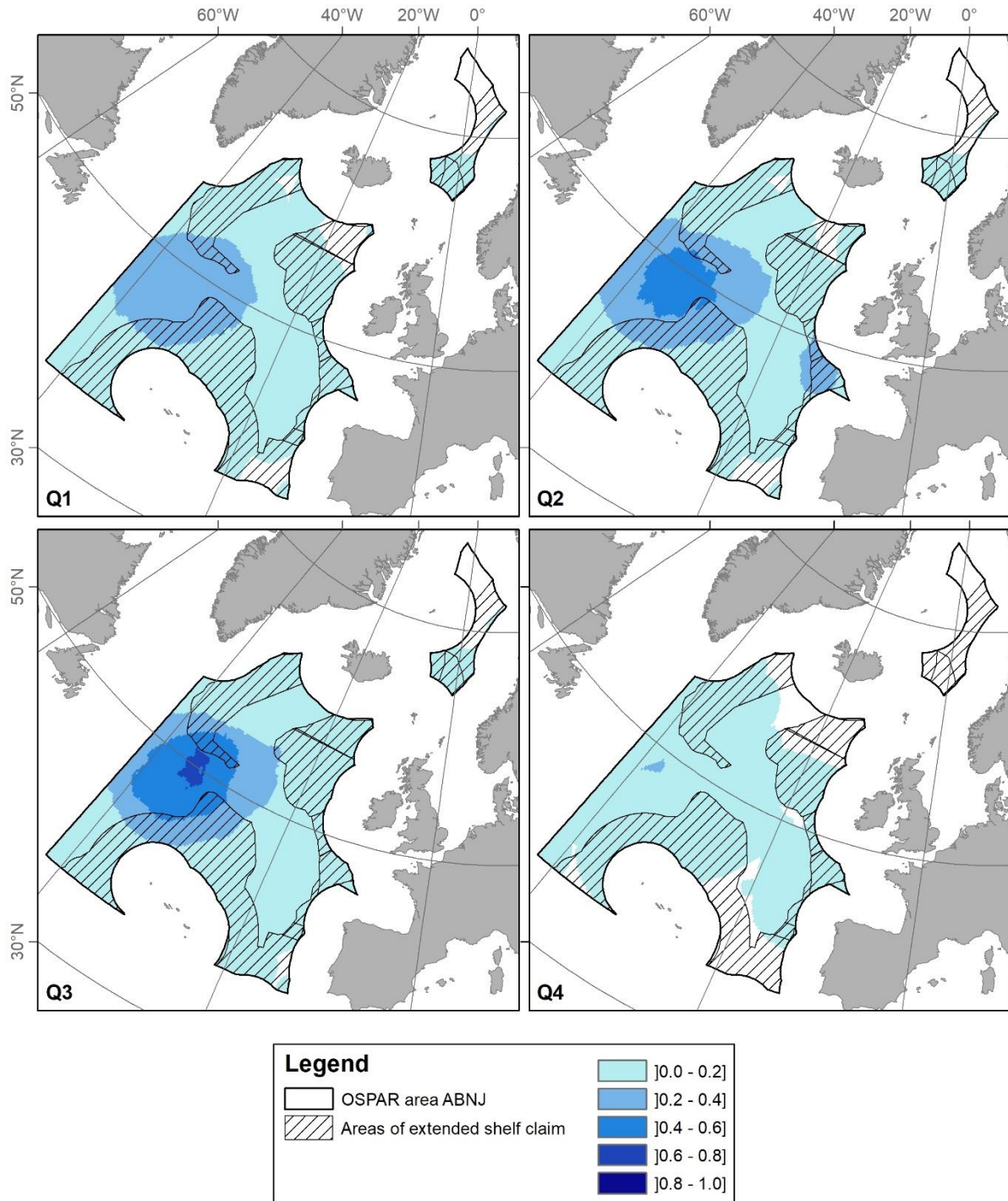


Figure A0.25 Important foraging areas identified for **Long-tailed Jaeger *Stercorarius longicaudus*** (Global Red List Status: Least Concern). Usage identified by year quarter, based on tracking data from the Greenland Sea (0.288) and Norwegian Sea + Barents Sea (0.712). Usage indicated by proportion of the LME populations using area.

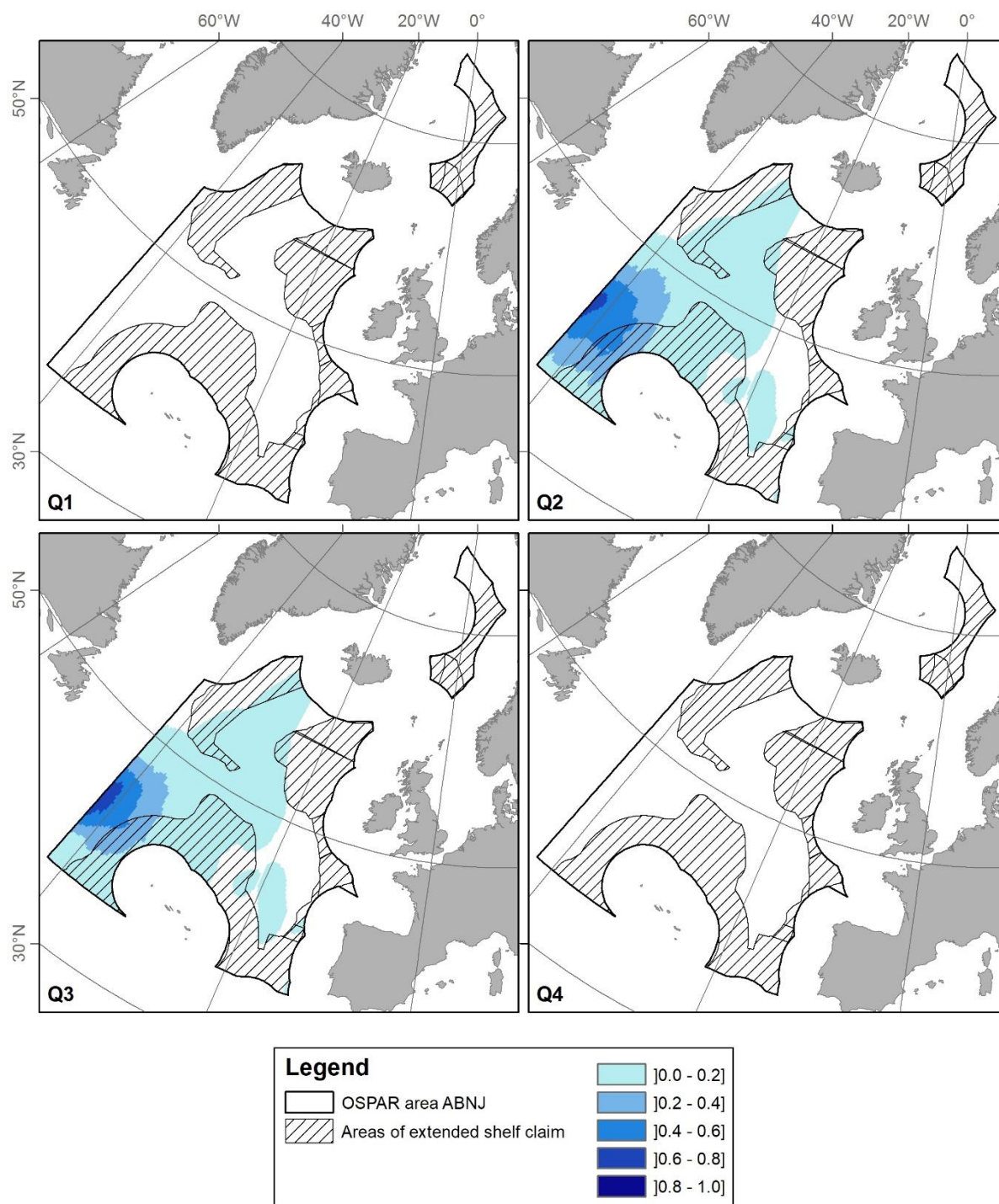


Figure A0.26 Important foraging areas identified for **South Polar Skua *Catharacta maccormicki*** (Global Red List Status: Least Concern). Usage identified by year quarter, based on tracking data from the South Shetland Islands Large Marine Ecosystem.

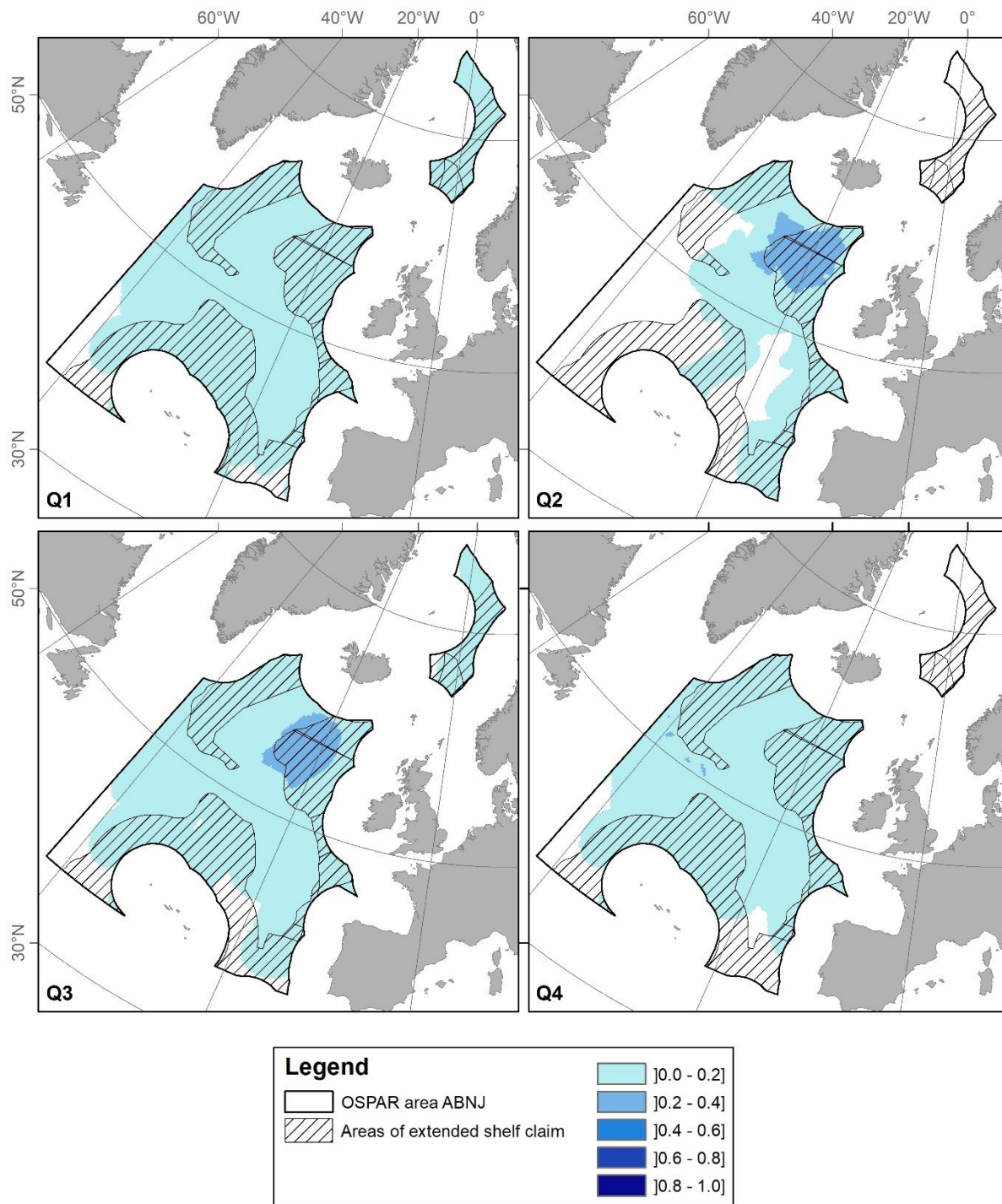


Figure A0.27 Important foraging areas identified for **Atlantic Puffin *Fratercula arctica*** (European Red List Status: Endangered; Global Red List Status: Vulnerable). Usage identified by year quarter, based on tracking data from the following Large Marine Ecosystems: (Quarters 1, 3 and 4) Celtic-Biscay Shelf (0.109), Iceland Shelf and Sea (0.765) and North Sea (0.125) (Q2) Celtic-Biscay Shelf (0.124) and Iceland Shelf and Sea (0.875). Usage indicated by proportion of the LME populations using area.

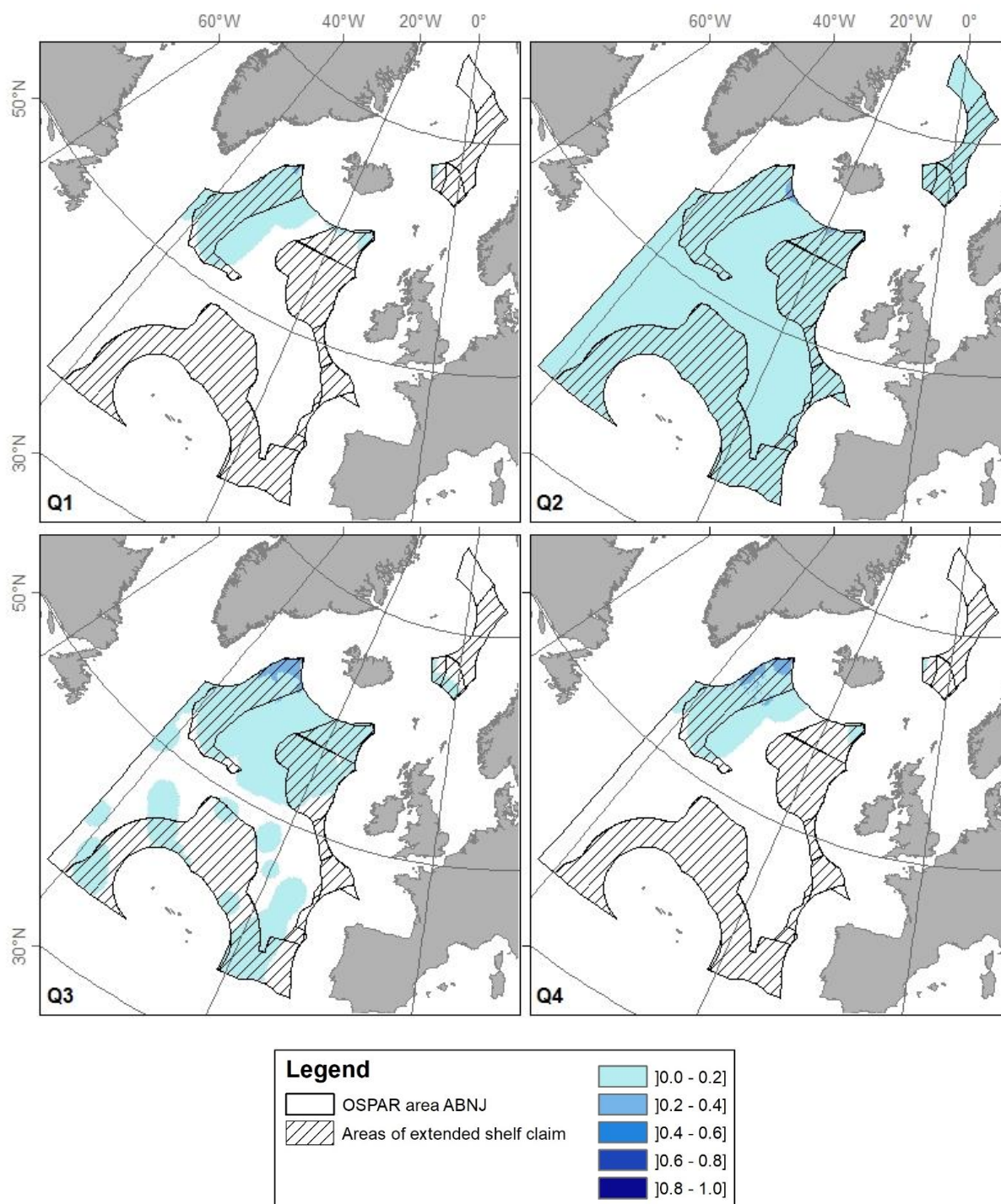


Figure A0.28 Important foraging areas identified for **Common Murre *Uria aalge*** (Global Red List Status: Least Concern). Usage identified by year quarter, based on tracking data from the Iceland Shelf and Sea Large Marine Ecosystem.

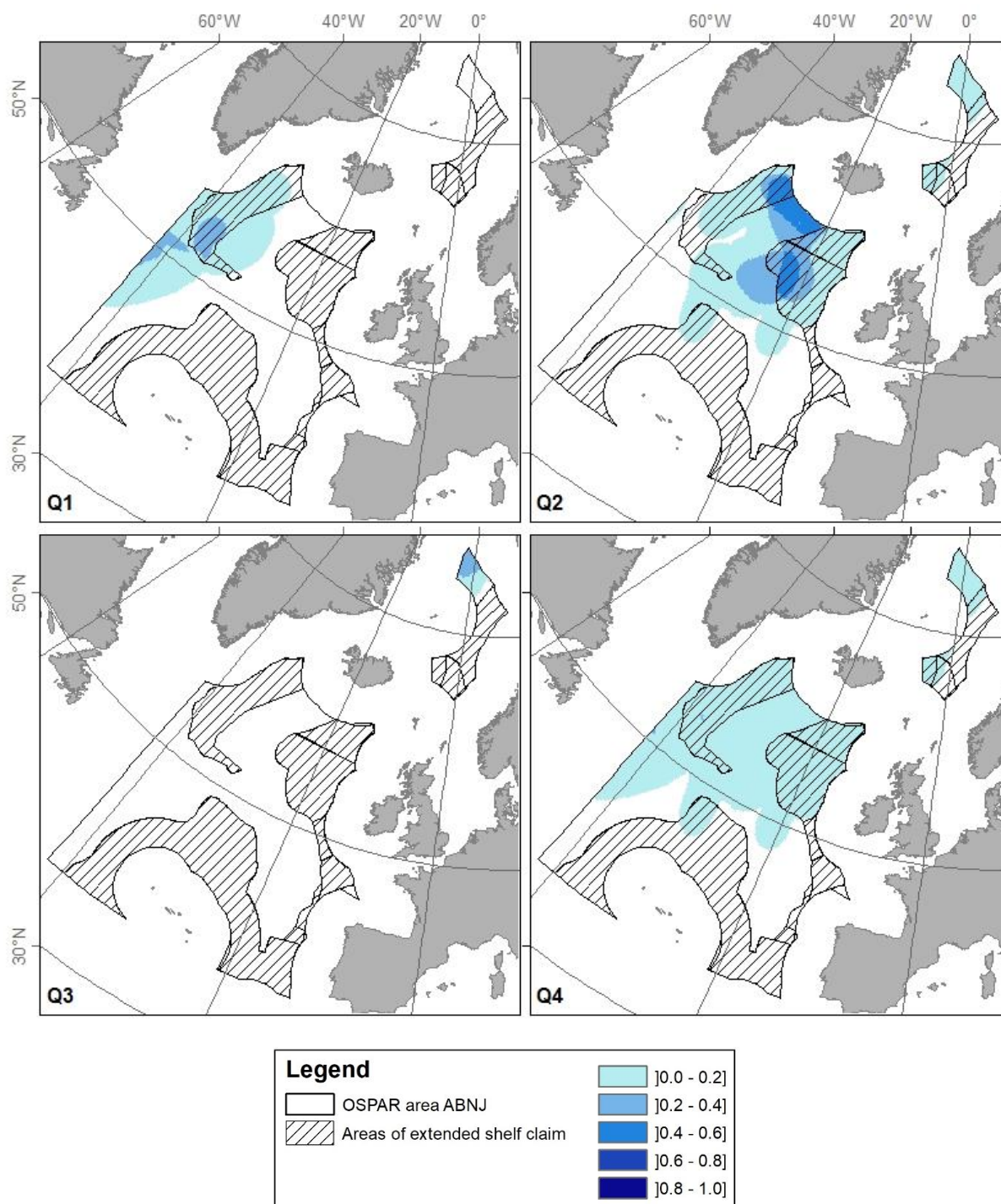


Figure A0.29 Important foraging areas identified for **Little Auk *Alle alle*** (Global Red List Status: Least Concern). Usage identified by year quarter, based on tracking data from the Greenland Sea Large Marine Ecosystem.

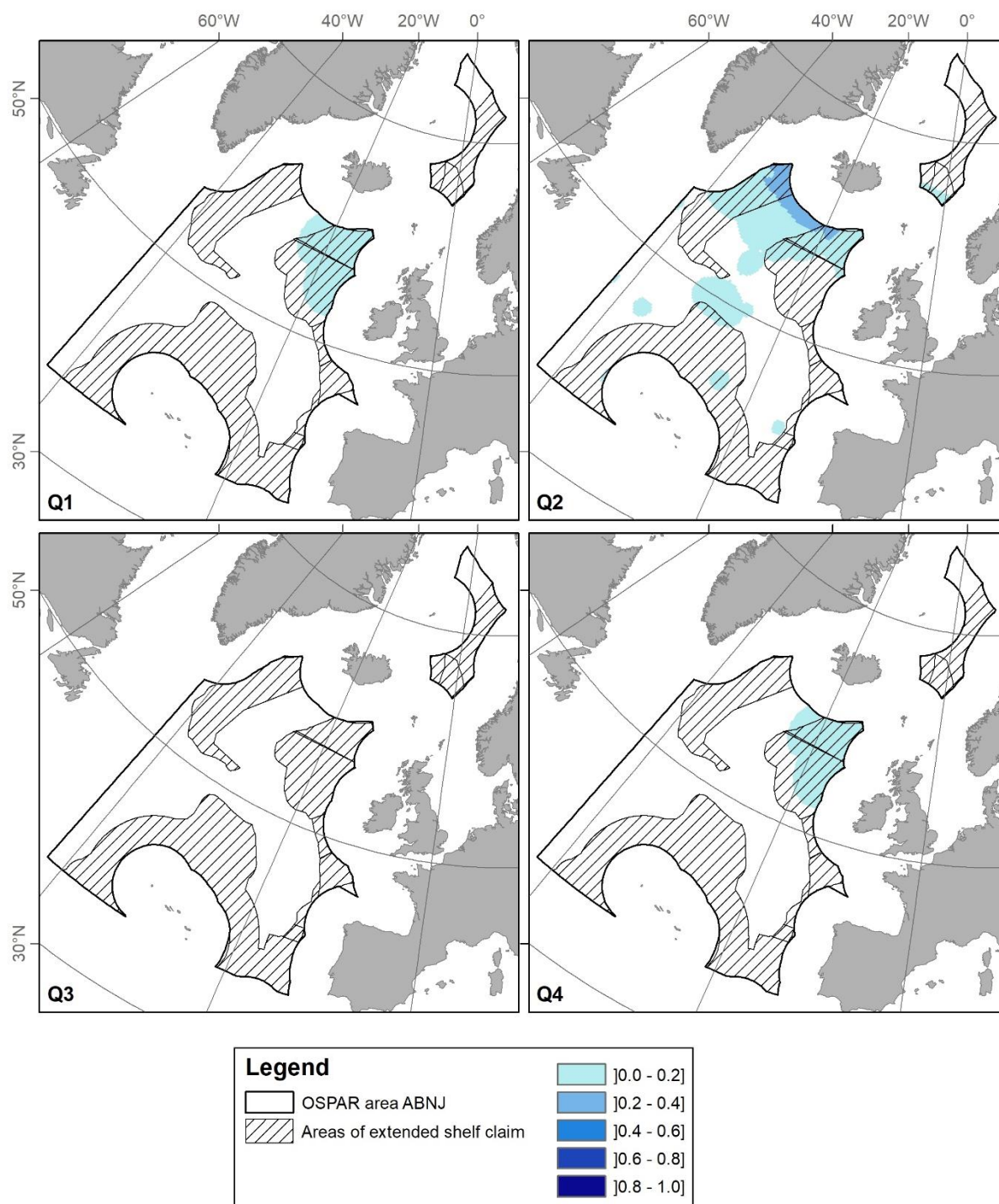


Figure A0.30 Important foraging areas identified for **Razorbill *Alca torda*** (Global Red List Status: Near Threatened). Usage identified by year quarter, based on tracking data from the Iceland Shelf and Sea Large Marine Ecosystem.

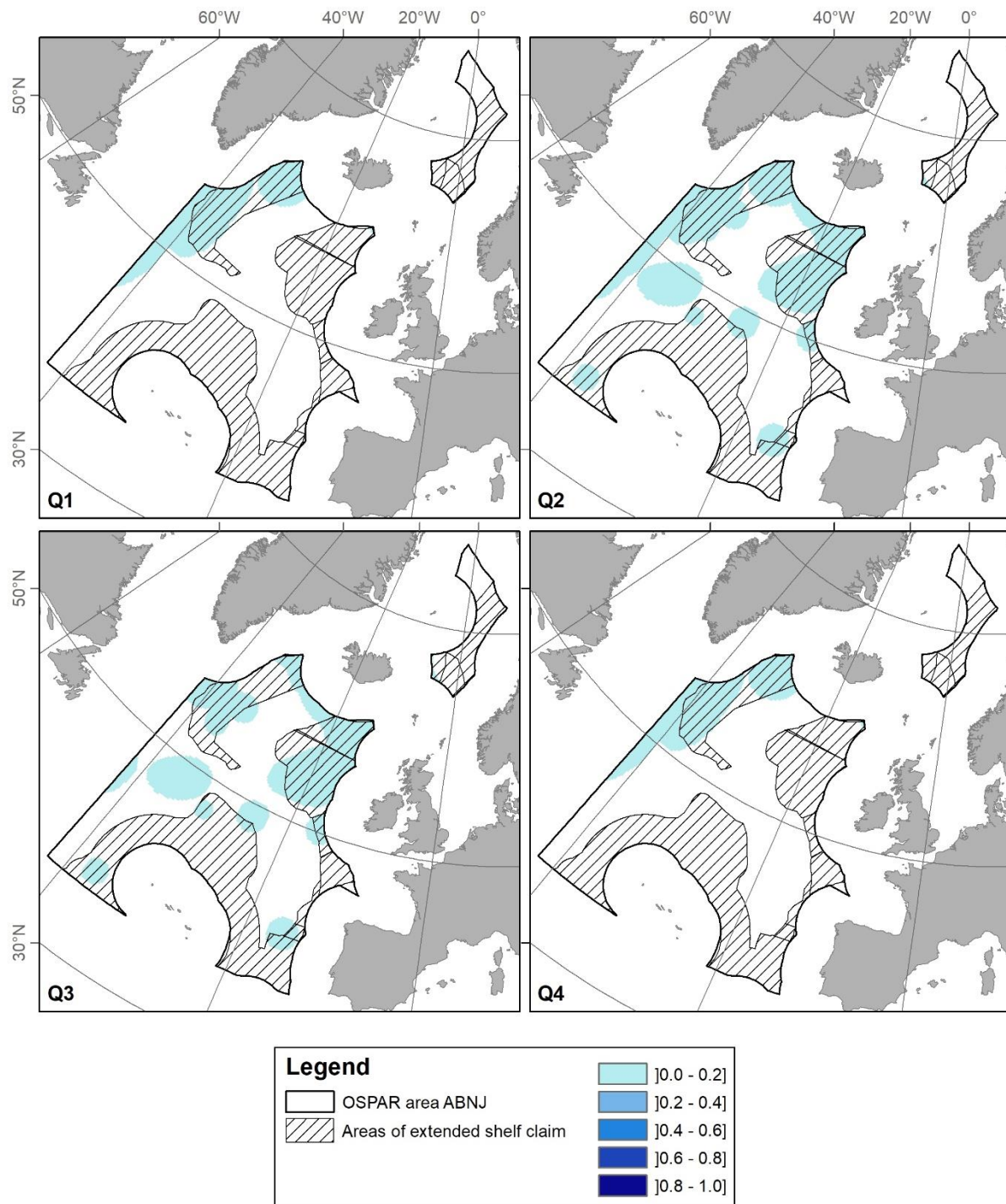


Figure A0.31 Important foraging areas identified for **Thick-billed Murre *Uria lomvia*** (European Red List Status: Least Concern. OSPAR Listed Species). Usage identified by year quarter, based on tracking data from the following Large Marine Ecosystems: (Quarters 1 and 4) Arctic Canada (0.417), NW Greeland Shelf (0.331) and Iceland Shelf and Sea (0.252) (Q2) Arctic Canada (0.623) and Iceland Shelf and Sea (0.377) (Q3) Iceland Shelf and Sea. Usage indicated by proportion of the LME populations using area.

Annex 5. Combined maps (richness and density)

Maps produced after merging the species' individual maps shown in Annex 0

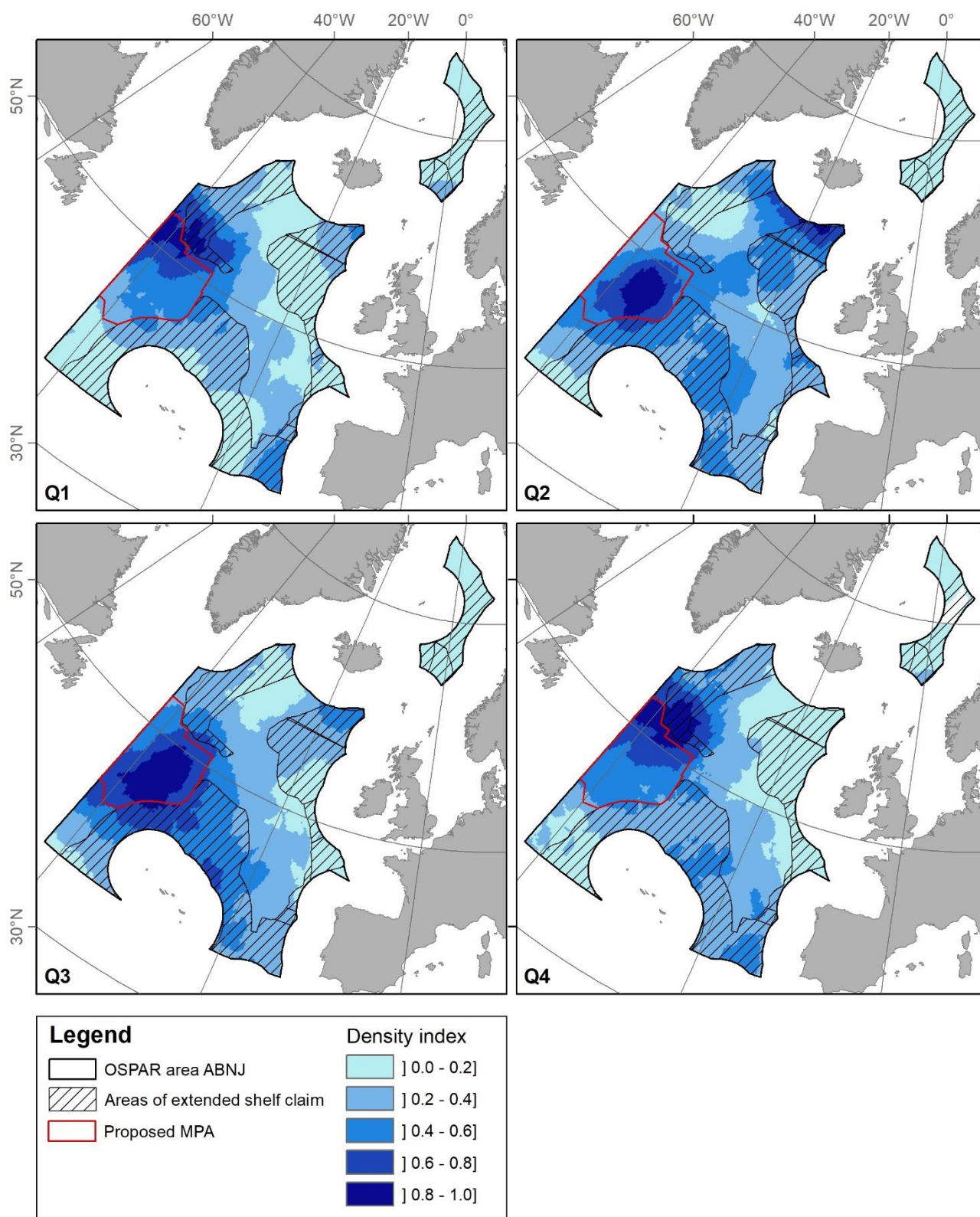


Figure A0.32 Map indicating seabird species **density (usage)** across the OSPAR ABNJ for each year quarter, with the boundary of the [proposed] MPA.

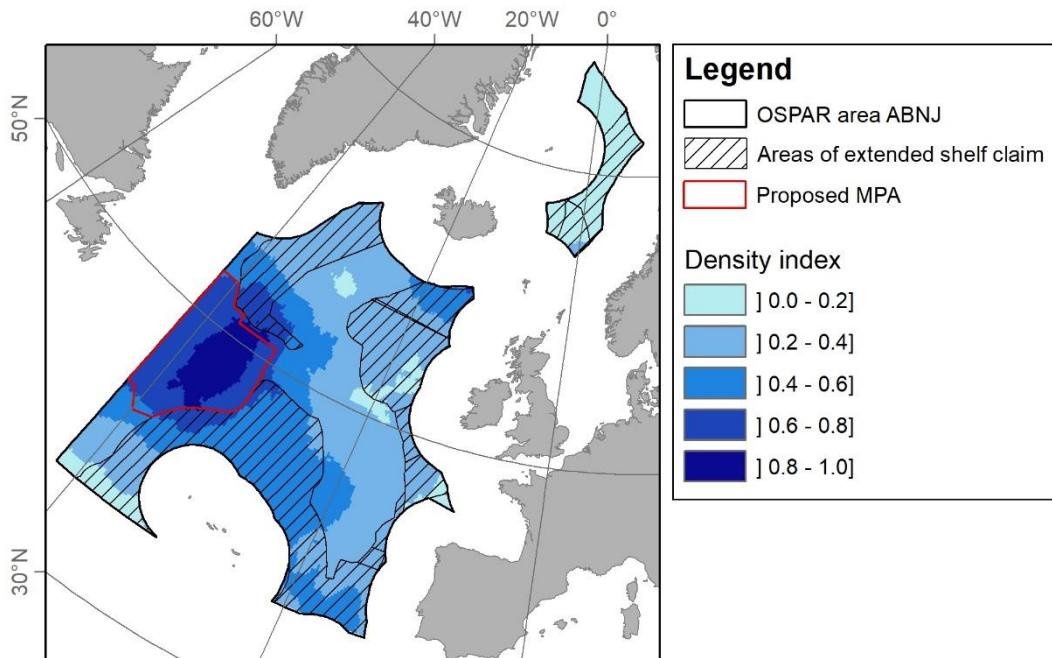


Figure A0.33. Map indicating seabird species **density (usage), all year quarters combined**, with the boundary of the [proposed] MPA.

The darker areas represent the most relevant sites considering density for seabirds in high-seas of the OSPAR area- regardless of season.

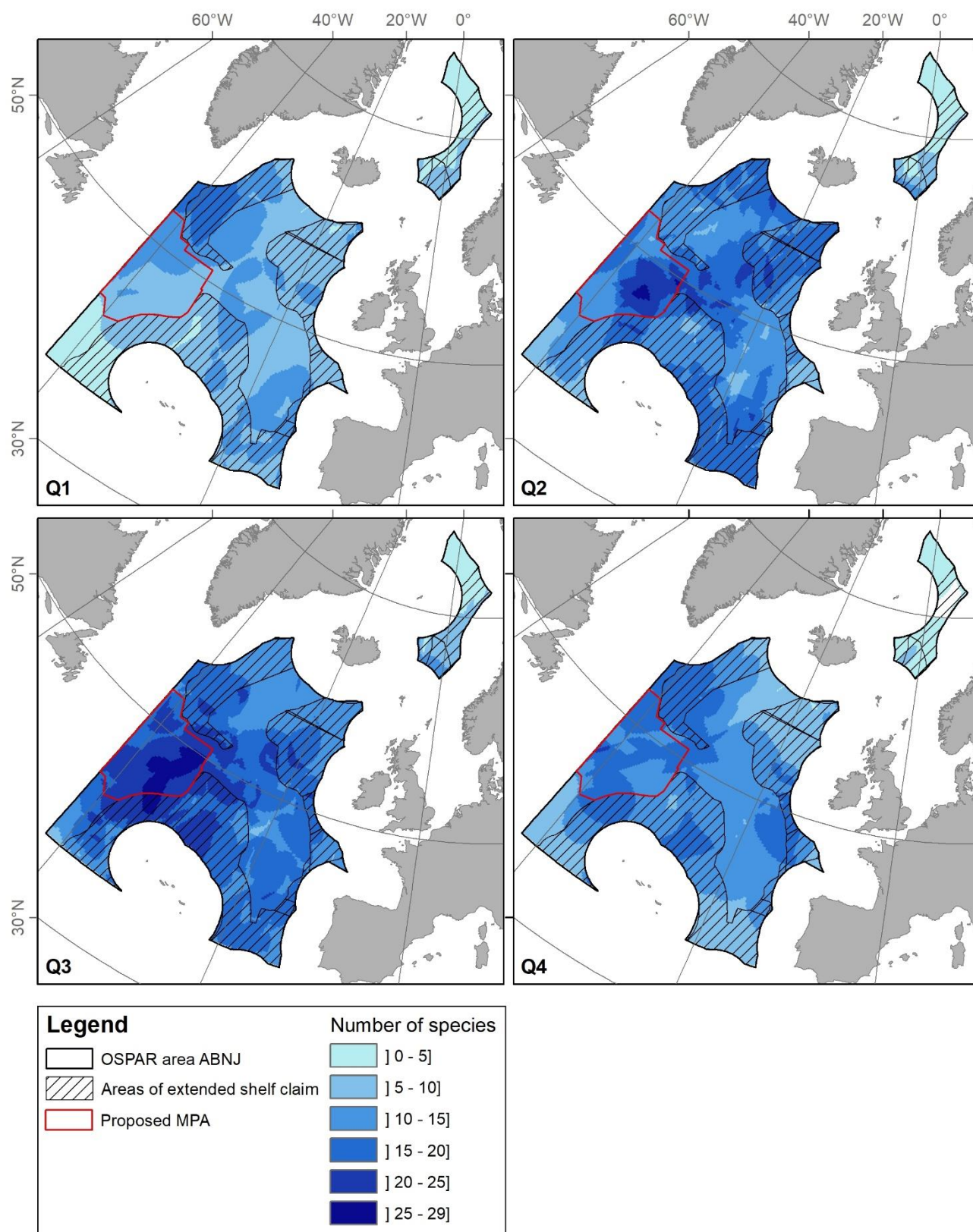


Figure A0.34. Map indicating seabird **species richness** across the OSPAR ABNJ area **for each year quarter**, with the boundary of the [proposed] MPA.

OSPAR priority species and threatened non-OSPAR species accounted more for the final result (i.e. a higher weight to OSPAR species (3x) and threatened non-OSPAR species (2x)). For all the other species a value of 1 was assumed.

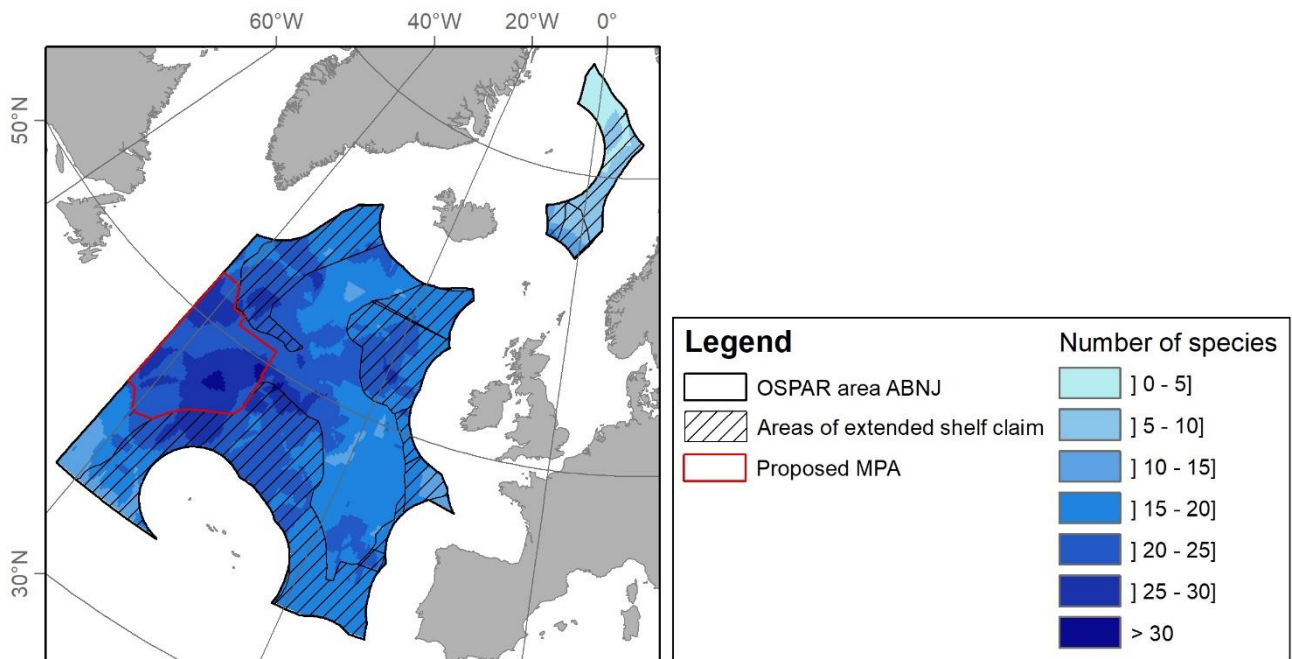


Figure A0.35 Map indicating seabird **species richness** across the OSPAR ABNJ area, **all year quarters combined**, with the boundary of the [proposed] MPA.
 Scale indicates total number of seabird species occurring in OSPAR ABNJ area regardless of season. OSPAR priority species and globally threatened species accounted more for the final result (i.e. a higher weight to OSPAR species (3x) and globally threatened species (2x)). For all the other species a value of 1 was assumed.

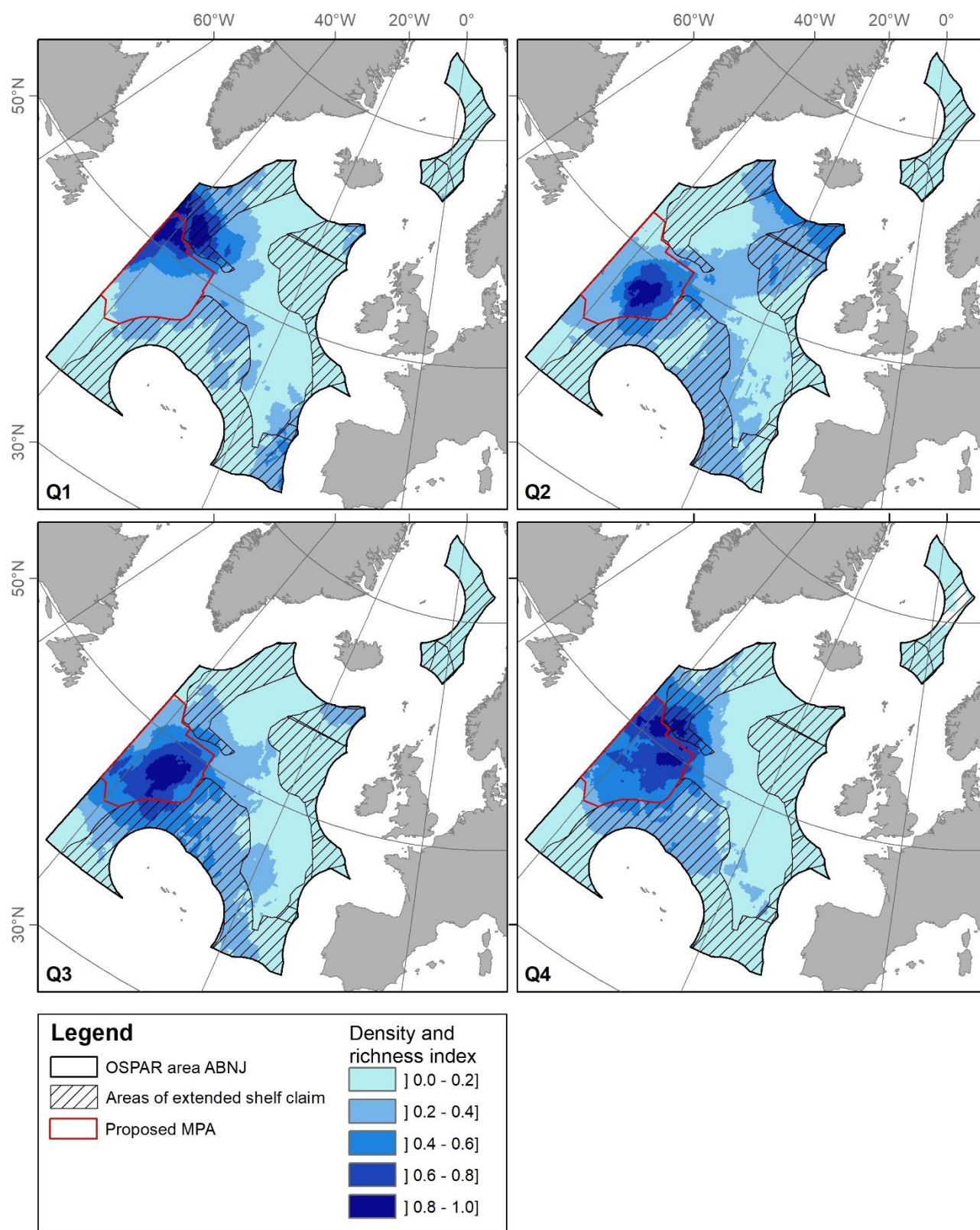


Figure A0.36 Map indicating the combined weighting of seabird species **density (usage)** and **species richness** for each year quarter, with the boundary of the [proposed] MPA.

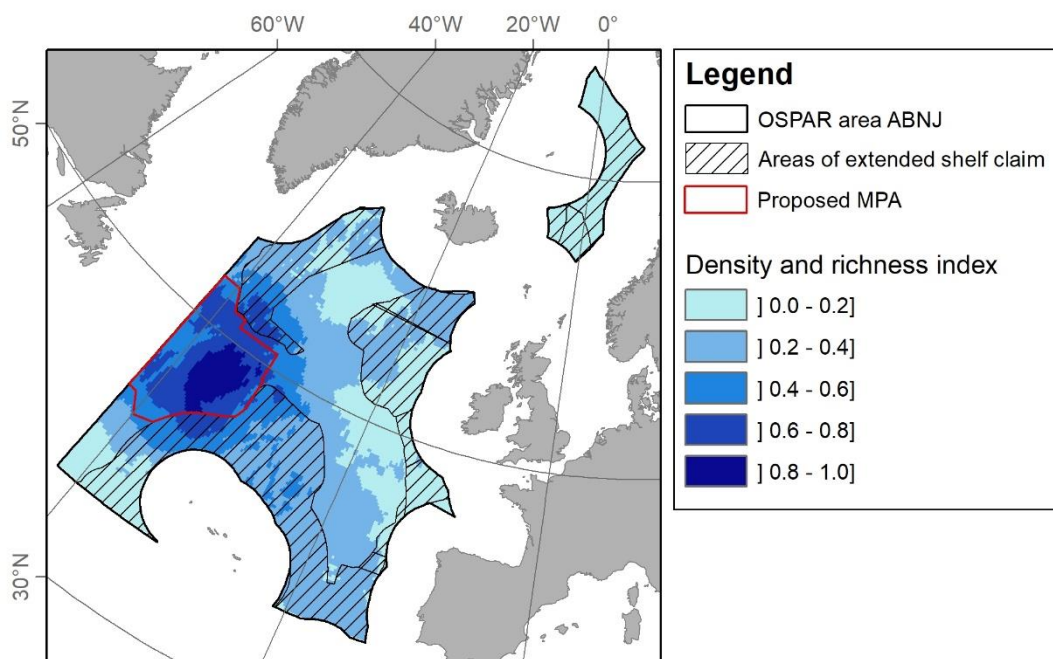


Figure A0.37. Map indicating the combined weighting of seabird species **density (usage)** and **species richness**, all year quarters combined, with the boundary of the [proposed] MPA. The darker areas represent the most relevant sites considering density and richness for seabirds in the OSPAR ABNJ area- regardless of season.

Annex 6. Maps with the estimated number of individuals in the [proposed] MPA

The [proposed] MPA qualify as a global marine IBA (Important Bird and Biodiversity Area) candidate for all the species mapped below, following the methods and criteria detailed in Lascelles et al. (2016). Legends based on the quantiles of number of mature individuals within the [proposed] MPA

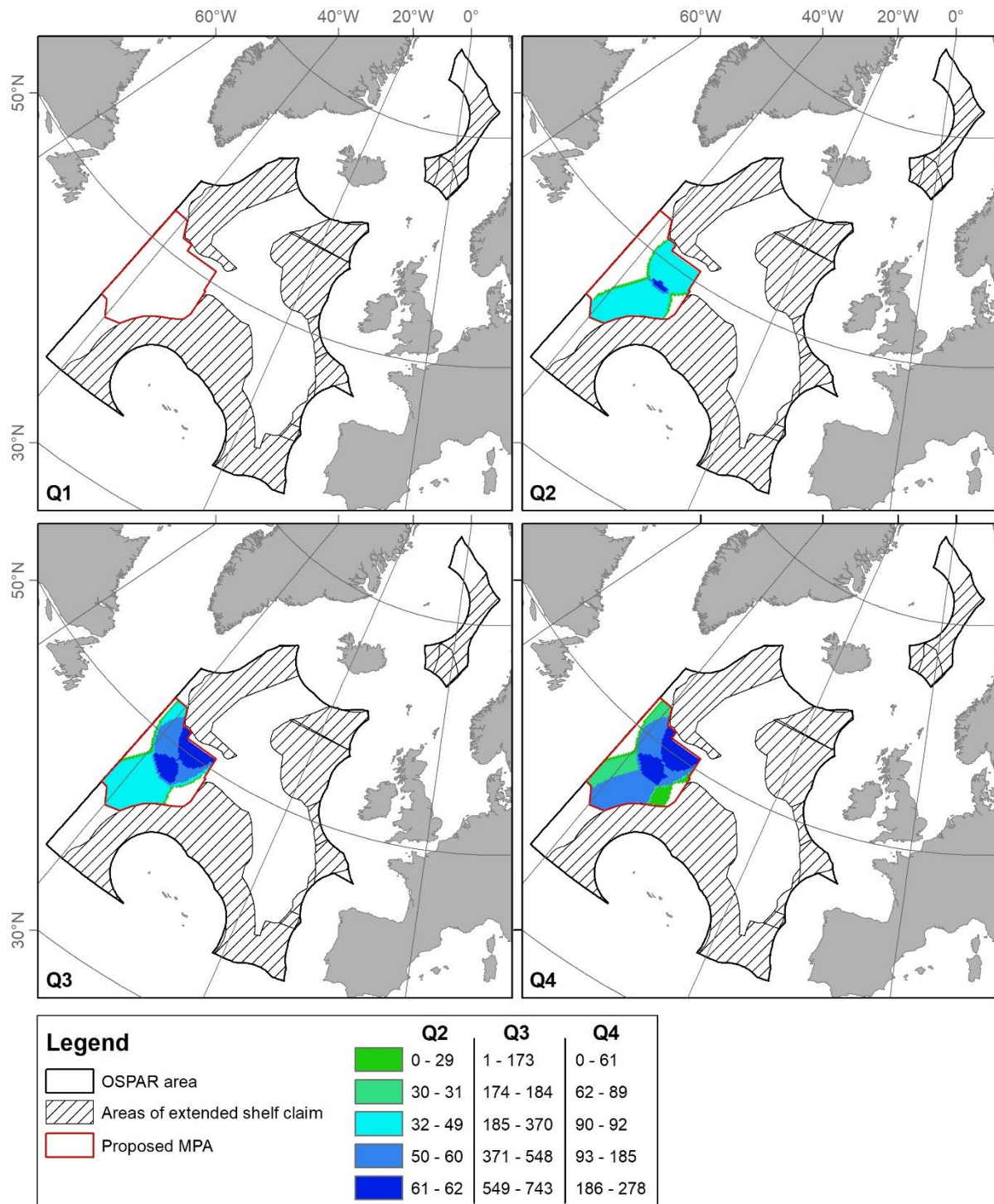


Figure A0.38 Number of mature individuals of **Audubon's Shearwater** *Puffinus lherminieri baroli* in the [proposed] MPA for each year quarter.

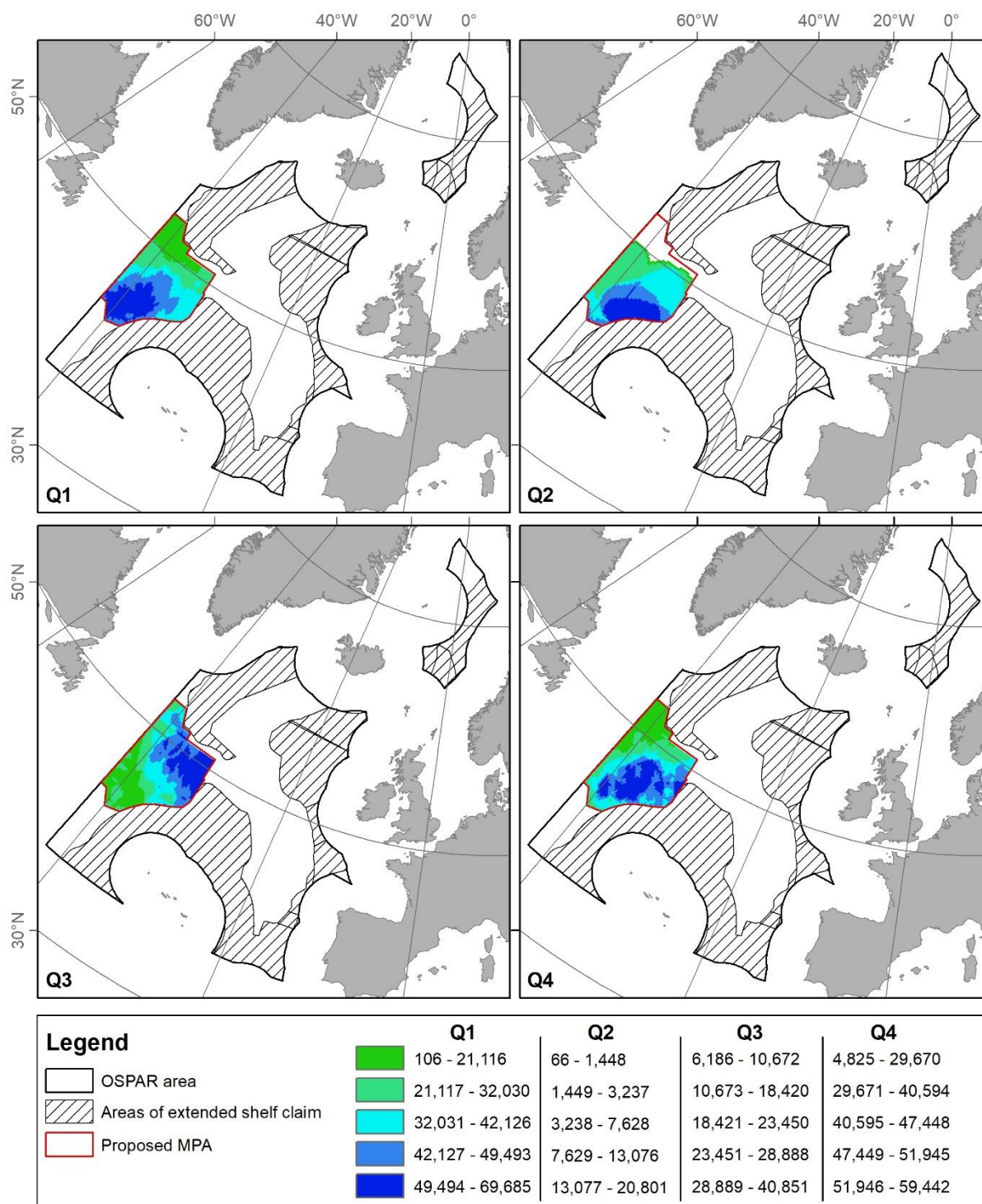


Figure A0.39 Number of mature individuals of *Cory's Shearwater* *Calonectris borealis* in the [proposed] MPA for each year quarter.

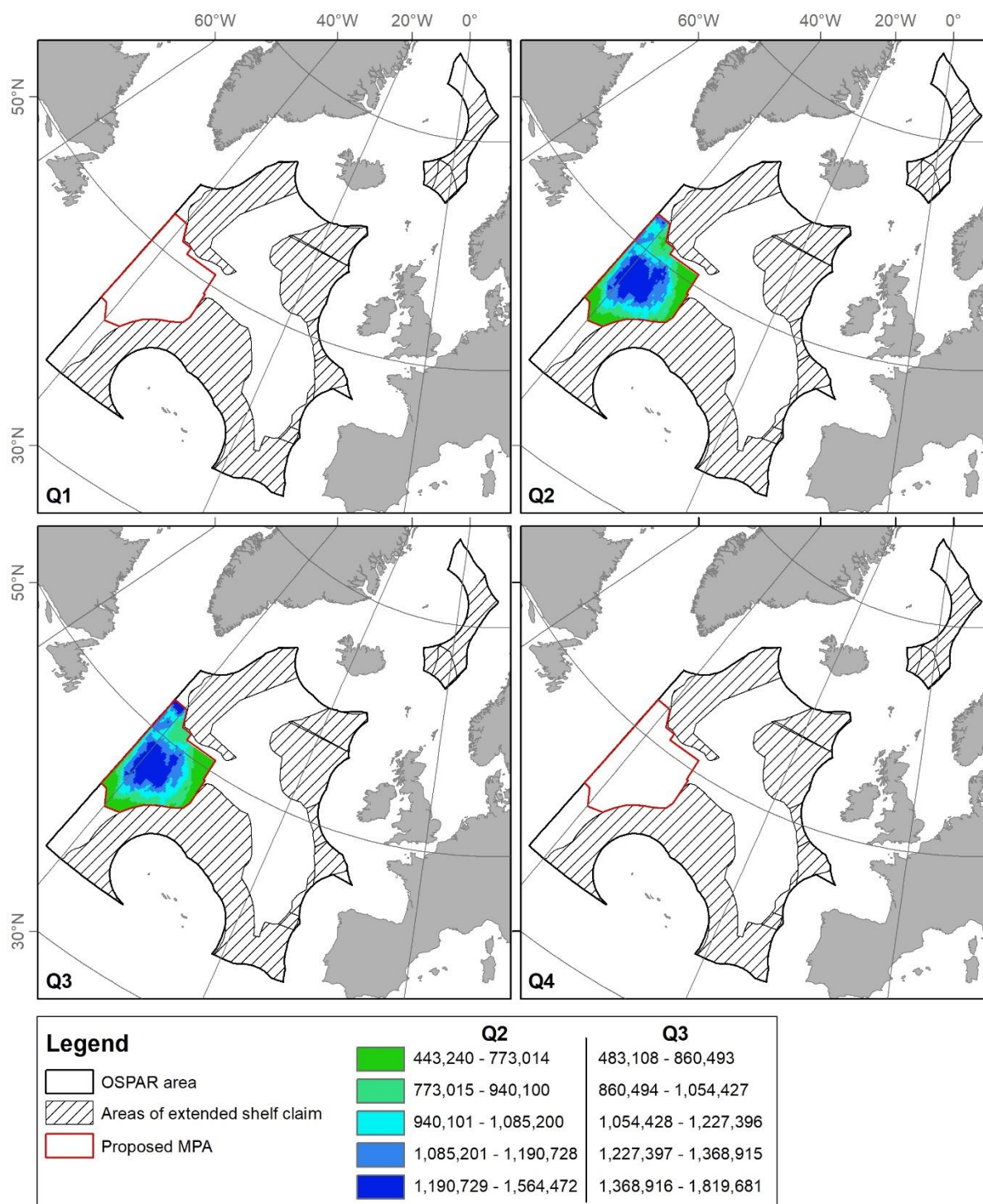


Figure A0.40 Number of mature individuals of **Great Shearwater** *Ardenna gravis* in the [proposed] MPA for each year quarter.

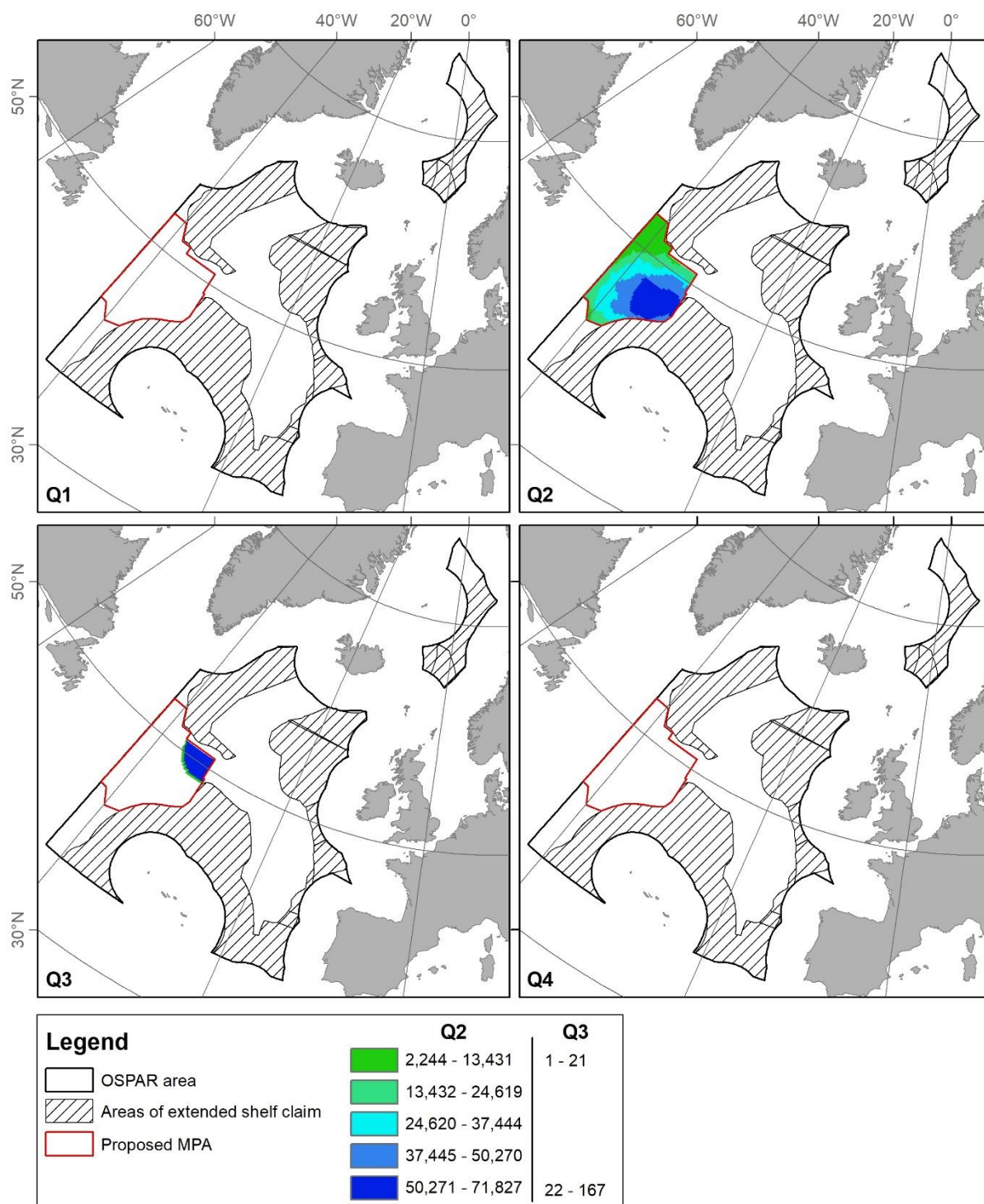


Figure A0.41 Number of mature individuals of **Manx Shearwater** *Puffinus puffinus* in the [proposed] MPA for each year quarter.

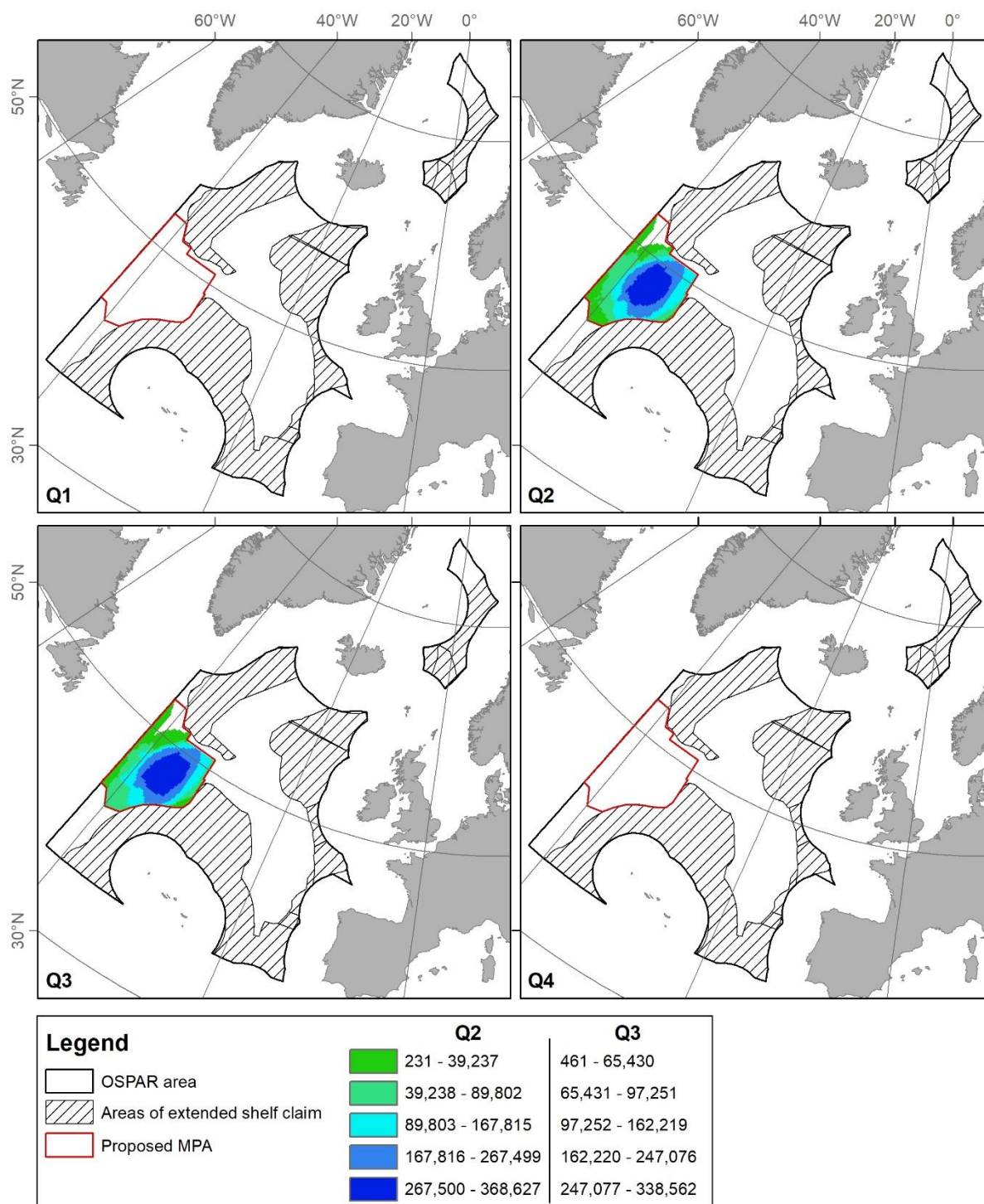


Figure A0.42 Number of mature individuals of **Sooty Shearwater** *Ardenna grisea* in the [proposed] MPA for each year quarter.

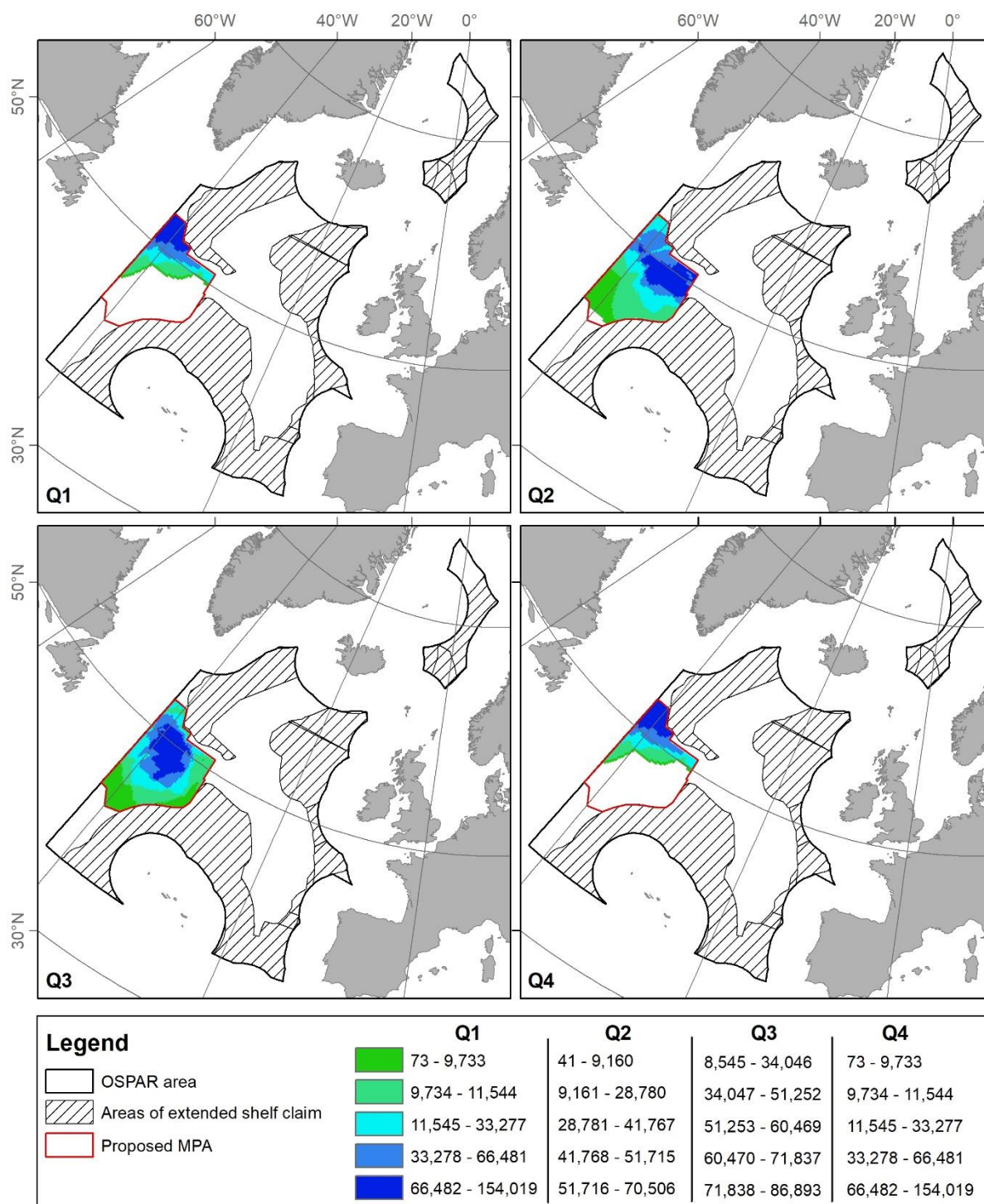


Figure A0.43. Number of mature individuals of **Northern Fulmar** *Fulmarus glacialis* in the [proposed] MPA for each year quarter

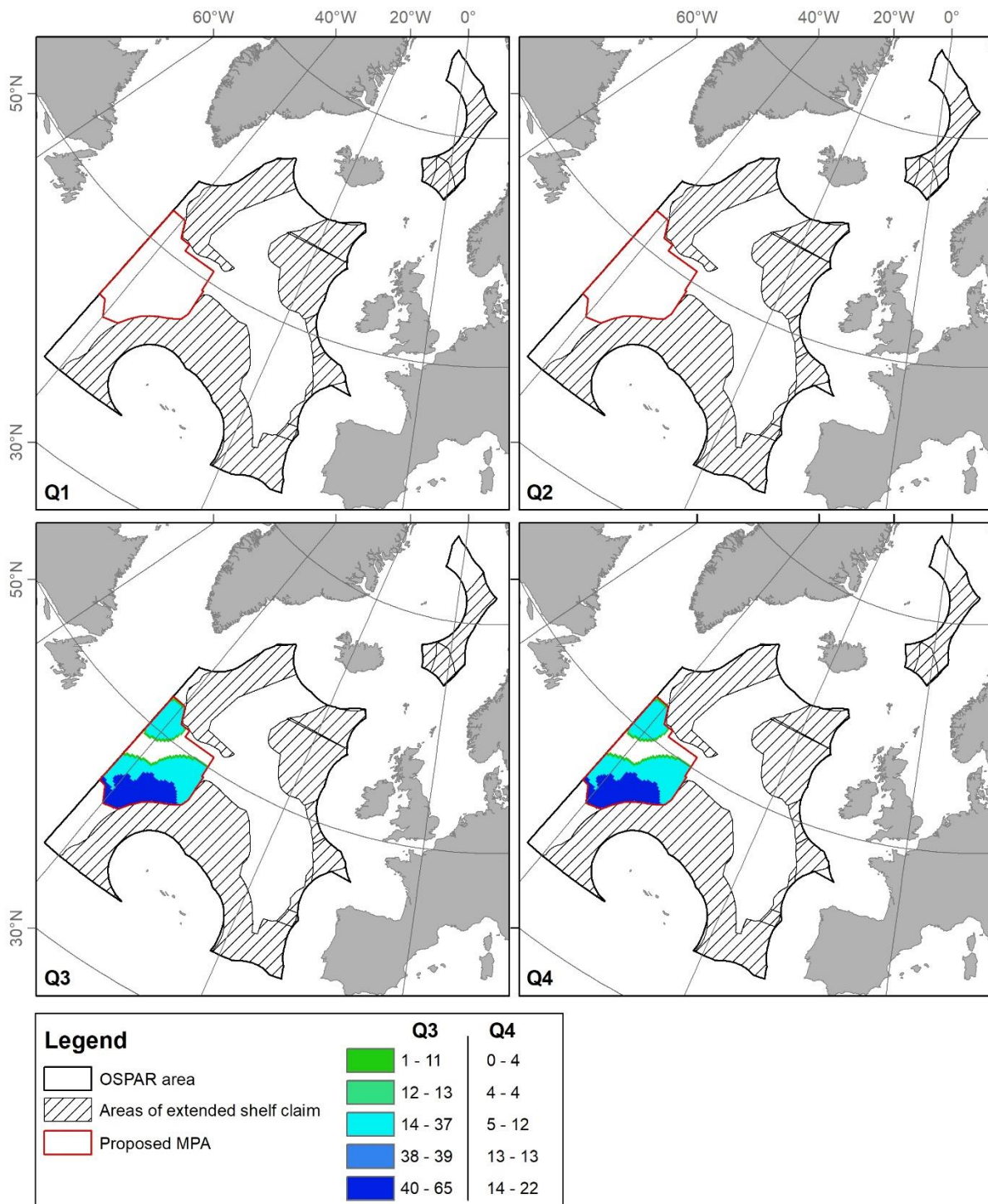


Figure A0.44 Number of mature individuals of **Bermuda Petrel** *Pterodroma cahow* in the [proposed] MPA for each year quarter.

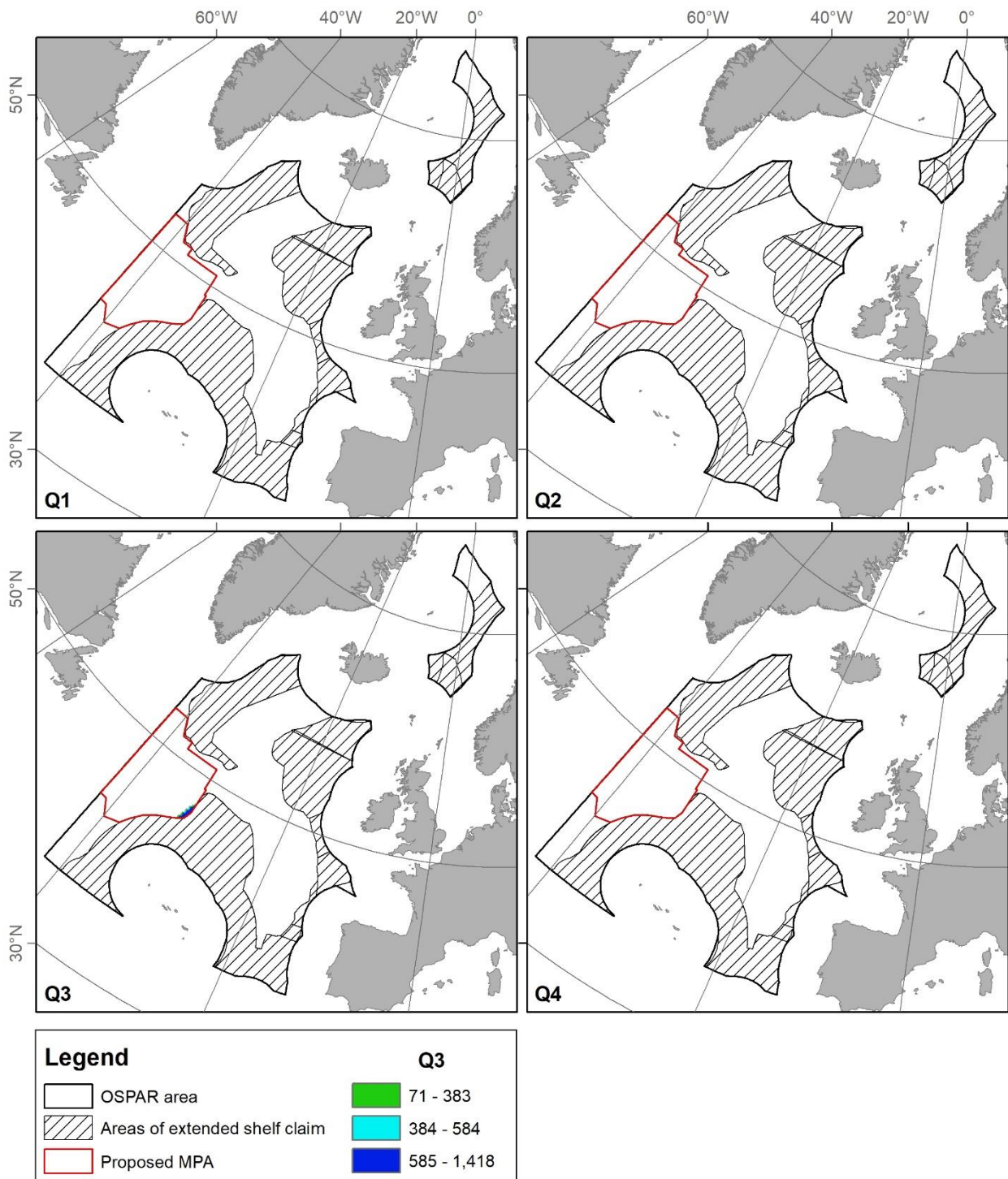


Figure A0.45 Number of mature individuals of **Bulwer's Petrel** *Bulweria bulwerii* in the [proposed] MPA for each year quarter.

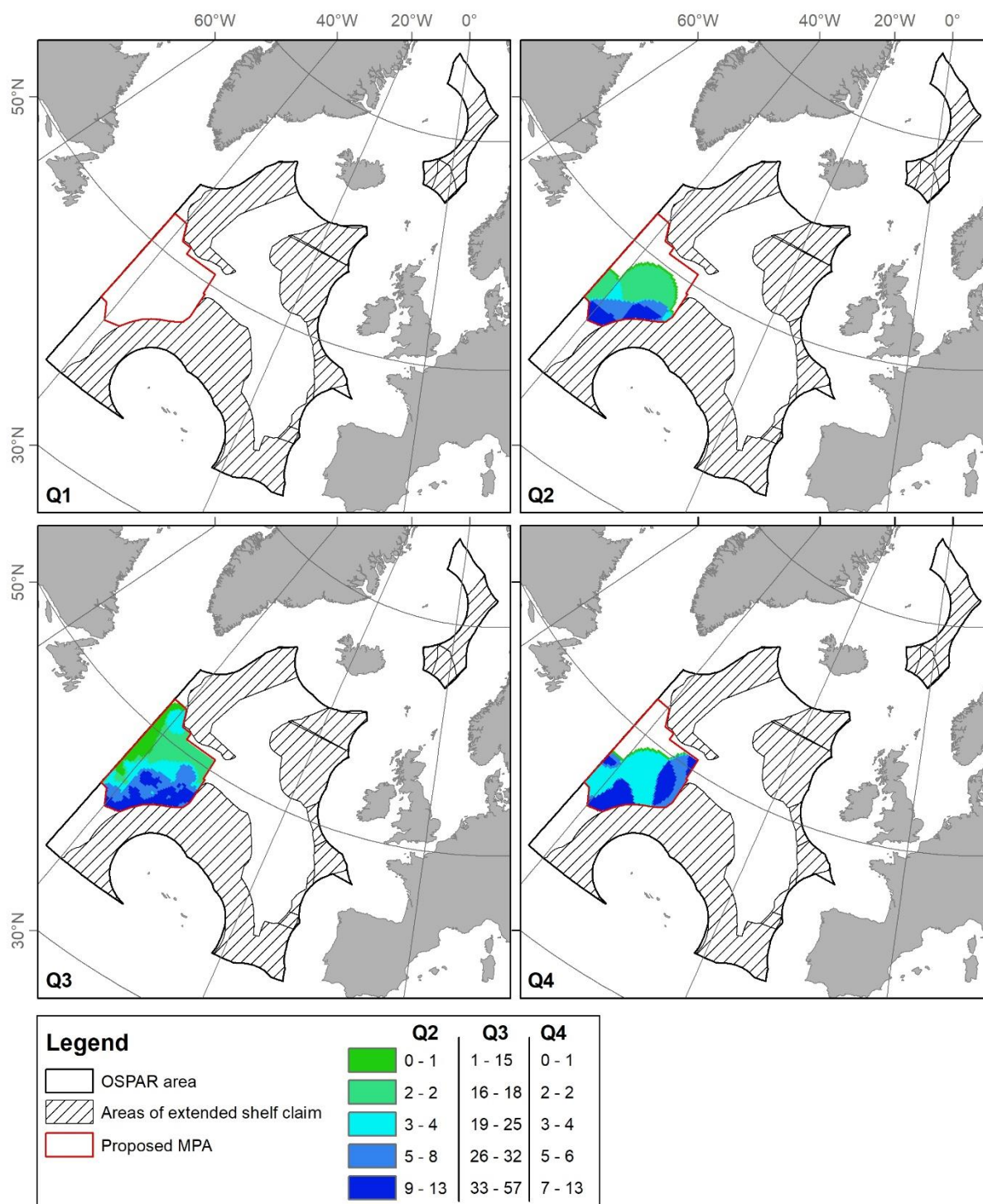


Figure A0.46 Number of mature individuals of **Desertas Petrel** *Pterodroma deserta* in the [proposed] MPA for each year quarter.

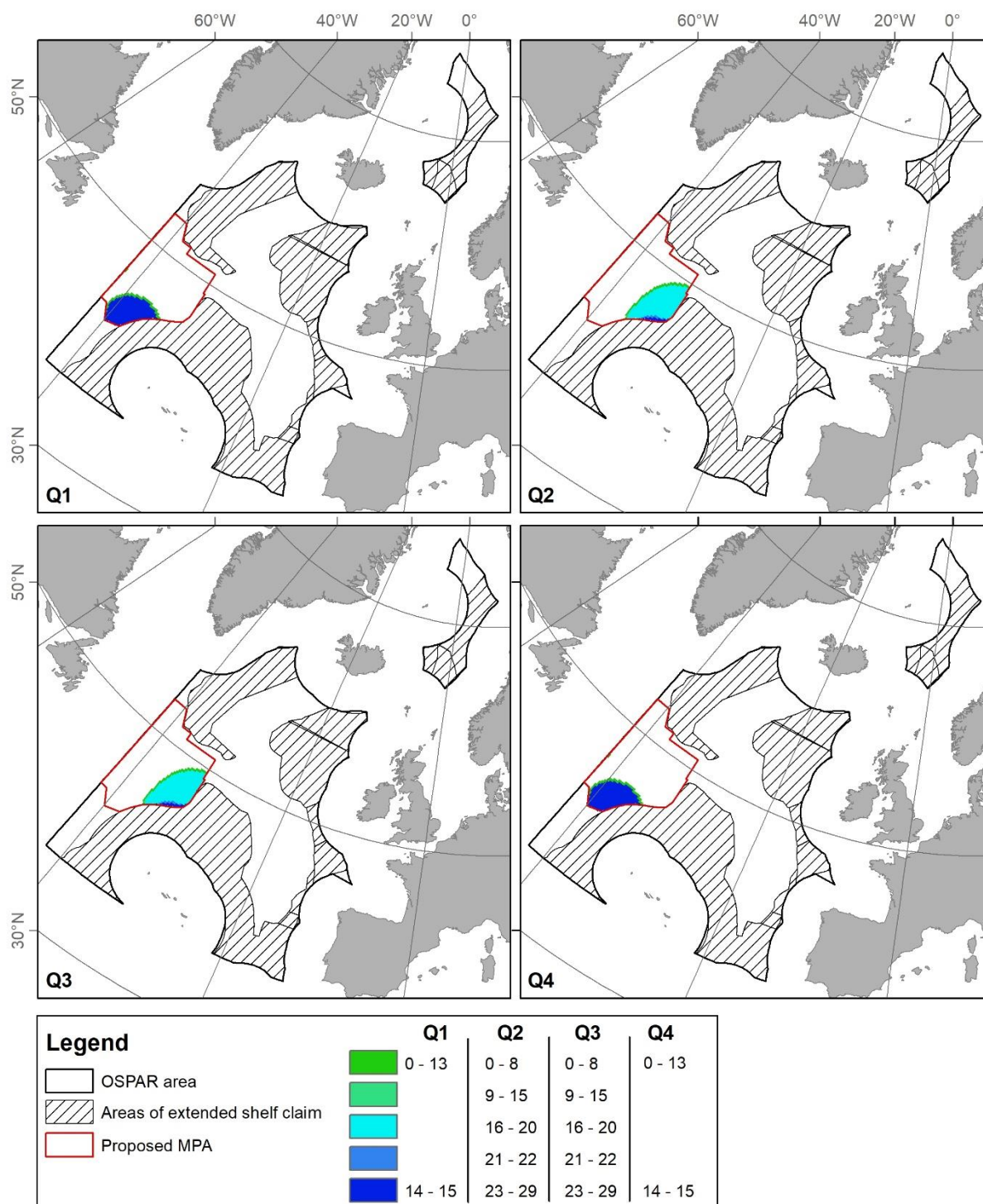


Figure A0.47 Number of mature individuals of **Zino's Petrel** *Pterodroma madeira* in the [proposed] MPA for each year quarter.

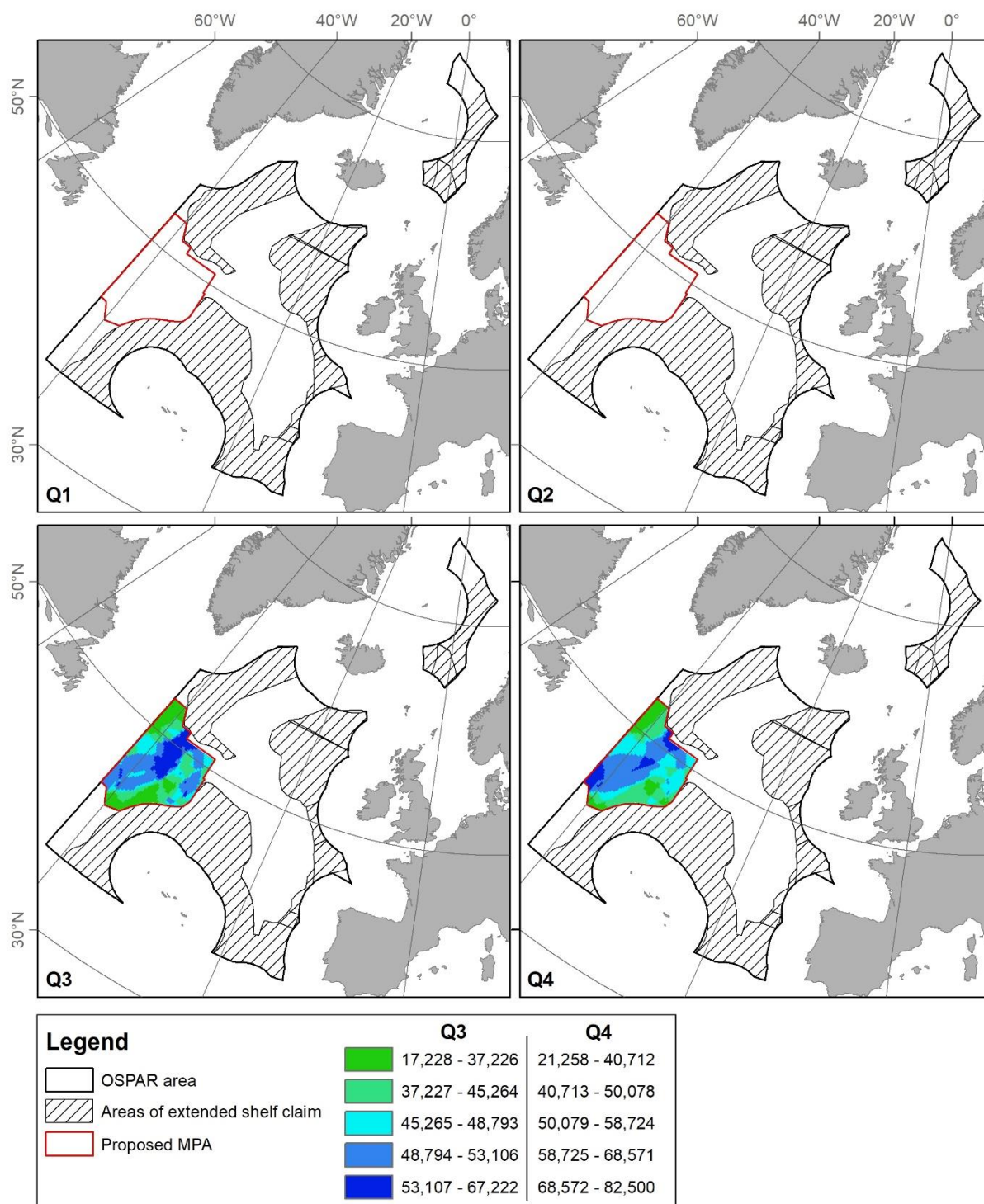


Figure A0.48 Number of mature individuals of Arctic Terns *Sterna paradisaea* in the [proposed] MPA for each year quarter.

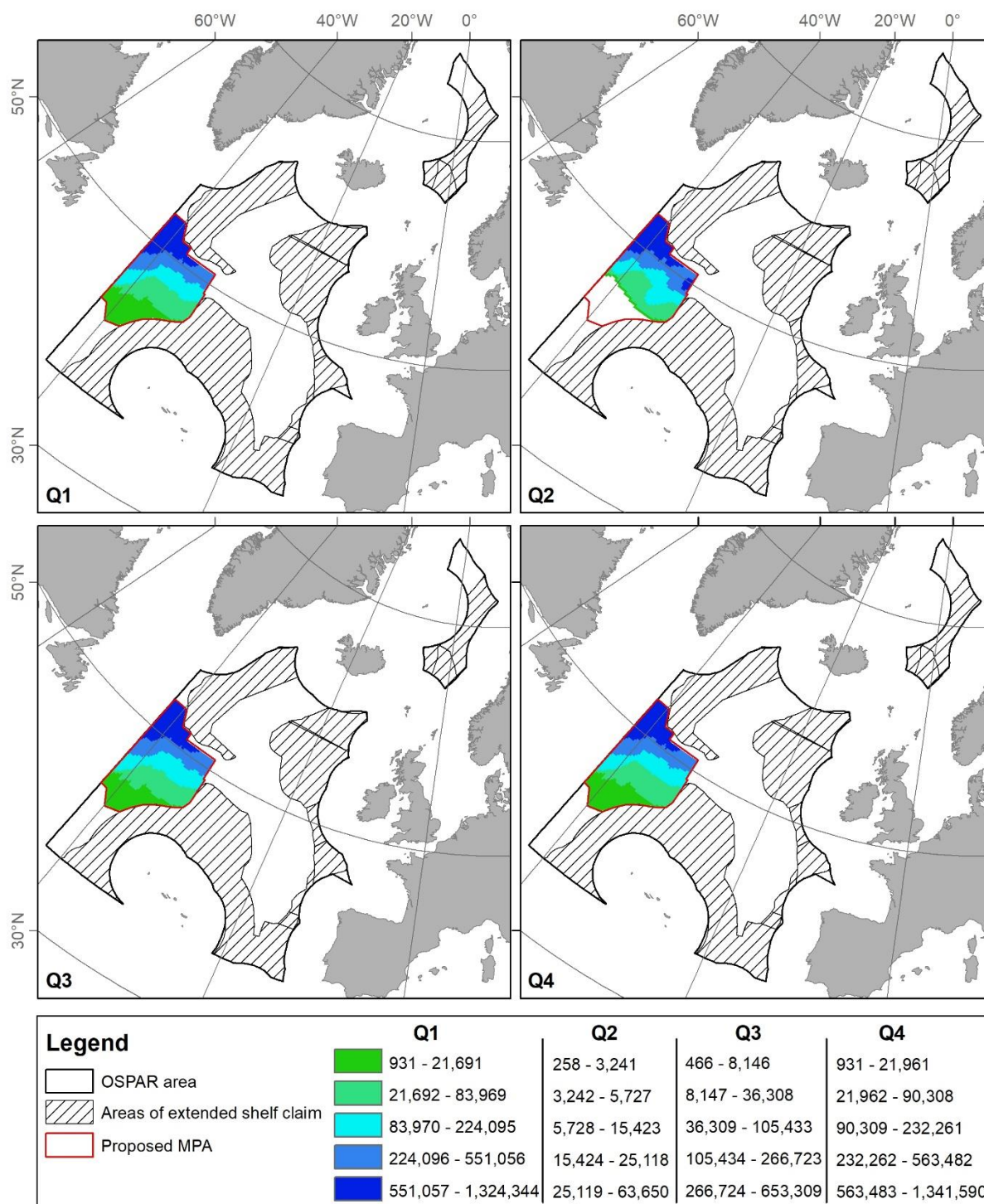


Figure A0.49 Number of mature individuals of **Black-legged Kittiwake** *Rissa tridactyla* in the [proposed] MPA for each year quarter

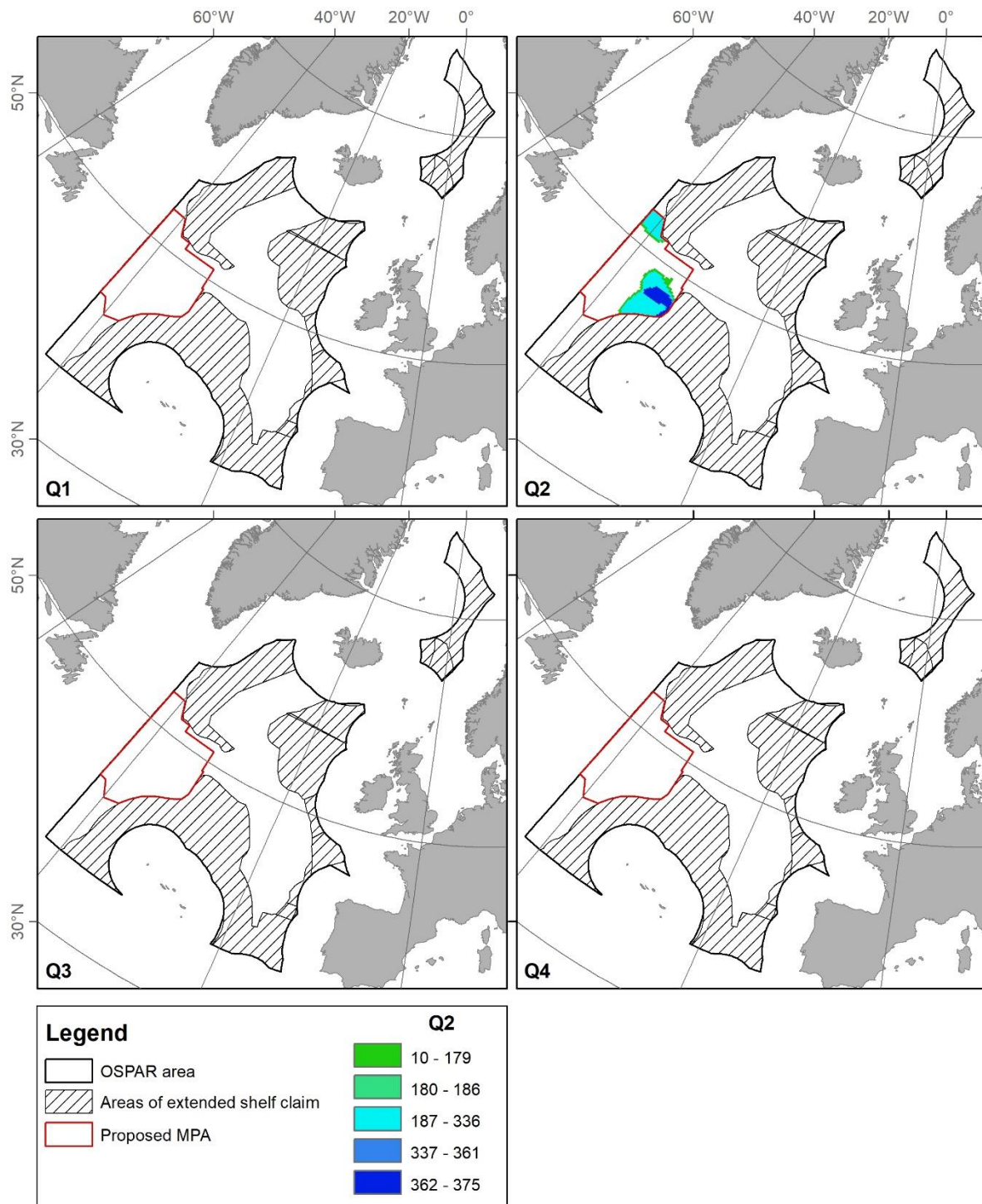


Figure A0.50 Number of mature individuals of **Sabine's Gull** *Xema sabini* in the [proposed] MPA for each year quarter.

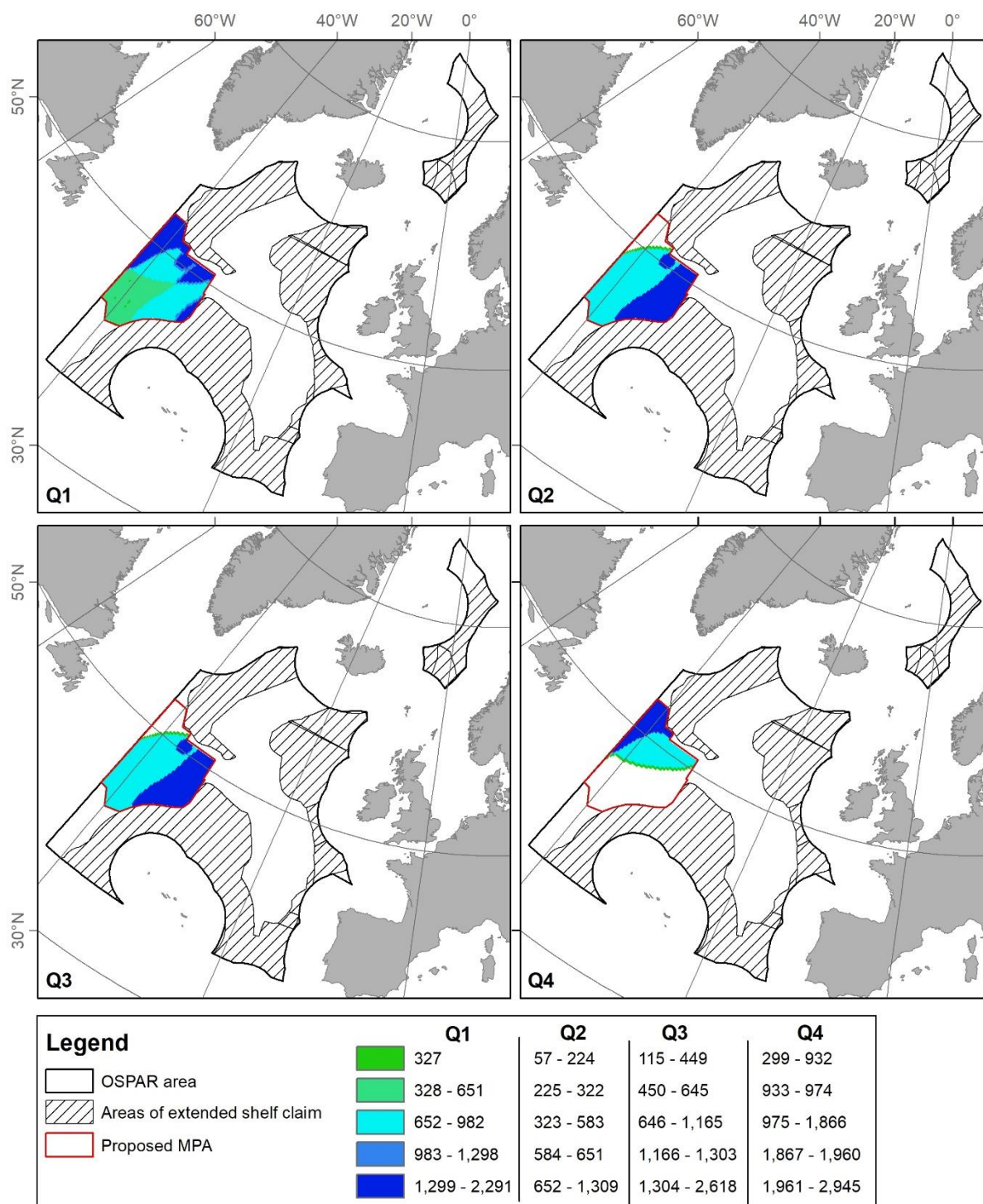


Figure A0.51 Number of mature individuals of Great Skua *Stercorarius skua* in the [proposed] MPA for each year quarter

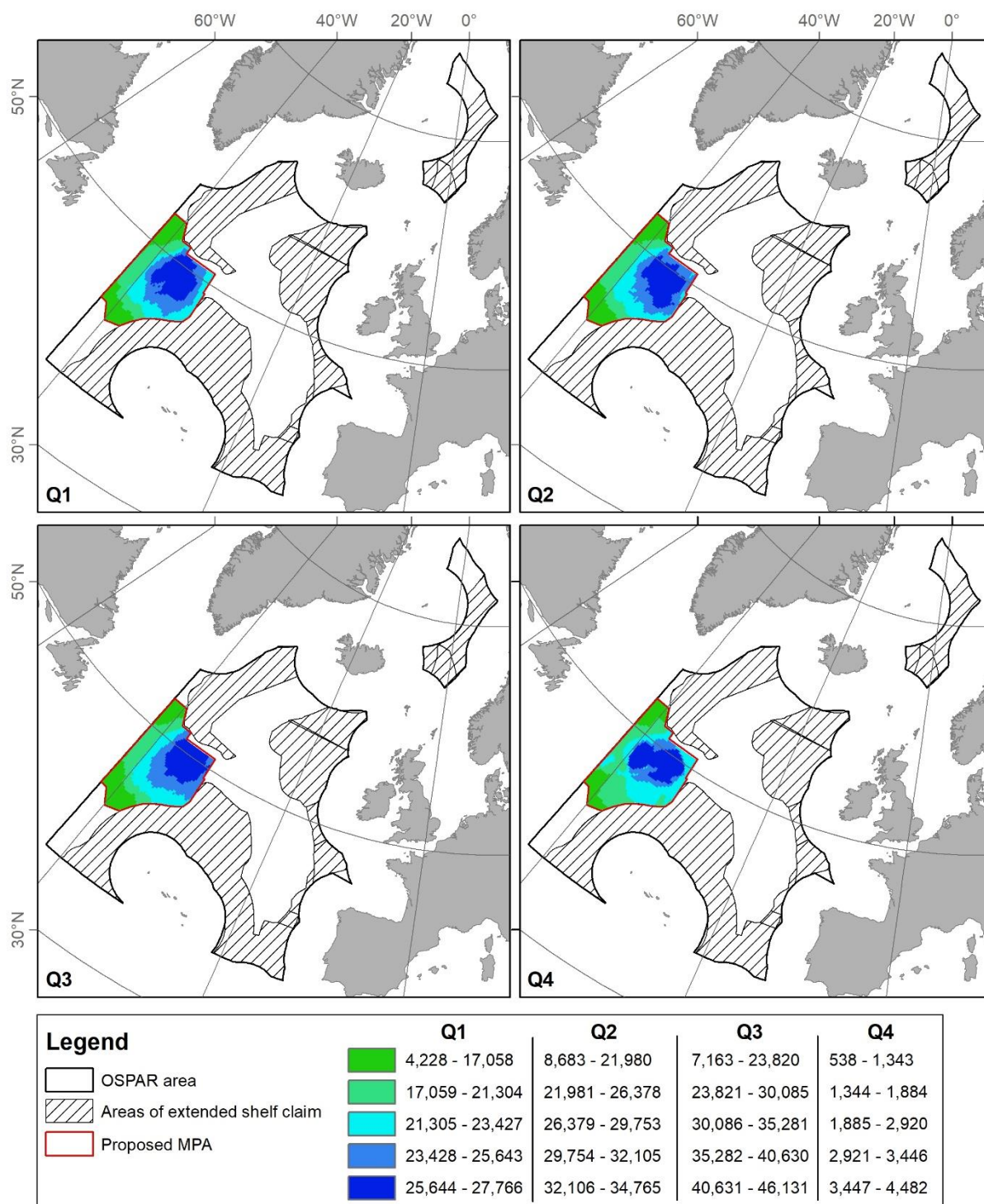


Figure A0.52 Number of mature individuals of **Long-tailed Jaeger** *Stercorarius longicaudus* in the [proposed] MPA for each year quarter.

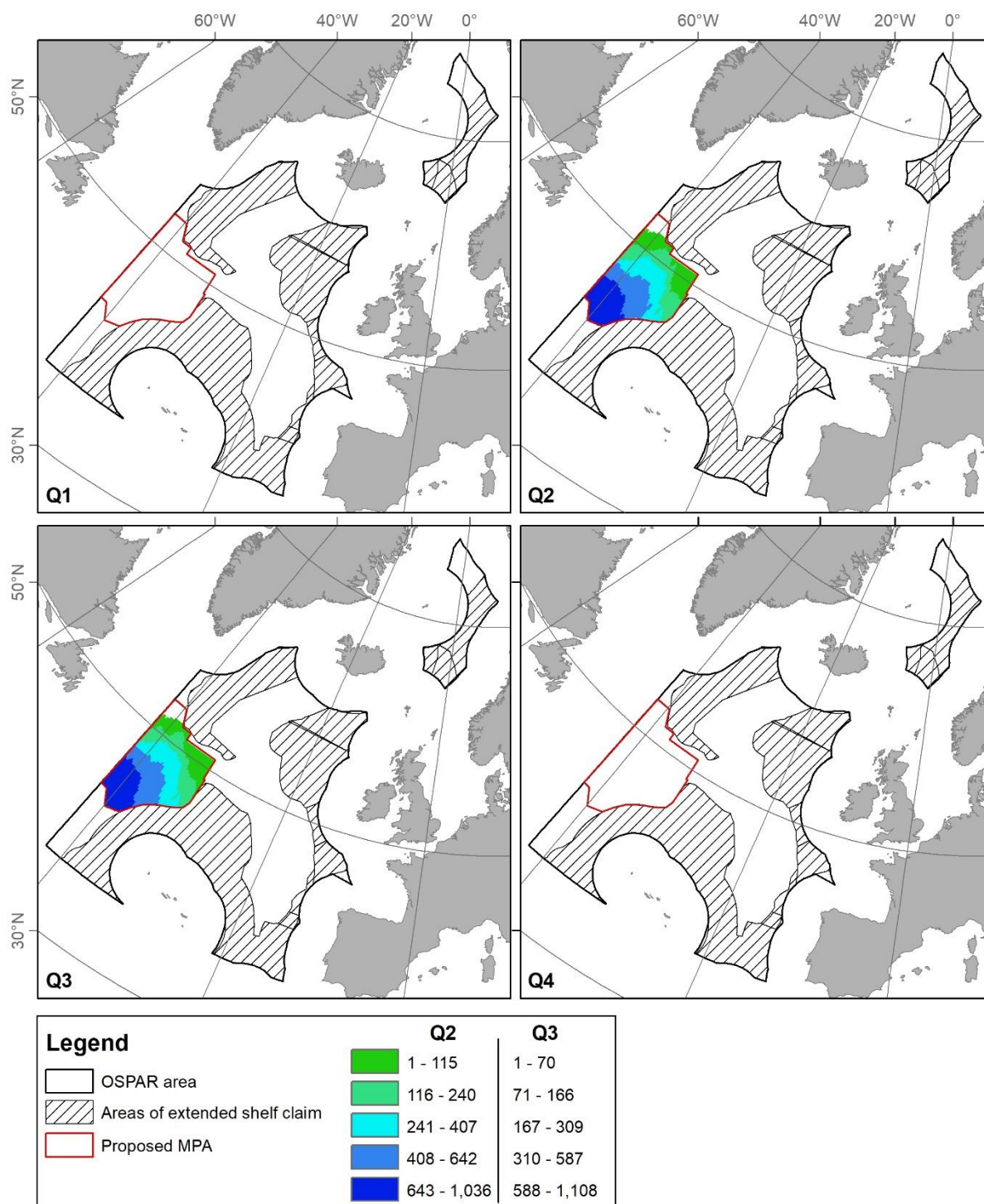


Figure A0.53 Number of mature individuals of **South Polar Skua** *Catharacta maccormicki* in the [proposed] MPA for each year quarter.

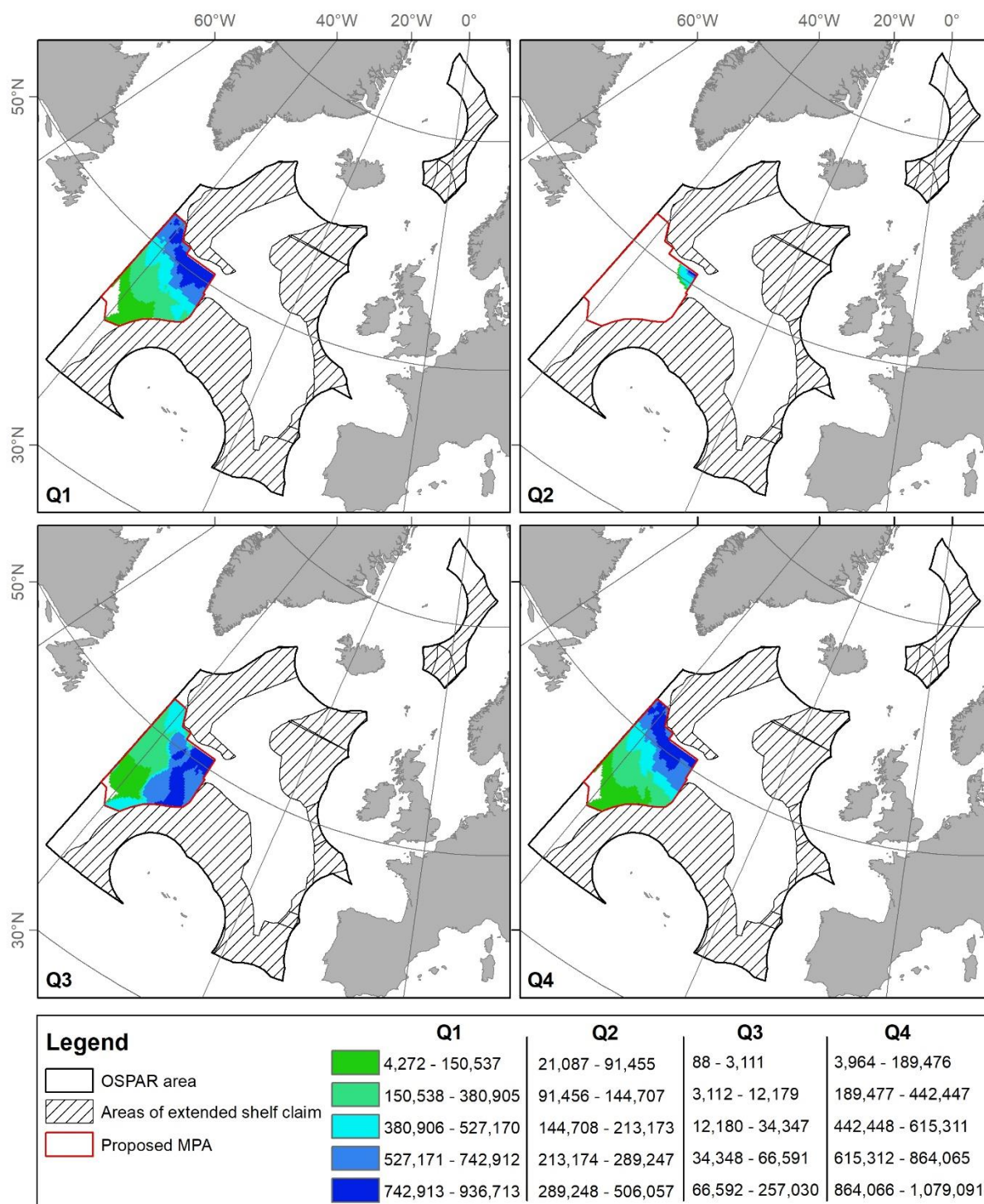


Figure A0.54 Number of mature individuals of **Atlantic Puffin *Fratercula arctica*** in the [proposed] MPA for each year quarter.

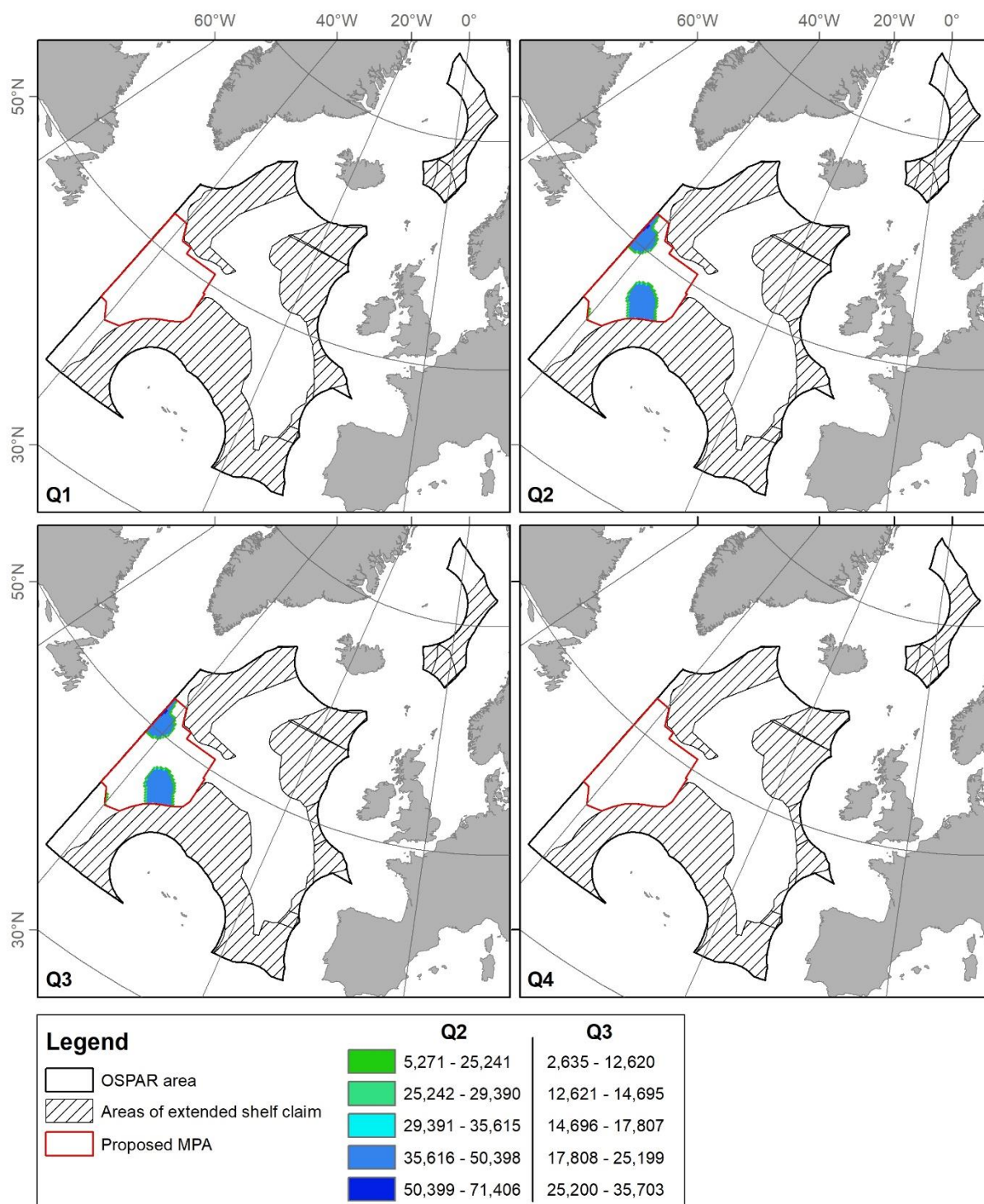


Figure A0.55 Number of mature individuals of **Common Murre** *Uria aalge* in the [proposed] MPA for each year quarter.

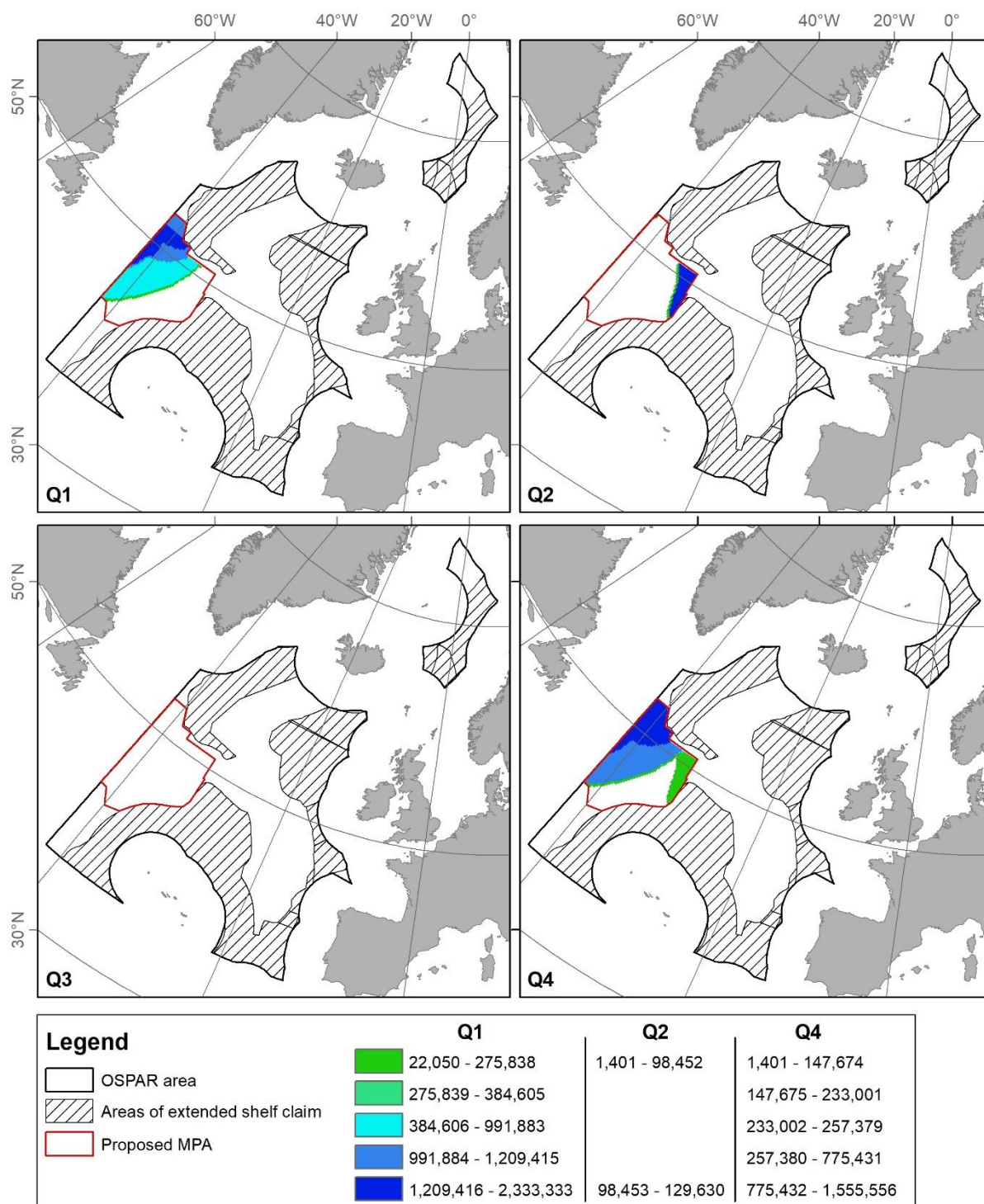


Figure A0.56 Number of mature individuals of **Little Auk *Alle alle*** in the [proposed] MPA for each year quarter.

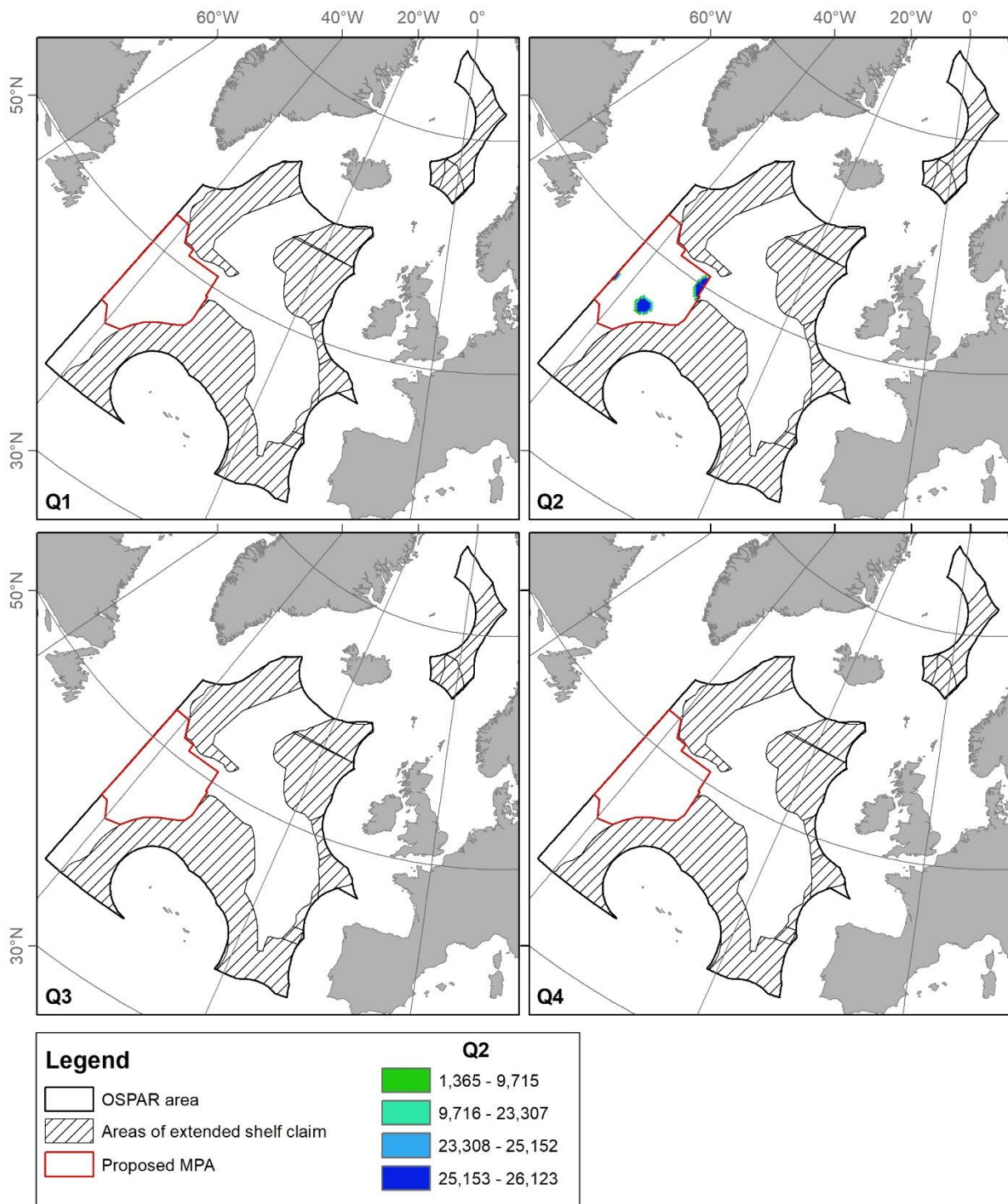


Figure A0.57 Number of mature individuals of *Razorbill Alca torda* in the [proposed] MPA for each year quarter

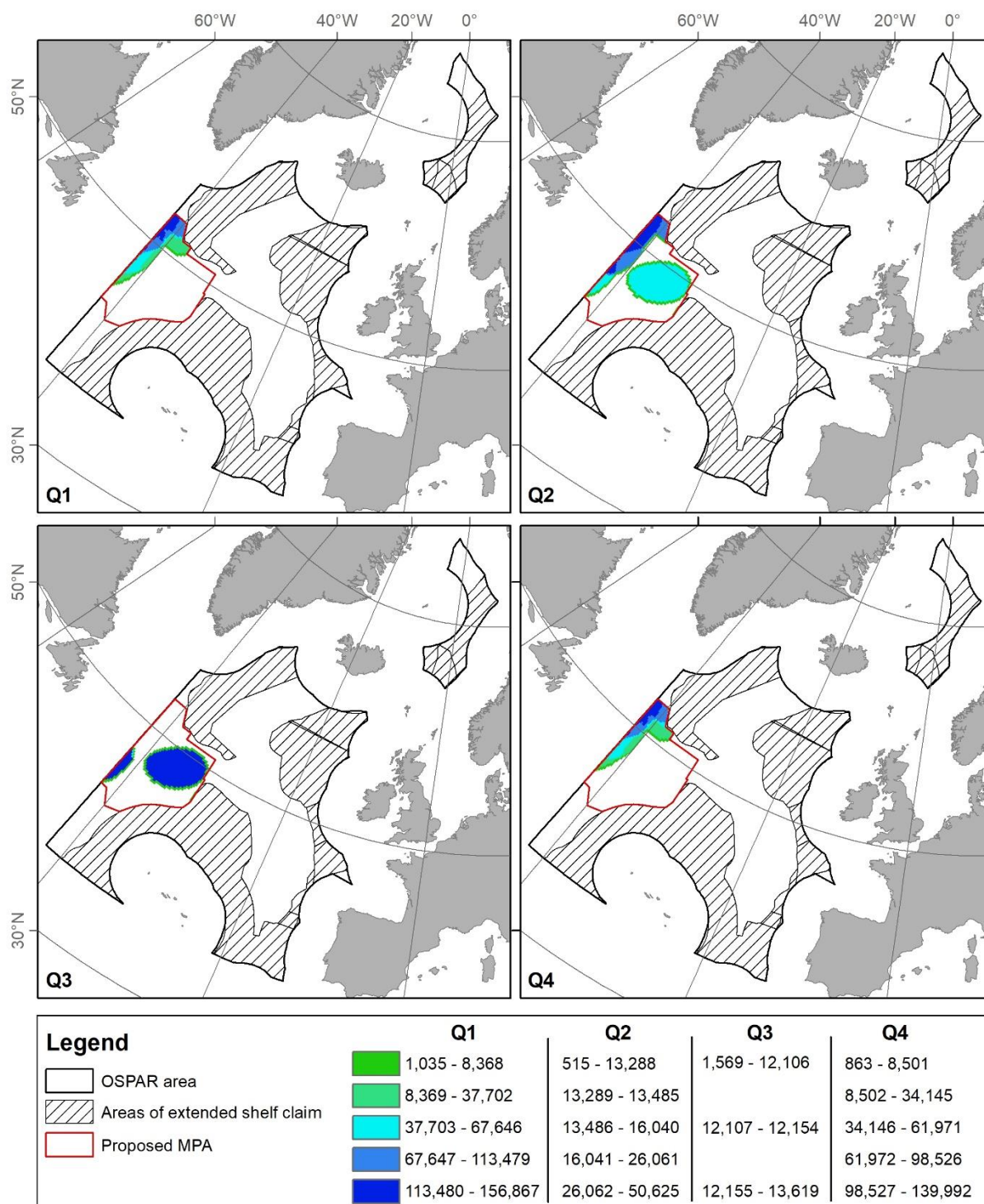


Figure A0.58 Number of mature individuals of **Thick-billed Murre** *Uria lomvia* in the [proposed] MPA for each year quarter.

Annex 7. Evidence of use of [proposed] MPA from published literature

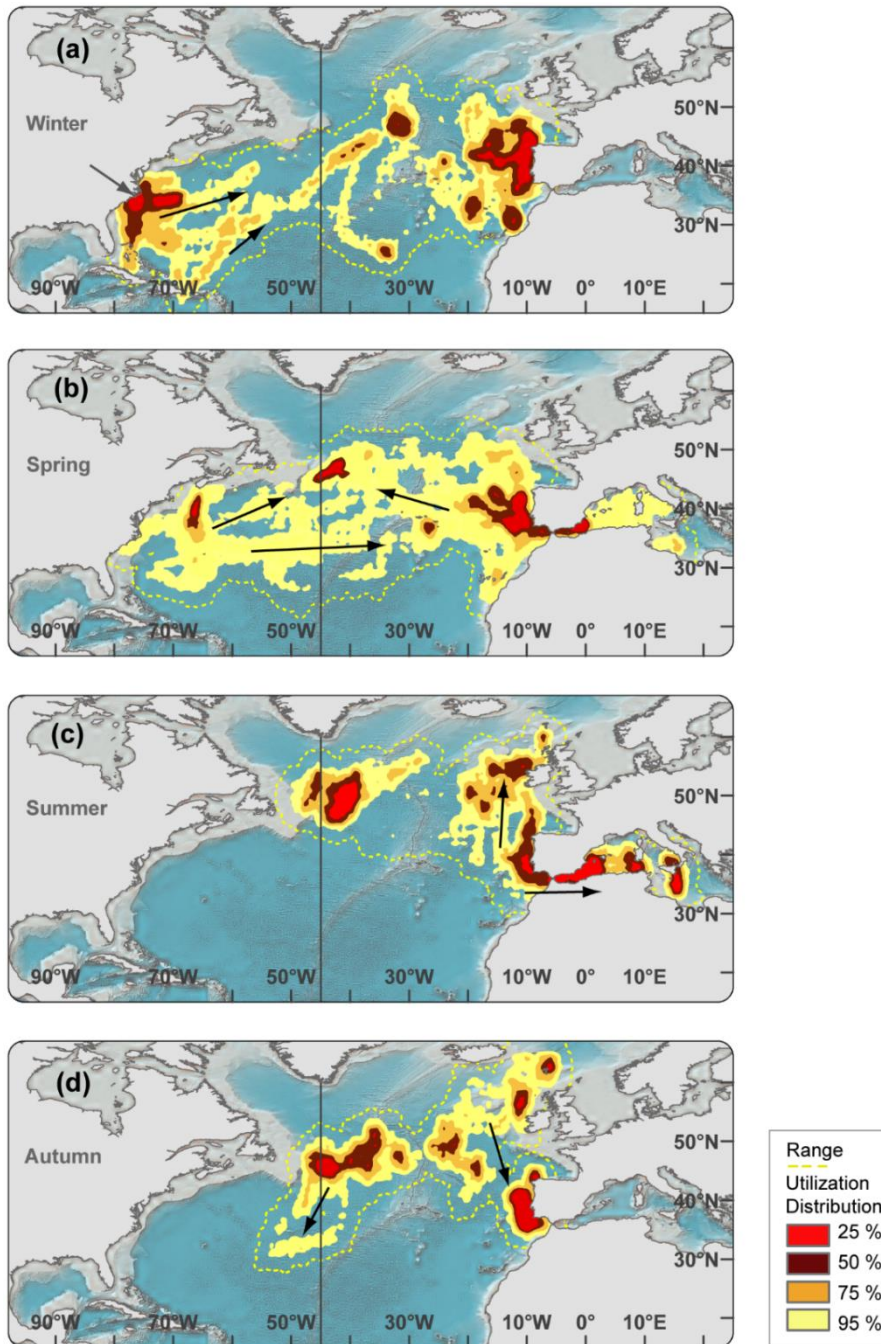


Figure A0.59 Atlantic Bluefin Tuna *Thunnus thynnus* (OSPAR-listed species; Global Red List Status: Endangered) foraging area hotspot analysis across seasons. Original figure taken from Walli et al. (2009)²

² Walli et al. (2009). PLOS ONE 4, e6151. doi:10.1371/journal.pone.0006151

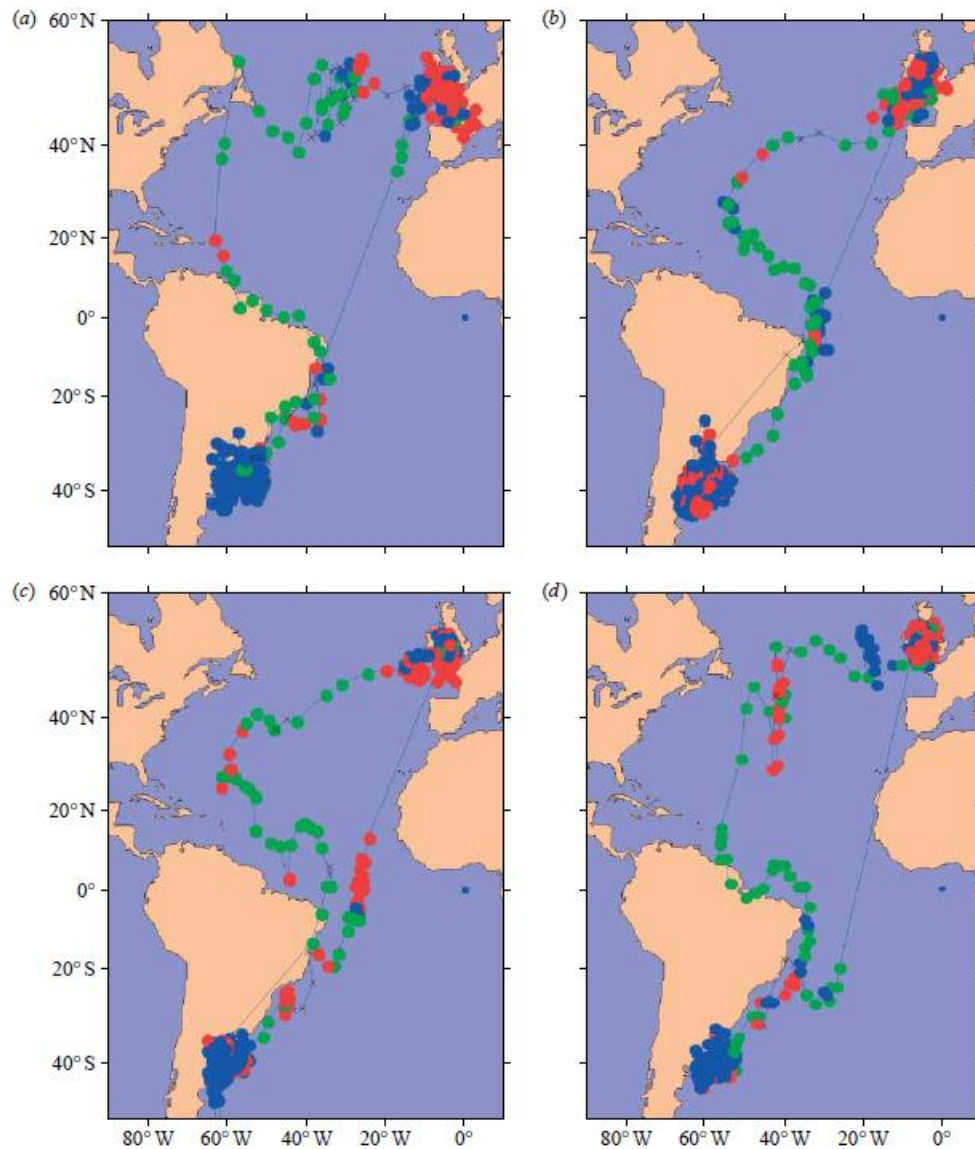


Figure A0.60. Maps showing the migratory movements of **Manx Shearwater *Puffinus puffinus***. Colours represent different behaviours classification (based on Bayesian machine learning techniques; red: summer feeding; blue: winter feeding; green: migration. “Summer feeding” behaviour during migratory periods reveals the potential role of stopovers as refuelling areas (including in the [proposed] area – see panel d). From Guilford et al. (2009)³

³ Guilford et al. (2009). Proc. R. Soc. B (2009) 276, 1215–1223. DOI: 10.1098/rspb.2008.1577

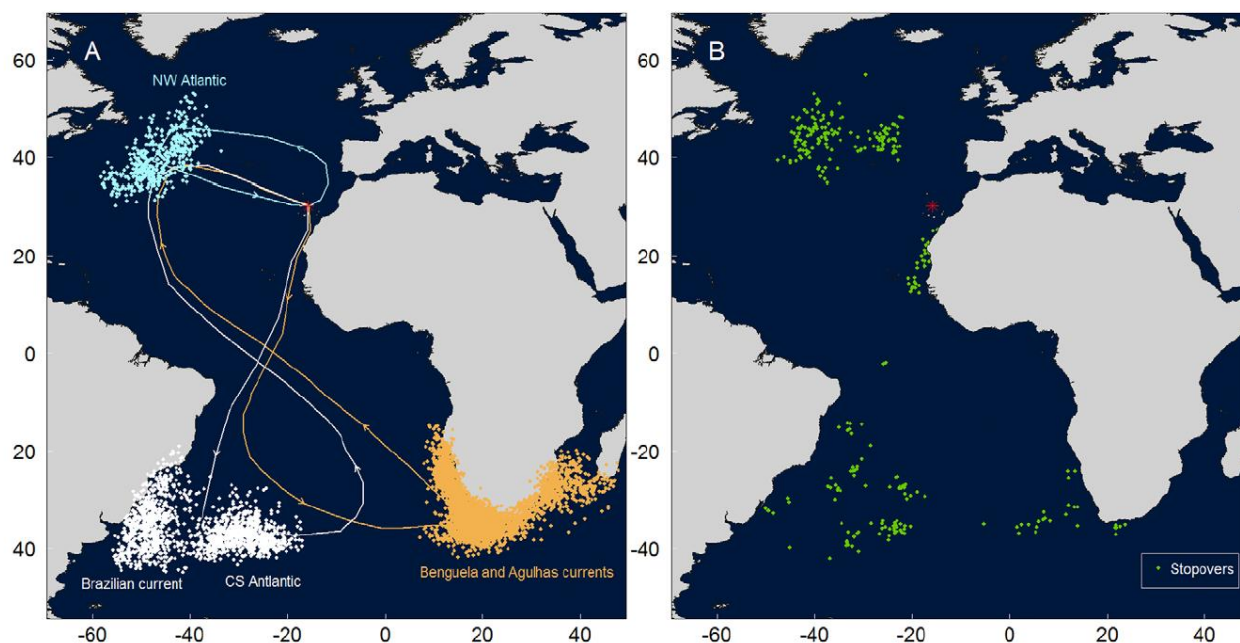


Figure A0.61. Maps showing the migratory movements of **Cory's Shearwater** *Calonectris borealis*. Birds tracked from the most important colony, located in Selvagem, Madeira (red asterisk). A: main wintering destinations; B: stopover locations. From Dias et al. (2012)⁴

⁴ Dias et al. (2012). PLoS ONE 7(11): e49376. doi:10.1371/journal.pone.0049376

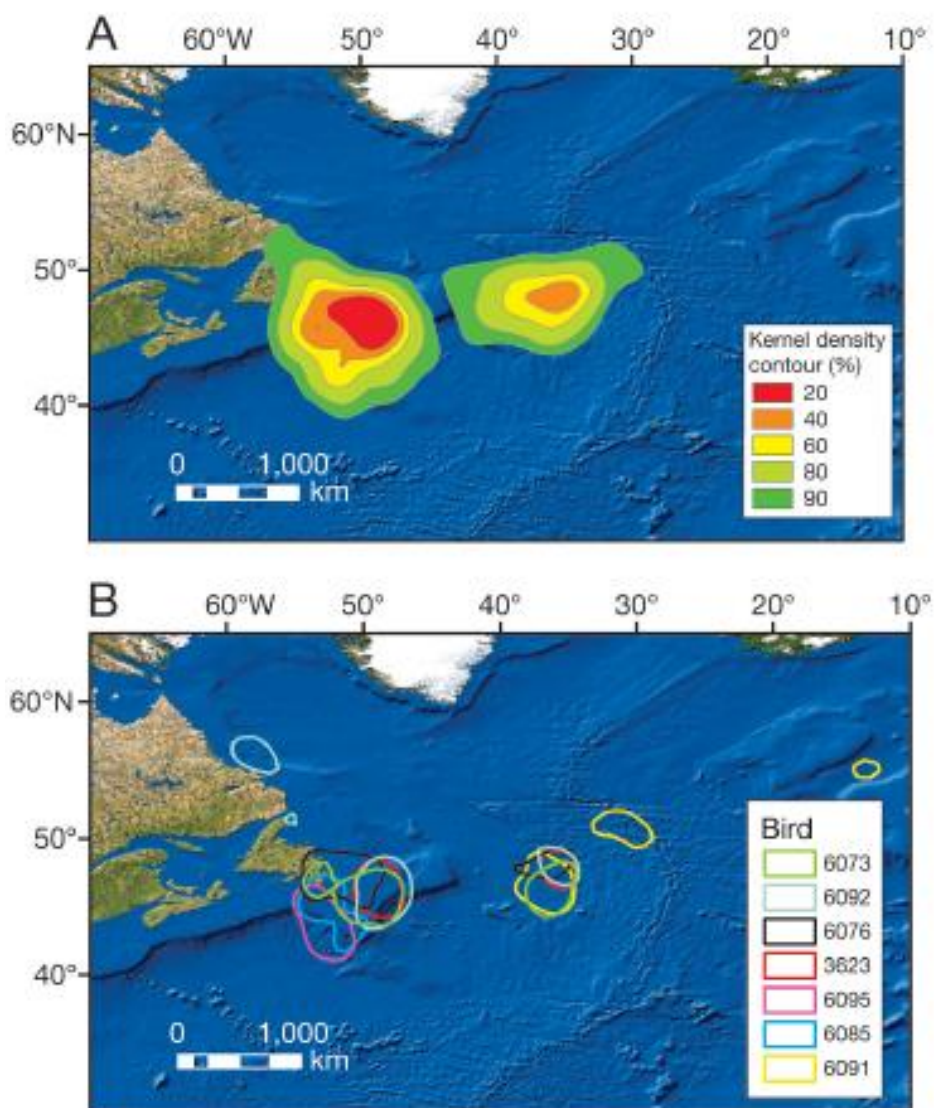


Figure A0.62. Kernel density distributions of wintering **Sooty Shearwater *Ardenna grisea***, tracked from the Falkland Islands.
 From Hedd et al. (2012)⁵

⁵ Hedd et al (2012). MEPS 449, 277–290 doi: 10.3354/meps09538

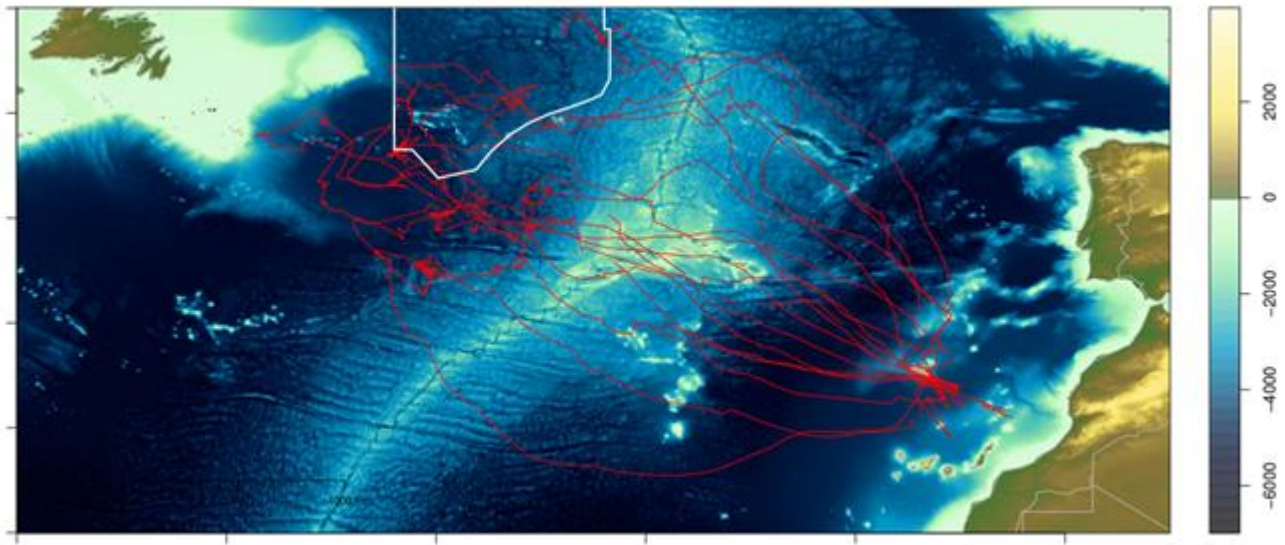


Figure A0.63. Foraging movements of **Desertas Petrel** *Pterodroma deserta* tracked from the colony located in Bugio (Desertas, Madeira), during the incubation period.
Based on GPS data collected by J.P Granadeiro and P. Catry (in prep). **Important note: The information included in this figure is to form the basis of a scientific publication (in preparation), and is therefore not for distribution.**

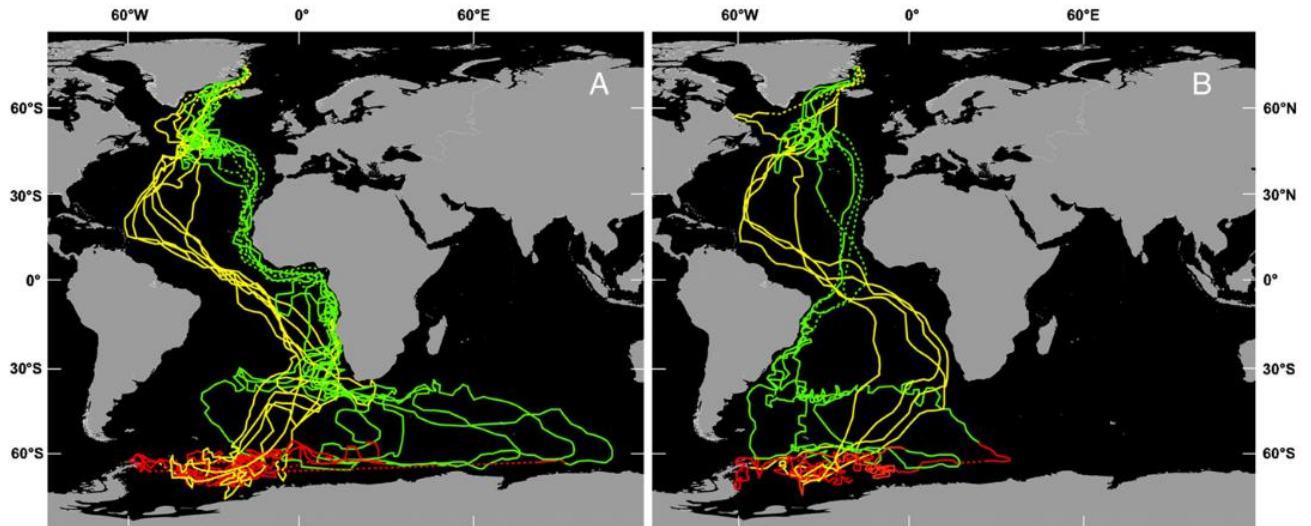


Figure A0.64. Migratory movements of **Arctic Tern *Sterna paradisaea***
Birds tracked from breeding colonies in Greenland (n = 10 birds) and Iceland (n = 1 bird), showing the use of the [proposed] MPA as a staging area. From Egevang et al. (2010)⁶

⁶ Egevang et al. (2010). PNAS 107, 2078–2081. doi:10.1073/pnas.0909493107

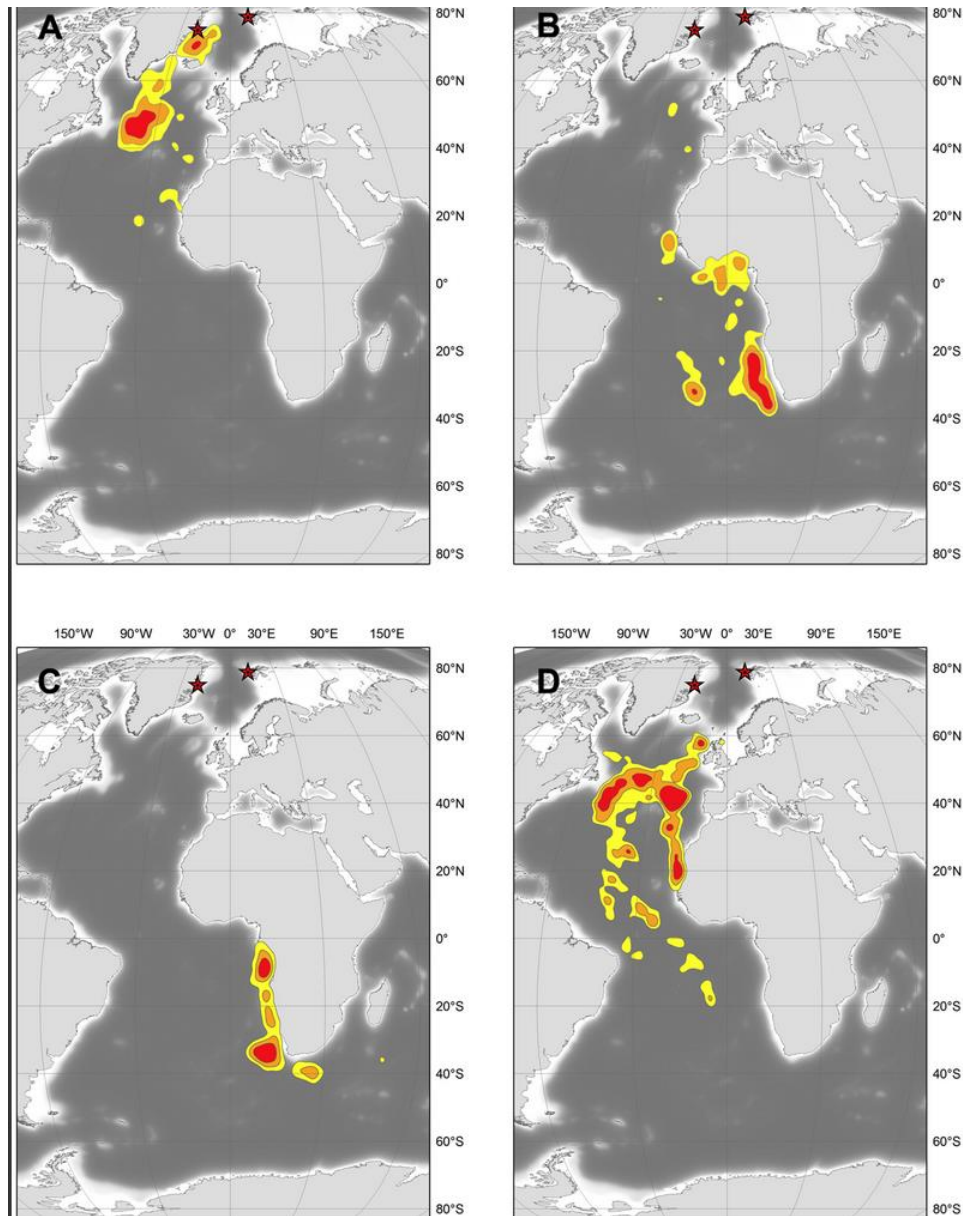


Figure A0.65. Kernel density distribution estimated for the **Long-tailed Jaeger *Stercorarius longicaudus*** along the annual cycle

(a) from release to September 10th, (b) between October 10th and November 31st, (c) December and January and (d) after April 10th. Contours represent densities of 25% (red), 50% (orange) and 75% (yellow). From Gilg et al. (2013)⁷

⁷ Gilg et al. (2013). PLoS ONE 8(5): e64614. doi:10.1371/journal.pone.0064614

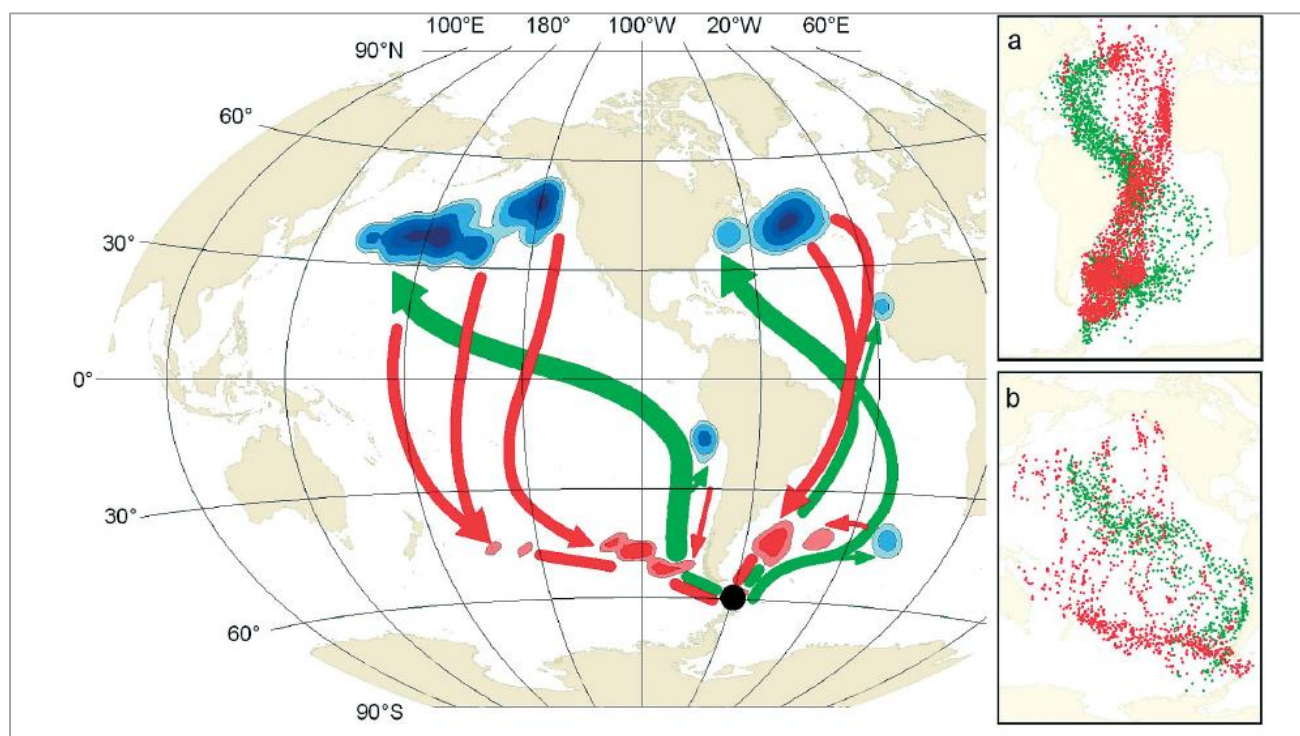


Figure A0.66. Wintering areas and migration routes of **South Polar Skua** *Catharacta maccormicki* tracked from the colonies located in King George Island (back dot). Wintering areas represented in blue. From Kopp et al. (2011)⁸

⁸ Kopp et al. (2011). MEPS 435: 263–267. doi: 10.3354/meps09229

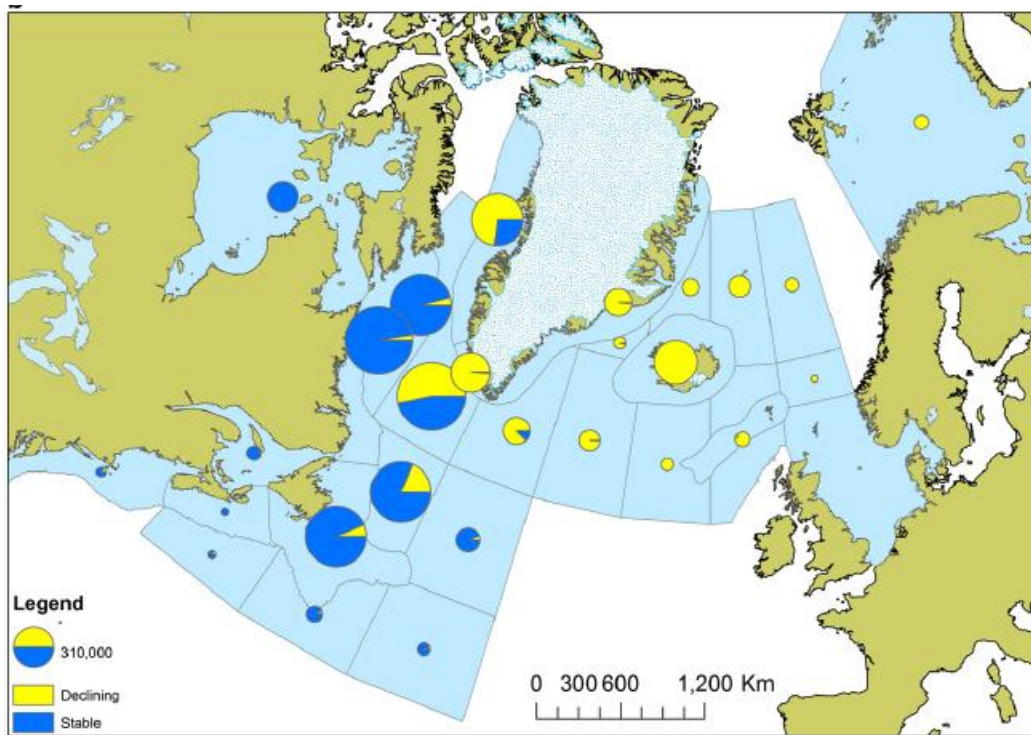


Figure A0.67. Map showing the estimated number of adult **Thick-billed Murre** *Uria lomvia* (OSPAR-listed species) in different Atlantic sectors.
Note the declining trend within the area where the [proposed] MPA is located. From Frederiksen et al. (2016)⁹

⁹ Frederiksen et al. (2016) Biol Cons 200 26–35. <http://dx.doi.org/10.1016/j.biocon.2016.05.011>

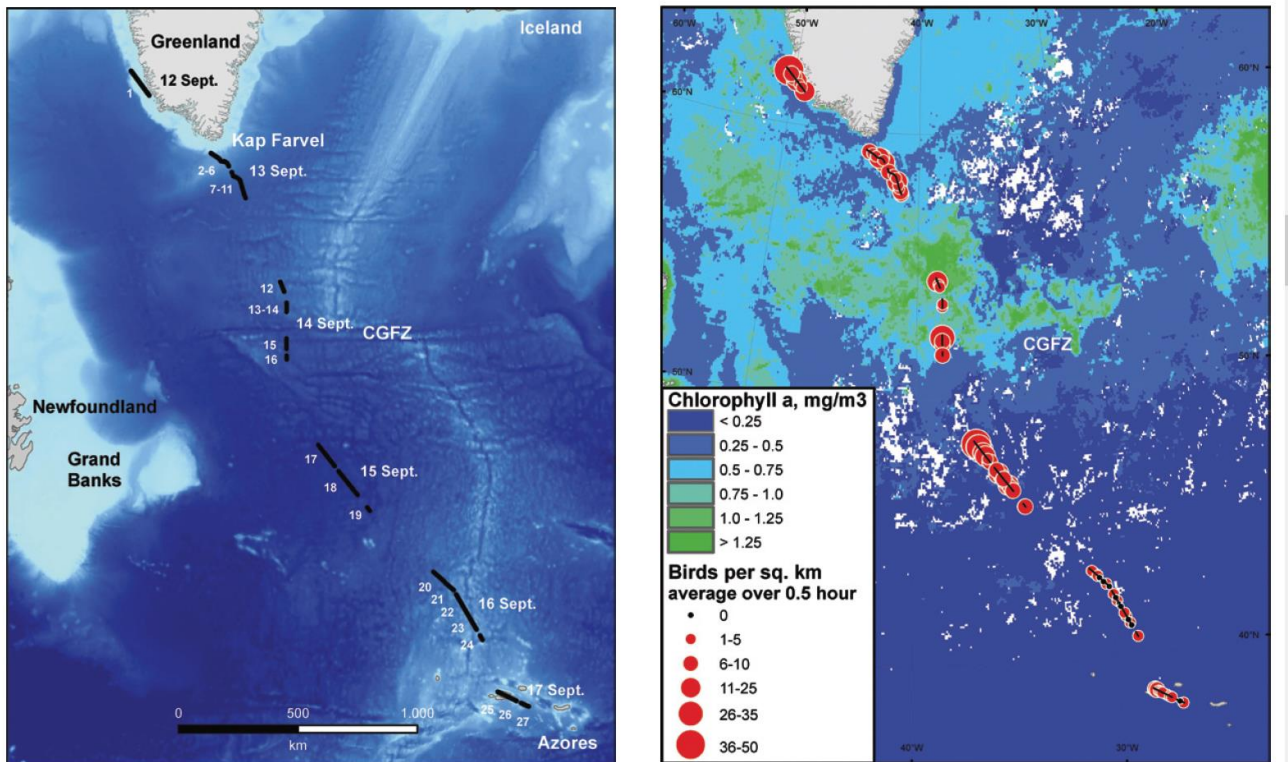


Figure A0.68. At sea survey in 2006 across [proposed] MPA area (dates 15-19 Sept).
 Left panel: The seabird-at-sea transect between Greenland and the Azores. Sub-transect numbers and dates are shown. CGFZ is the Charlie–Gibbs fracture zone. Right panel: Densities of seabirds (all species combined) along the transect. Densities are aggregated over 30 min periods, to provide a better overview. From Boertmann (2014)¹⁰

¹⁰ Boertmann (2014). Dansk Ornitologisk Forenings Tidsskrift 108: 199-206

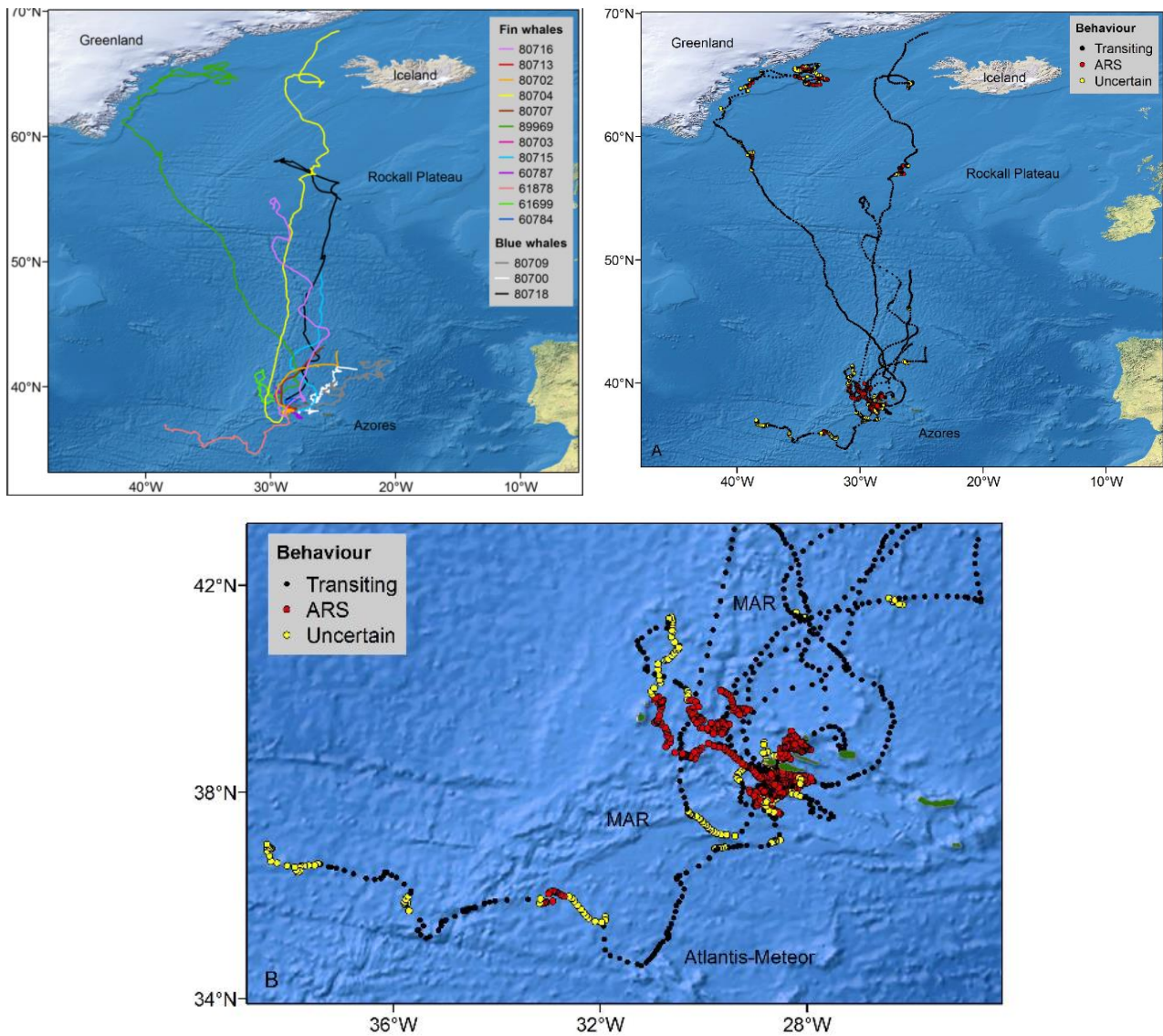


Figure A0.69 Top left: Movements of **Fin Whales *Balaenoptera physalus*** and **Blue Whales *Balaenoptera musculus*** tagged in the Azores.

Top right: Derived locations of Fin whales (based on hierarchical switching state-space models) showing inferred behavioural modes (transiting, area restricted movement and uncertain behaviour). Bottom: Details of the tracks at middle latitudes, showing the location of the Mid-Atlantic Ridge (MAR) and the Atlantis-Meteor seamount complex. From Silva et al. (2013)¹¹

¹¹ Silva et al. (2013). PLOS ONE 8, e76507. doi:10.1371/journal.pone.0076507

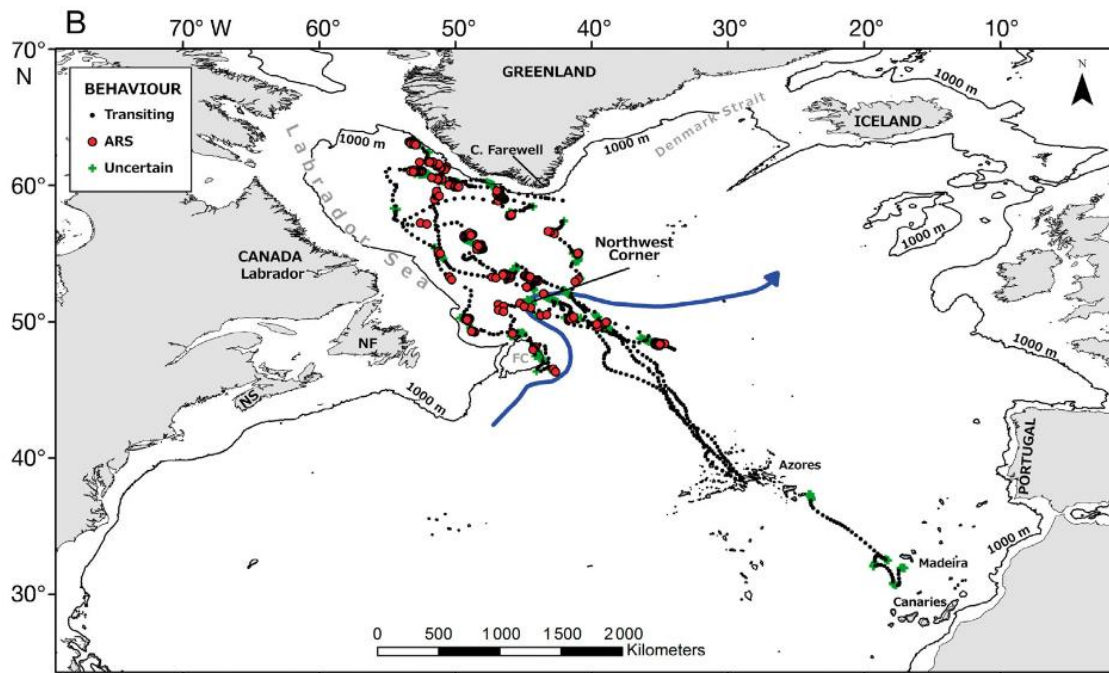


Figure A0.70 Hierarchical switching state-space model-derived locations of **Sei Whale *Balaenoptera borealis*** showing inferred behavioural modes.

The thick, blue line is a schematic representation of the main branch of the North Atlantic Current, showing the quasi-stationary large meander known as the 'Northwest Corner' and referred to in the text. ARS: area-restricted search; NS: Nova Scotia; NF: Newfoundland; FC: Flemish Cap. From: Prieto et al. (2014)¹²

¹² Prieto et al. (2014). *Endangered Species Research* 26, 103–113. doi:10.3354/esr00630

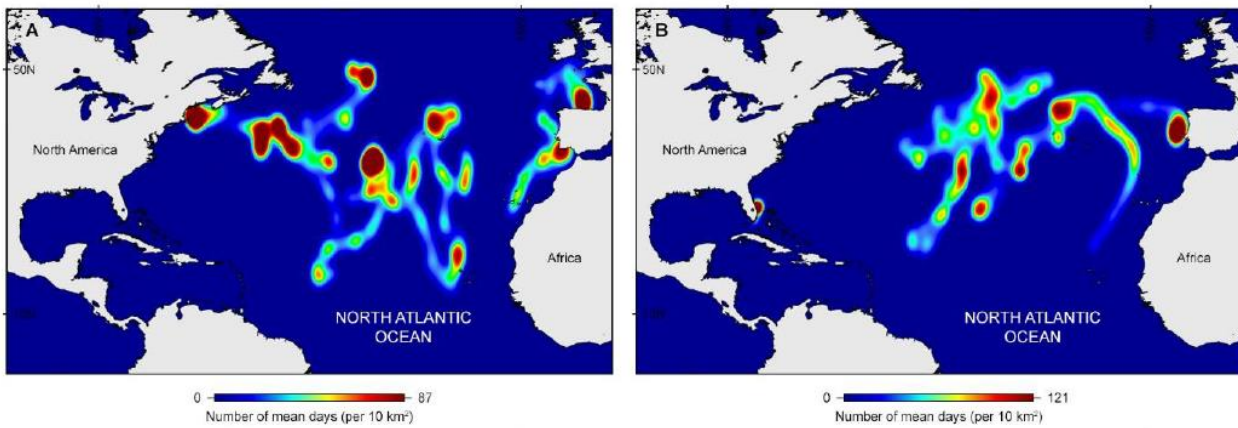


Figure A0.71 High species-specific space-use areas calculated for A) **Blue shark *Prionace glauca*** and B) **Shortfin Mako Shark *Isurus oxyrinchus***.

The kernel smoothing parameter was kept constant to enable the visual comparison of residence probabilities. From Queiroz et al. (2016)¹³

¹³ Queiroz et al (2016). PNAS 113, 1582–1587. doi:10.1073/pnas.1510090113

Annex 8. Brief description and preliminary results of the oceanographic Cruise DY080

Distribution and Ecology of Seabirds in the Sub-Polar Frontal Zone of the Northwest Atlantic

Author: Ewan Wakefield, July 2017 with contributions from Paloma Carvalho, Rob Ronconi, Claire Lacey, Nadya Ramirez Martinez and Guilherme Bortolotto.

Important note: The information included below is to form the basis of a number of scientific publications and is therefore not for distribution.

Cruise DY080 (**Distribution and Ecology of Seabirds in the Sub-Polar Frontal Zone of the Northwest Atlantic**) was carried out between the 6th of June and the 2nd of July, 2017 under the auspices of the UK Natural Environment Research Council, with Dr Ewan Wakefield of the Institute of Biodiversity Animal Health and Comparative Medicine, University of Glasgow, acting as Principal Scientist. Participating institutes included GEOMAR, the Sea Mammal Research Unit, Environment Canada, the University of Rhode Island, ISPA - Instituto Universitário, the Centre for Ecology, Fisheries and Aquaculture Science and BirdLife International.

The objectives of the cruise were:

1. To estimate the distribution, abundance and behaviour of seabirds and cetaceans in the seabird hotspot identified by BirdLife and Ewan Wakefield, centred on the sub-polar front, south of the Charlie Gibbs Fracture Zone.
2. To map major frontal features and nutrient regimes within the off-shelf study area and along the survey track.
3. To refine non-lethal methods of sampling seabirds at sea.
4. To estimate the diet, stable isotope and contaminant loading, faecal nutrient and moult status of seabirds within the study areas, with particular focus on the cephalopod component of seabird diet.
5. To determine the comparative habitat use of great shearwaters on and off-shelf and the timing of their movements between these areas.
6. To estimate rates of primary production within the study area, phytoplankton community structure, the identity of the nutrients limiting productivity, and the effects of seabird faeces on phytoplankton growth.
7. To estimate the vertical distribution and biomass of mesopelagic nekton within the study areas.

The cruise departed from Southampton, UK and disembarked in St Johns, Newfoundland. The principal area of interest was covered in series of survey lines running approximately N-S though the seabird hotspot area,

aligned along the major sea surface temperature and salinity gradients in the region, as well as core distributions of different seabird species (Figure A0.72). Broadly speaking, the planned cruise track was followed. However, the northern portion of line 4 was modified such that a transient eddy and associated phytoplankton bloom detected using satellite images could be sampled (line 4b). In addition, sampling was carried out more intensively on the southern section of line 5 in order to characterise a second mesoscale eddy apparent from satellite images. During the early days of the cruise high winds and seas disrupted data collection, while during the latter half of the cruise, fog frequently reduced the seabird and cetacean survey transect width.

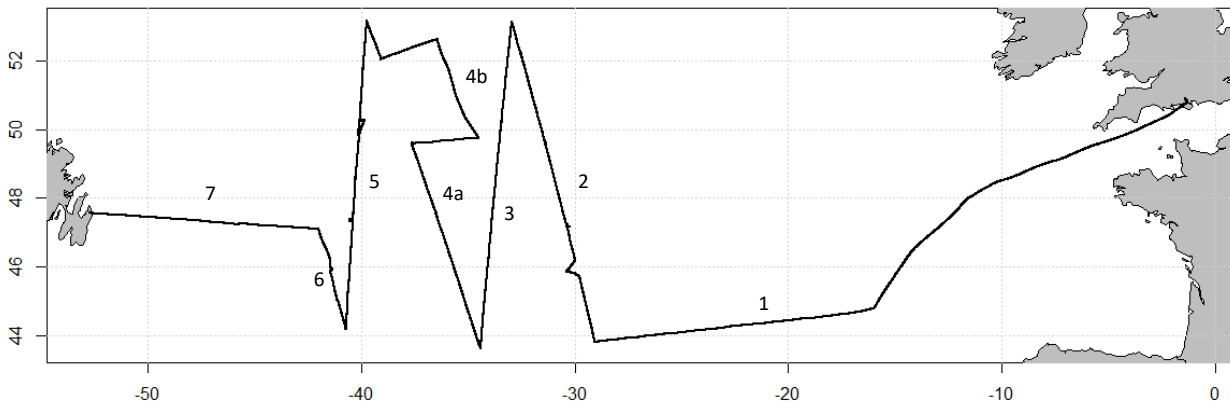


Figure A0.72 Track of cruise DY080, June 6th – July 2nd 2017
(numbers indicate survey lines).

Underway data collection (visual seabird and cetacean survey; passive acoustic cetacean survey; logging of surface seawater and atmospheric indices; and acoustic survey of nekton) was carried out as conditions allowed throughout the cruise (Figs. A7.2 and A7.3). CTD casts were made to 500 m at the beginning and end of lines 2 - 6 and at dawn and dusk between these stations. Water samples were collected only during CTD casts at ends of each line. Vertical plankton hauls, from 200m to the surface, were generally carried out immediately after each evening CTD cast. On-deck phytoplankton incubation experiments, to examine nutrient limitation, were carried out on lines 1 - 5.

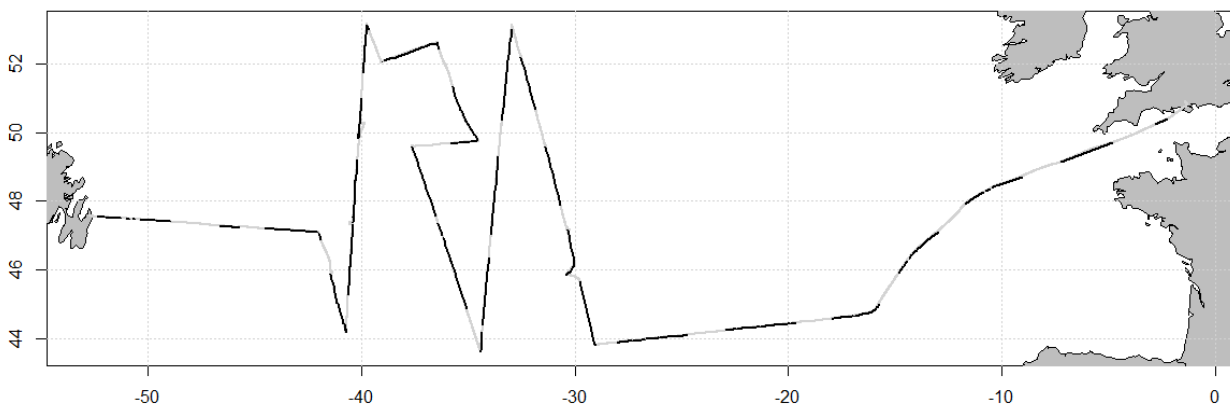


Figure A0.73. Seabird visual survey effort during cruise DY080.

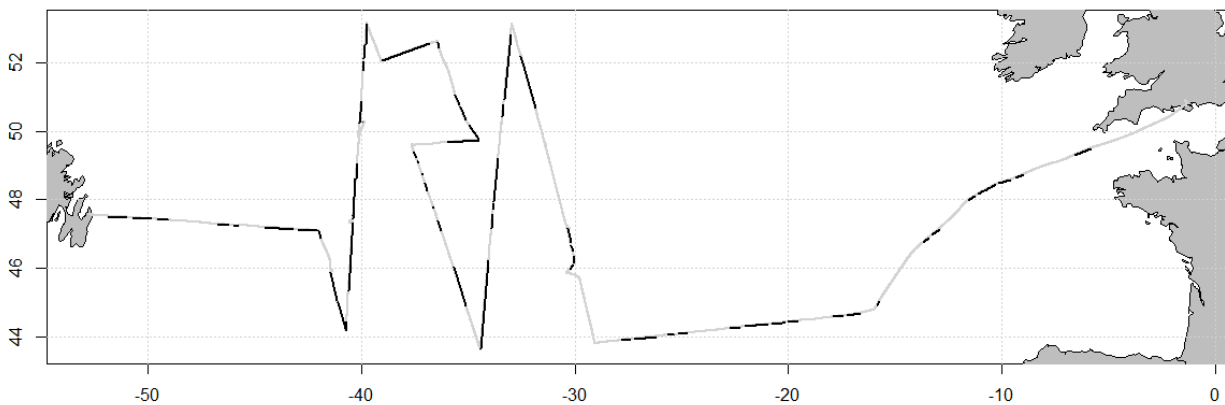


Figure A0.74 Cetacean visual survey effort during cruise DY080.

When conditions allowed, efforts were made to capture seabirds (using non-lethal methods) in order to obtain diet and tissue samples. Generally speaking, the ship hove to late in the afternoon each day on lines 2 – 6 for this purpose. Unfortunately, high sea states and fog largely precluded capturing seabirds using the Discovery's Fast Rescue Boat, as had been intended. Rather, birds were attracted to the ship using bait and caught using a cast net. Samples were obtained from 13 northern fulmars and 14 great shearwaters in this manner and GPS tags were deployed on ten of the latter. In addition, 19 Leach's petrels were caught and sampled after dark, using either a tape lure, a mist net or the ship's lights. Visual point transect surveys were carried out of seabirds and cetaceans during daytime seabird catching sessions.

Data from the cruise are currently being analysed and results will appear in due course in the scientific literature. Preliminary results confirm that the oceanography of the MPA area is dominated by a series of banded fronts, broadly aligned in the zonal direction, following the course of the North Atlantic Current downstream of the Northwest Corner. In addition, a number of large eddies were identified, one of which may be an undescribed, permanent feature of the region. A total of 16 seabird species were recorded in the proposed MPA, the commonest species being great shearwaters, northern fulmars and Cory's shearwaters (Table A7.1 – please note that these counts have not yet been corrected for variability due to weather, etc.). The latter were noticeably zoned by latitude – fulmars in the north, great shearwater at mid-latitudes and Cory's shearwaters to the south. In addition, relatively high numbers of Leach's petrels were encountered in the west of the MPA (Fig. A7.4). Analytical work currently being carried out aims to estimate the true density of these species in the MPA and to determine the causes of the distribution patterns. It looks likely that the latter reflect the distribution of major fronts and water masses in the region: That is, habitat partitioning is marked within the MPA implying that the relatively high species diversity there is likely to be due to its high diversity of habitats. Tracks of the great shearwaters tagged on the Flemish Cap confirm that birds move from the North American continental shelf to the MPA area in mid-summer.

Nutrient and phytoplankton sampling indicate that the entire MPA area was iron-limited during the cruise. Results of bioassays undertaken during the cruise suggest that seabird guano may alleviate iron stress in the phytoplankton community. More analysis is required to confirm this important result, which if correct would underline the crucial role that seabirds play in recycling nutrients in the ecosystem of the MPA.

Table A0.5. Bird species recorded in the proposed MPA area during cruise DY080 (June 6th – July 2nd 2017). Species ordered by raw, uncorrected, counts.

Species/taxon		Raw count
Great Shearwater	<i>Ardenna gravis</i>	2664
Northern Fulmar	<i>Fulmarus glacialis</i>	666
Cory's Shearwater	<i>Calonectris borealis</i>	251
Leach's Petrel	<i>Oceanodroma leucorhoa</i>	190
Sooty Shearwater	<i>Ardenna grisea</i>	123
Skua sp.	<i>Stercorarius sp.</i>	21
Storm petrel sp.	<i>Hydrobatidae/Oceanitidae sp.</i>	17
Arctic Tern	<i>Sterna paradisaea</i>	10
Manx Shearwater	<i>Puffinus puffinus</i>	9
South Polar Skua	<i>Stercorarius maccormicki</i>	6
Long-tailed Skua	<i>Stercorarius longicaudus</i>	3
Arctic Skua	<i>Stercorarius parasiticus</i>	3
Wilson's Petrel	<i>Oceanites oceanicus</i>	3
Common/Arctic tern		2
Guillemot	<i>Uria aalge</i>	1
Bulwer's Petrel	<i>Bulweira bulwerii</i>	1
Dark petrel sp.		1
Northern Gannet	<i>Morus bassanus</i>	1
Great Black-backed Gull	<i>Larus marinus</i>	1
Pomarine Skua	<i>Stercorarius pomarinus</i>	1

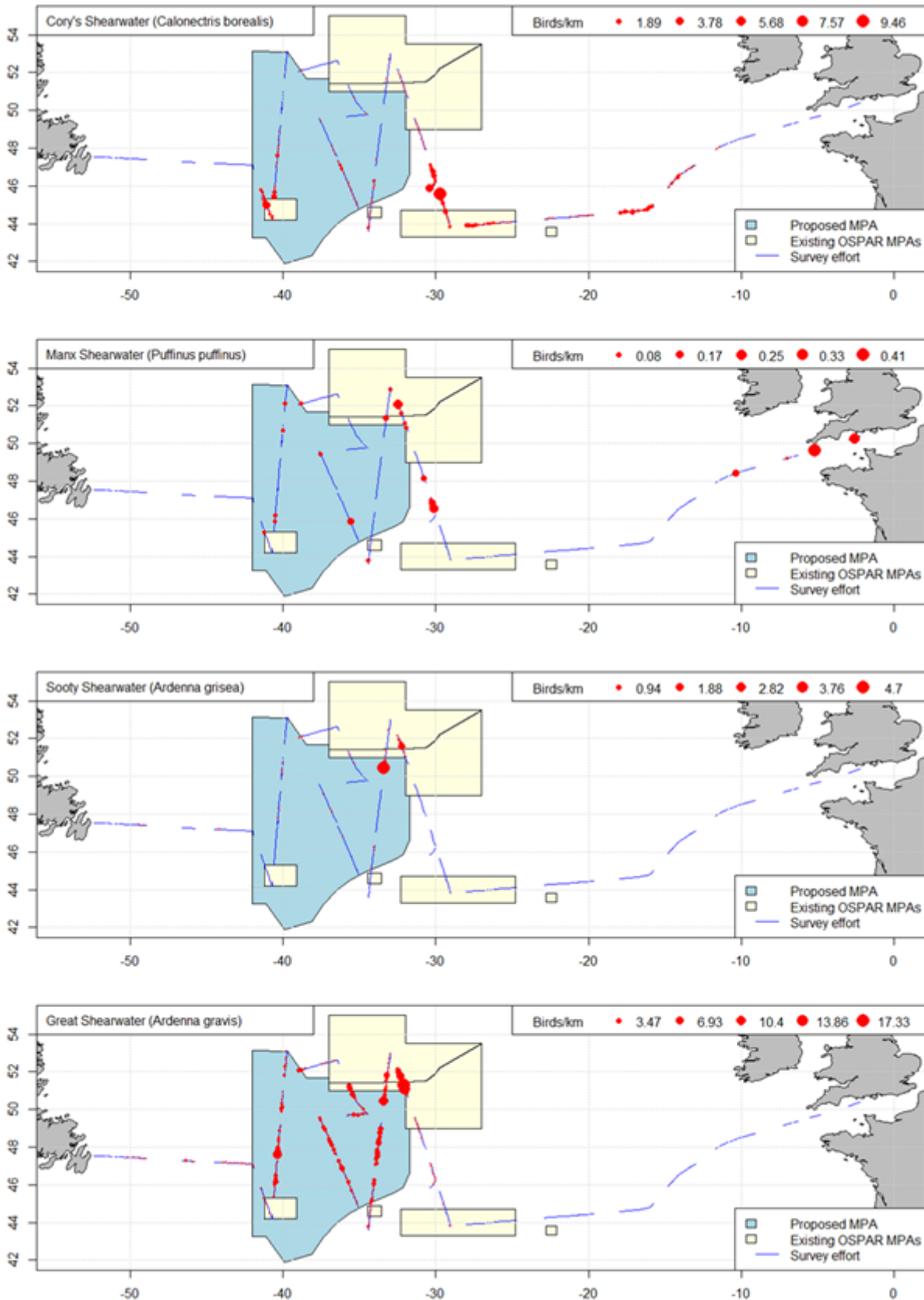


Figure A0.75 Density of bird species along the transect
 (the values presented are still preliminary and have not yet been corrected for variability due to weather or other confounding factors).

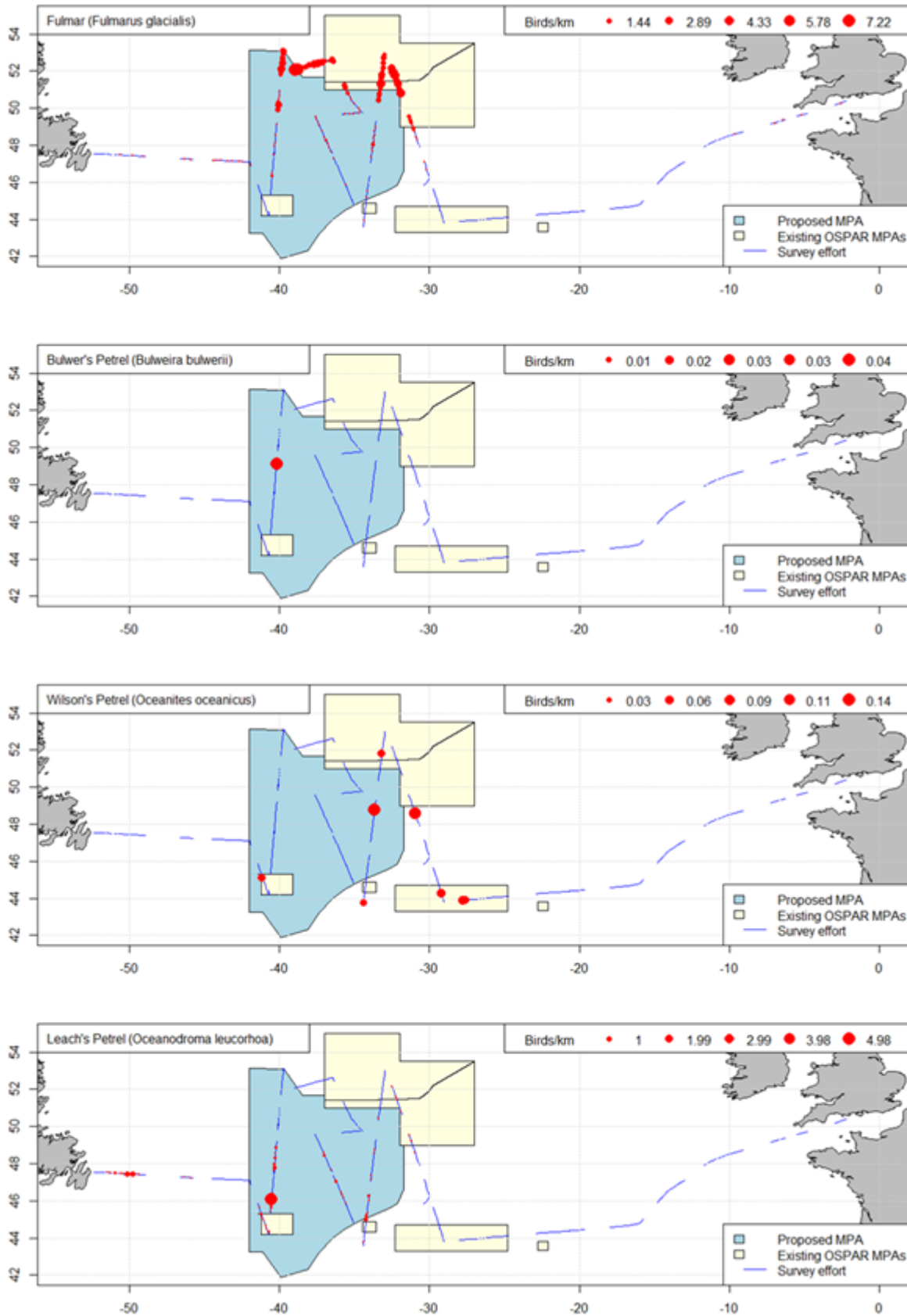


Figure A0.75 (cont.) Density of bird species along the transect
 (the values presented are still preliminary and have not yet been corrected for variability due to weather or other confounding factors).

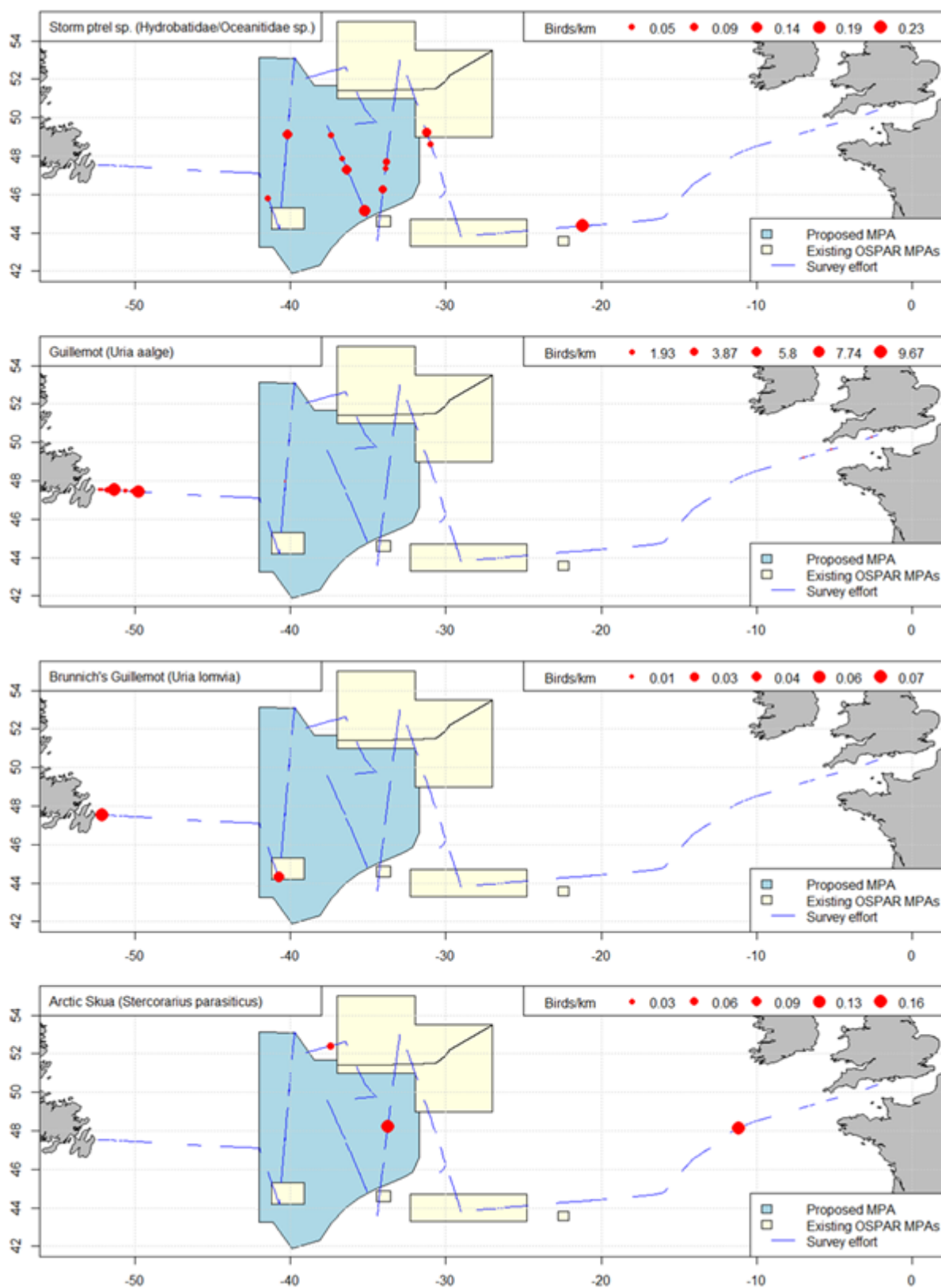


Figure A0.75 (cont.) Density of bird species along the transect
 (the values presented are still preliminary and have not yet been corrected for variability due to weather or other confounding factors).

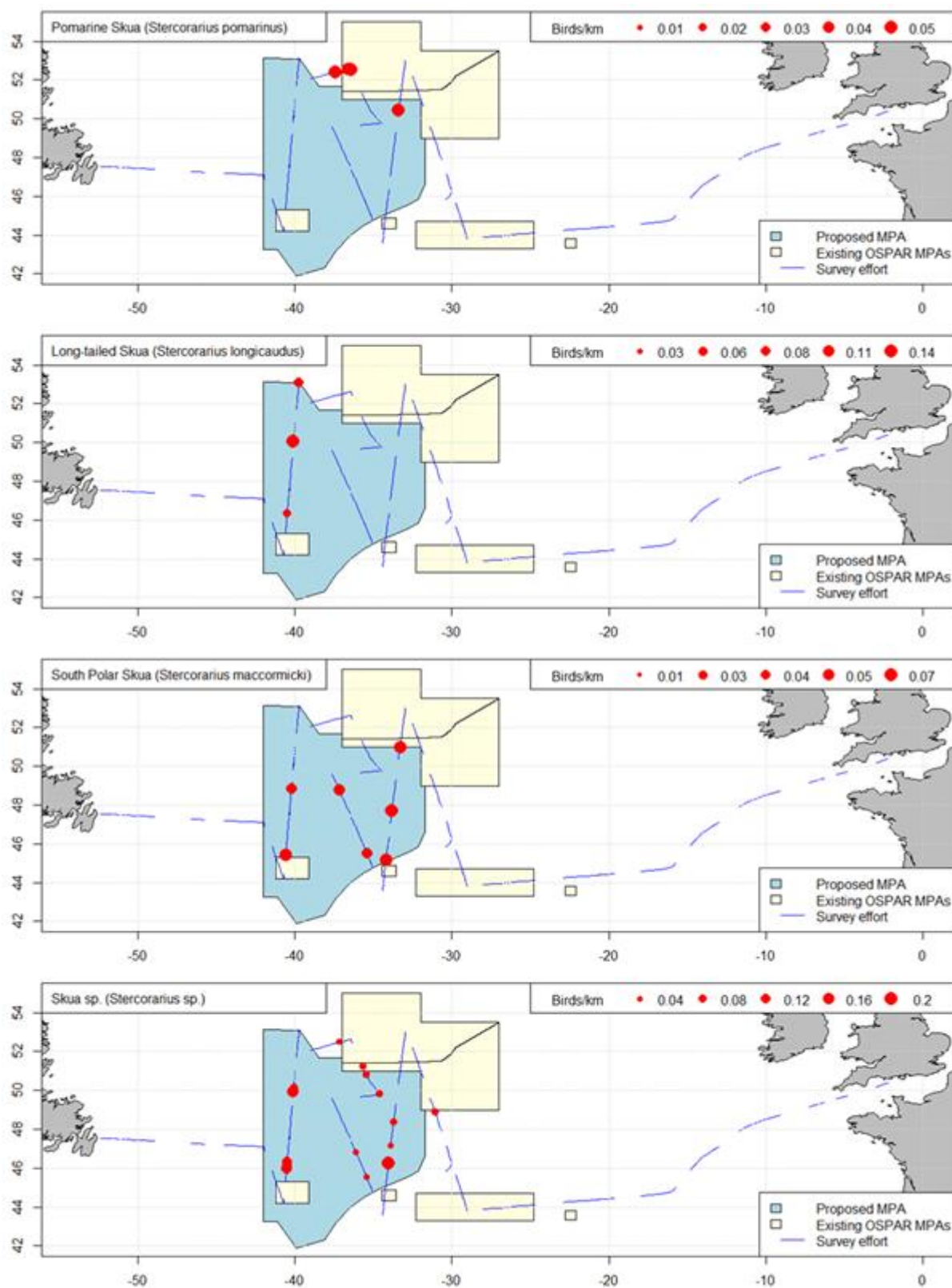


Figure A0.75 (cont.) Density of bird species along the transect
 (the values presented are still preliminary and have not yet been corrected for variability due to weather or other confounding factors).

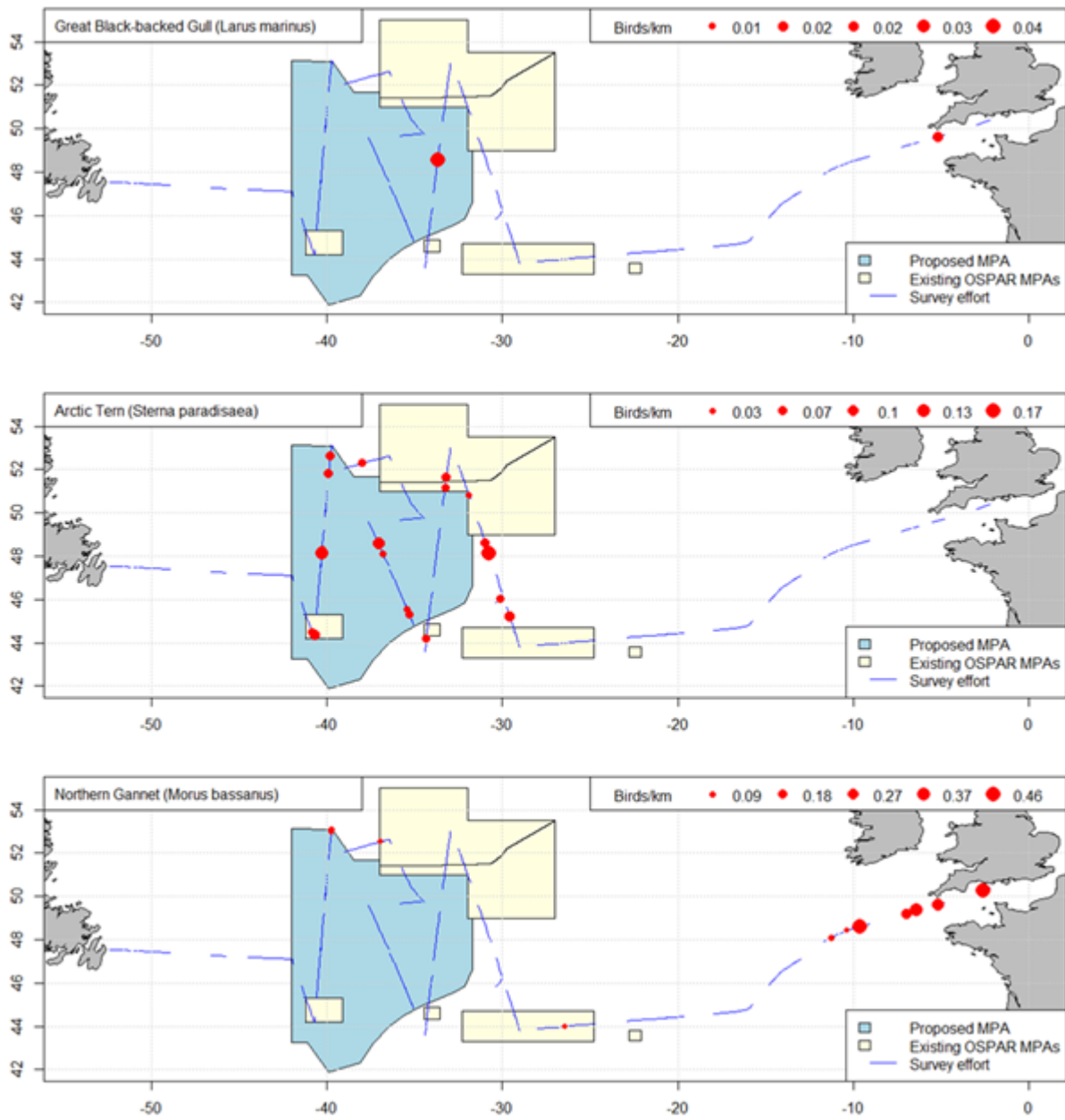
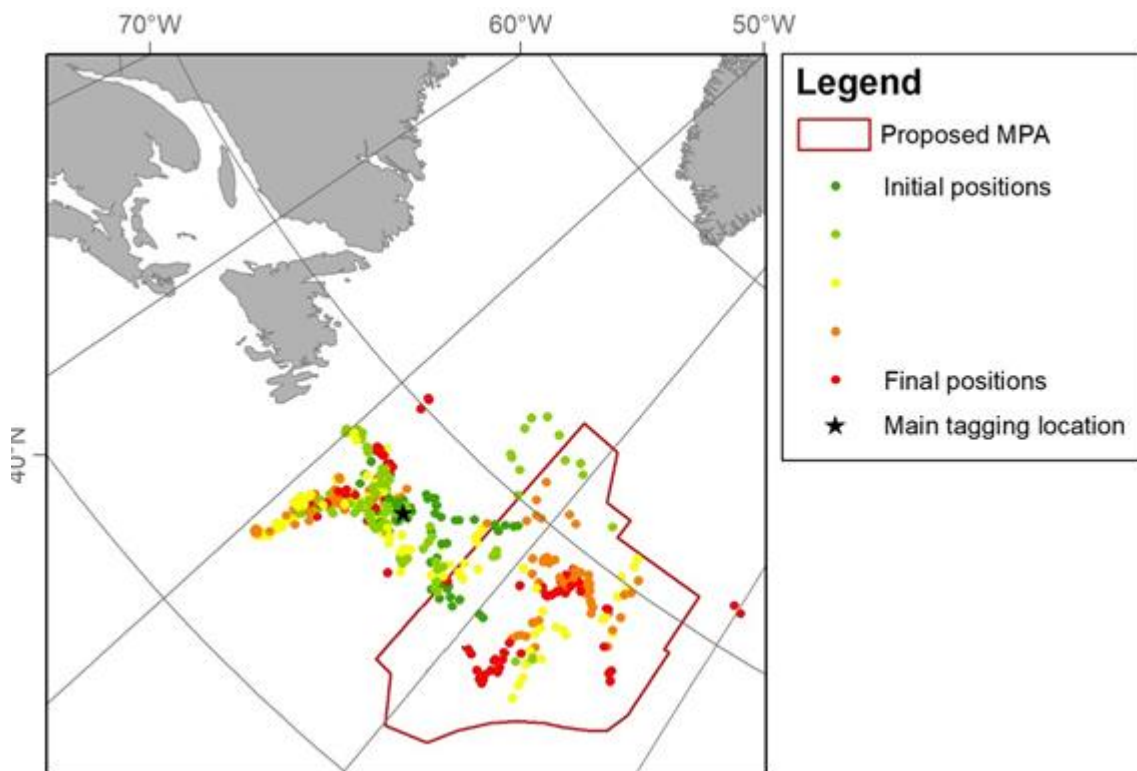


Figure A0.75 (cont.) Density of bird species along the transect
 (the values presented are still preliminary and have not yet been corrected for variability due to weather or other confounding factors).



Figure

A0.76. Movements of the Great Shearwaters *Ardenna gravis* caught at sea and tagged during the DY080 cruise.

Most birds moved eastwards, towards the direction of the [proposed] MPA

Table A0.6. Cetacean sightings

Species	Total cruise		Within MPA boundary	
	Number of sightings	Total number of animals	Number of sightings	Total number of animals
Baleen whales				
Blue whale, <i>Balaenoptera musculus</i> (EN)	5	7	2	3
Fin whale, <i>Balaenoptera physalus</i> (EN)	39	70	13	37
Sei whale, <i>Balaenoptera borealis</i> (EN)	7	10	1	1
Humpback whale, <i>Megaptera novaeangliae</i> (LC)	37	40	5	5
Blue, fin or sei whale	46	51	13	16
Humpback whale or sperm whale	3	3	1	1
Unidentified “large” whale	21	22	1	1
Odontocetes				
Sperm whale, <i>Physeter macrocephalus</i> (VU)	7	8	3	3
Pilot whale <i>Globicephala</i> spp (DD)	7	159	6	139
Common dolphin, <i>Delphinus</i> spp. (DD/LC)	34	391	15	131
Risso’s dolphin, <i>Grampus griseus</i> (LC)\	1	10	1	10
Striped dolphin <i>Stenella coeruleoalba</i> (LC)	3	157	3	157
White-sided dolphin, <i>Lagenorhynchus acutus</i> (LC)	3	28	3	28
“Patterned” dolphin	6	26	3	13
Unidentified dolphin	20	109	15	97
Total	250	1102	87	644

Cetacean data collected by the Sea Mammal Research Unit (University of St Andrews, Scotland) supported by funding from the Marine and Freshwater Research Institute (Reykjavik, Iceland).

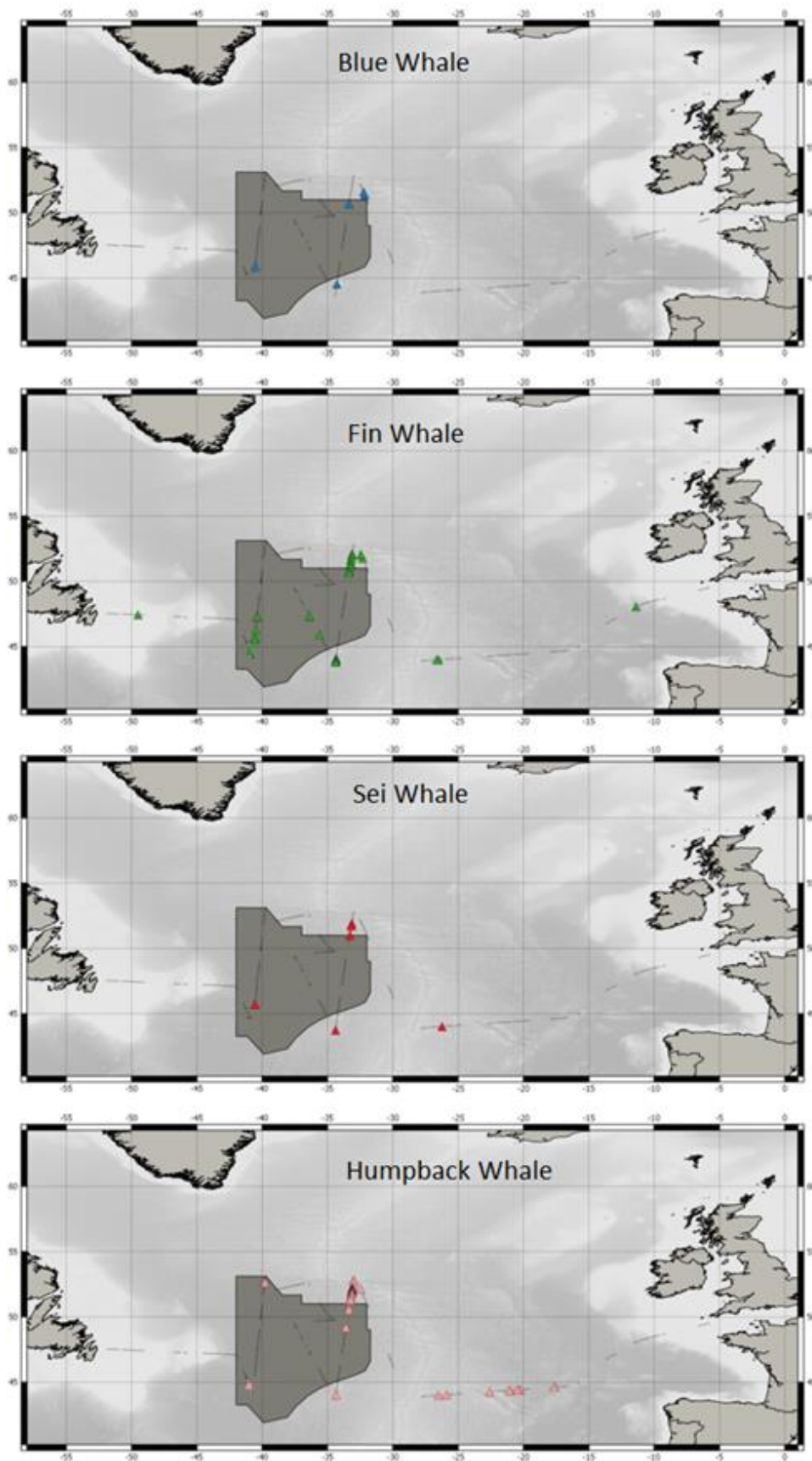


Figure A0.77. Cetaceans sightings along the DY080 transect and within the [proposed] MPA

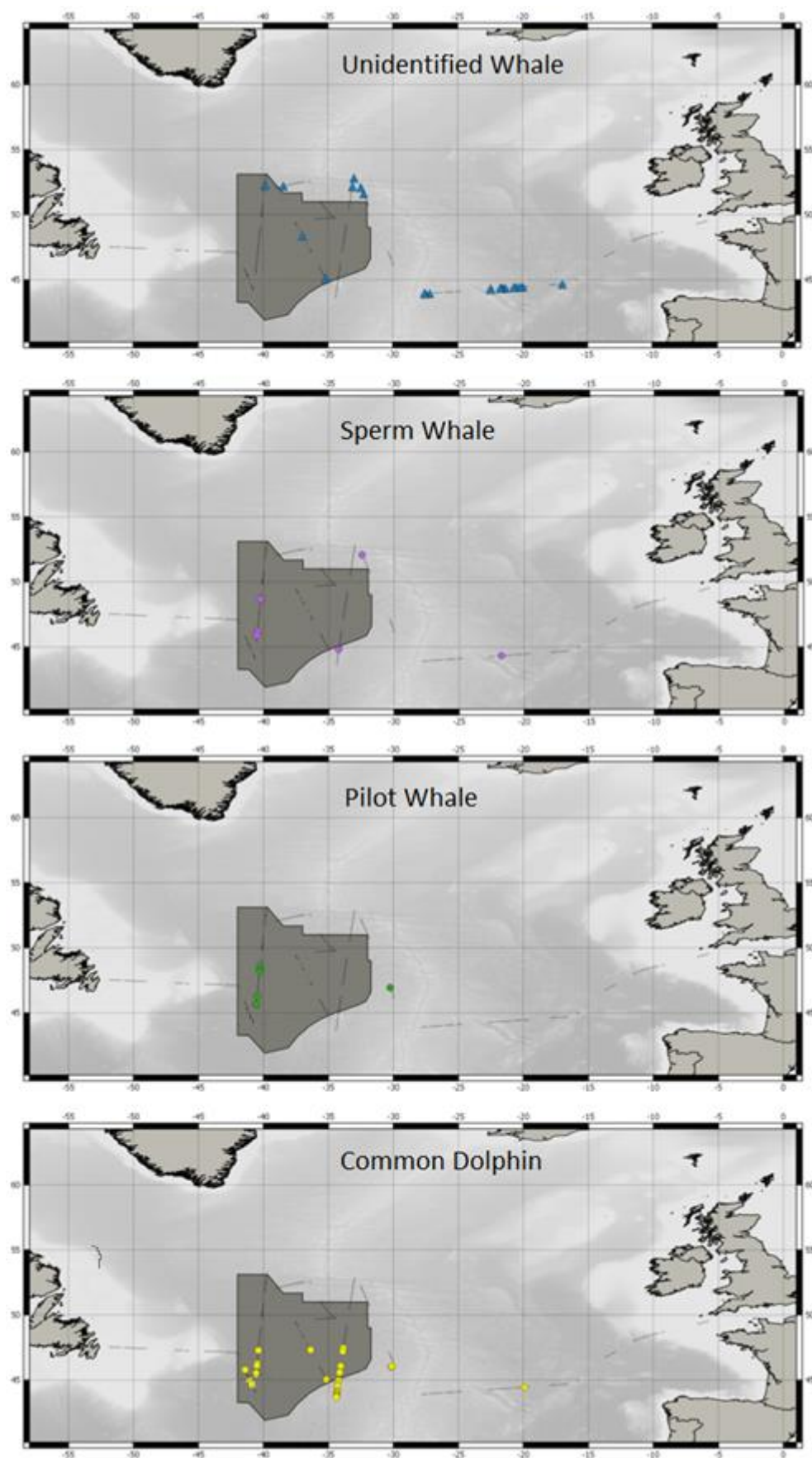


Figure A0.77 (cont) Cetaceans sightings along the DY080 transect and within the [proposed] MPA

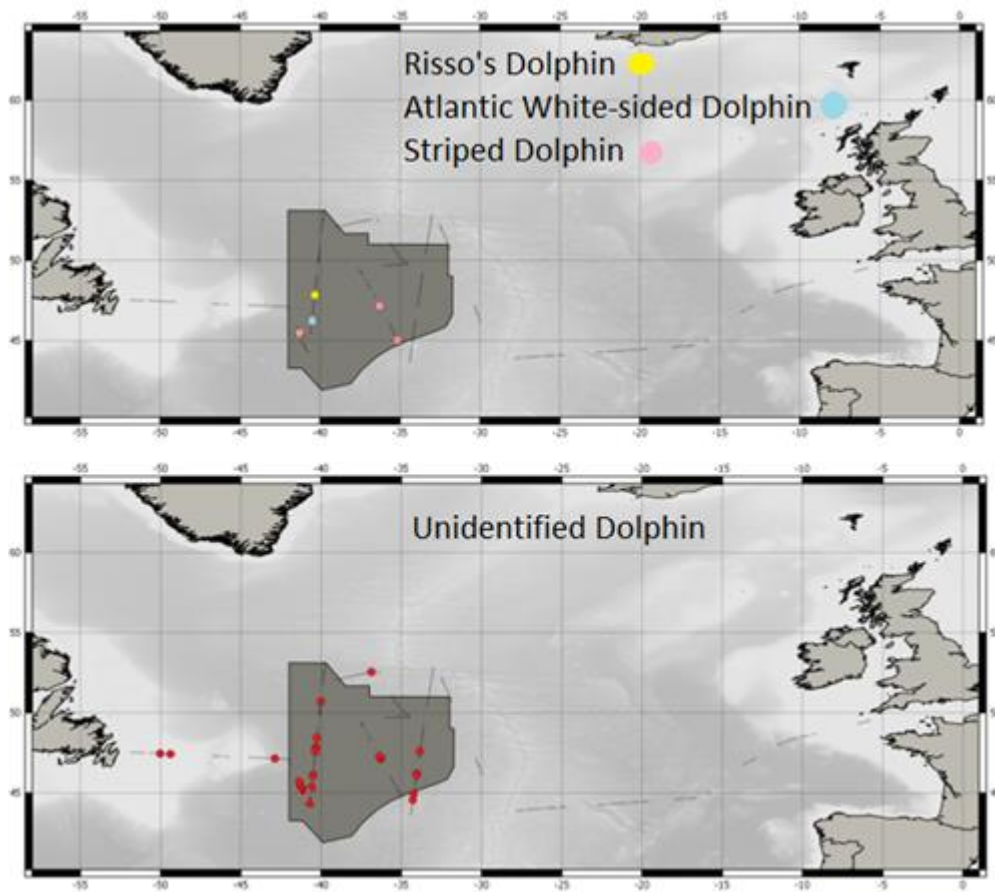


Figure A0.77 (cont) Cetaceans sightings along the DY080 transect and within the [proposed] MPA