OSPAR COMMISSION

Background Document on Milne Seamount

Biodiversity Series

2010

OSPAR Convention

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the “OSPAR Convention”) was opened for signature at the Ministerial Meeting of the former Oslo and Paris Commissions in Paris on 22 September 1992. The Convention entered into force on 25 March 1998. It has been ratified by Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Sweden, Switzerland and the United Kingdom and approved by the European Community and Spain

Convention OSPAR

La Convention pour la protection du milieu marin de l'Atlantique du Nord-Est, dite Convention OSPAR, a été ouverte à la signature à la réunion ministérielle des anciennes Commissions d'Oslo et de Paris, à Paris le 22 septembre 1992. La Convention est entrée en vigueur le 25 mars 1998. La Convention a été ratifiée par l'Allemagne, la Belgique, le Danemark, la Finlande, la France, l’Irlande, l’Islande, le Luxembourg, la Norvège, les Pays-Bas, le Portugal, le Royaume-Uni de Grande Bretagne et d’Irlande du Nord, la Suède et la Suisse et approuvée par la Communauté européenne et l’Espagne

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Contents

Executive summary

The Milne Seamount Complex lying in a remote area to the west of the Mid-Atlantic Ridge is considered to include potentially near-pristine examples of oceanic seamount ecosystems. Although little-explored, it is likely to contain unique species, as well as sustain important concentrations of a wide range of fish and corals.

In 2003, the OSPAR Commission agreed to establish a network of Marine Protected Areas (MPAs) with the aim of that this should become an ecologically coherent network of well-managed sites. OSPAR agreed that the OSPAR Network of MPAs should comprise sites that are established as MPAs within the jurisdiction of OSPAR Contracting Parties as well as sites in the maritime area outside the jurisdiction of the Contracting Parties (area beyond national jurisdiction ABNJ). In the OSPAR Biodiversity and Ecosystems Strategy, OSPAR agreed to identify, on the basis of reports from Contracting Parties and observer organisations, possible components of the OSPAR Network in areas beyond national jurisdiction in order to achieve the purposes of the network.

This background document makes available the information which has been compiled and evaluated within the OSPAR framework in support of the identification by OSPAR 2009 of the Milne Seamount Complex as a potential MPA in ABNJ. On the basis of this information, the 2010 Ministerial Meeting of the OSPAR Commission adopted OSPAR Decision 2010/1 on the establishment of an MPA for the Milne Seamount Complex. The Milne Seamount Complex lies in a remote area to the west of the Mid-Atlantic Ridge and information on the biodiversity and ecosystems of this area is relatively scarce. OSPAR has recognised that the case for protecting the area is based on the precautionary approach and its similar characteristics to seamounts in the proximity protected by the Northwest Atlantic Fisheries Organisation (NAFO) that have been studied more closely.

The report includes conservation objectives developed within the OSPAR framework for application to an MPA in the area, which have been formalised in OSPAR Recommendation 2010/12 on the management of the Milne Seamount Complex MPA

Récapitulatif

On considère que le complexe du mont sous-marin Milne, s'étendant dans une zone éloignée à l'ouest de la dorsale médio-atlantique, comporte des exemples d'écosystèmes de monts sous-marins océaniques potentiellement quasi vierges, Il est fort probable qu'il héberge des espèces uniques et qu'il comporte des concentrations important d'un large éventail de poissons et de coraux bien qu'il ne soit que peu exploré.

La Commission OSPAR est convenue, en 2003, de créer un réseau de zones marines protégées (ZMP) afin que celui-ci devienne un réseau de sites écologiquement cohérent et bien géré. OSPAR est convenue que le réseau OSPAR de ZMP devra englober les sites créés à titre de ZMP situés dans la juridiction des Parties contractantes OSPAR ainsi que les sites de la zone maritime situés au-delà de la juridiction des Parties contractantes (zone au-delà de la juridiction nationale (ABNJ)). OSPAR est convenue, dans sa Stratégie biodiversité et écosystèmes, de déterminer, en se fondant sur des rapports des Parties contractantes et d'organisations observatrices, des composantes éventuelles du réseau OSPAR situées dans des zones au-delà de la juridiction nationale afin de parvenir aux objectifs du réseau.

Le présent document de fond présente des informations qui ont été recueillies et évaluées dans le cadre de travail d'OSPAR à l'appui de la détermination, par OSPAR 2009, du complexe du mont sous-

marin Milne à titre de ZMP potentielle dans une ABNJ. La réunion ministérielle de 2010 de la Commission OSPAR a adopté, en se fondant sur ces informations, la Décision OSPAR 2010/1 sur la création de la ZMP du Complexe du mont sous-marin Milne. Le complexe du mont sous-marin Milne s'étend dans une zone éloignée à l'ouest de la dorsale médio-atlantique et les informations sur la biodiversité et les écosystèmes de cette zone sont relativement rares. OSPAR a reconnu que la question de la protection de la zone se fond sur l'approche de précaution et ses caractéristiques similaires à celles des monts sous-marins situés à proximité qui sont protégés par l'Organisation des pêcheries du Nord-ouest Atlantique (OPNA) qui ont été étudiés de plus près.

Le présent document comporte également des objectifs de conservation développés au sein du cadre de travail d'OSPAR à appliquer à une ZMP située dans la zone, objectifs qui ont été officialisés dans la Recommandation OSPAR 2010/12 sur la gestion de la ZMP du Complexe du mont sous-marin Milne.

A. General information

1. Area

Milne Seamount Complex

2. Conservation Objectives

2.1 Conservation Vision[1]

Maintenance and where appropriate, restoration of the integrity of the functions and biodiversity of the various ecosystems of the Milne Seamount Complex so they are the result of natural environmental quality and ecological processes[2].

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 subject to good governance, sustainable utilization and adequate regulations. Best available scientific knowledge and the precautionary principle form the basis for conservation.

2.2 General Conservation Objectives [3] [4]

1. To **protect and conserve** the range of habitats and ecosystems including the water column of the Milne Seamount Complex for resident, visiting and migratory species as well as the marine communities associated with key habitats.

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, and to enable populations of species, both known and unknown, to maintain or recover natural population densities and population age structures.

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[1] The conservation vision describes a desired long-term conservation condition and function for the ecosystems in the entire Milne Seamount Complex. The vision aims to encourage relevant stakeholders to collaborate and contribute to reach the 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 Milne Seamount Complex or, if it is decided to subdivide, for a zone or subdivision of the area, respectively.

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

3. To **prevent** degradation of, and damage to, species, habitats and ecological processes, in order to maintain the structure and functions - including the productivity - of the ecosystems**.**

4. To **restore** the naturalness and richness of key ecosystems and habitats, in particular those hosting high natural biodiversity.

5. To provide a **refuge** for wildlife within which there is minimal human influence and impact.

2.3 Specific Conservation Objectives [5]

2.3.1 **Water Column**

a. To prevent deterioration of the environmental quality of the bathypelagic and epipelagic water column (for example toxic and non-toxic contamination[6]) from levels characteristic of the ambient ecosystems, and where degradation from these levels has already occurred, to recover environmental quality to levels characteristic of the ambient ecosystems.

b. To prevent other physical disturbance (for example acoustic).

c. To protect, maintain and, where in the past impacts have occurred, restore where appropriate the epipelagic and bathypelagic ecosystems, including their functions for resident, visiting and migratory species, such as: cetaceans, and mesopelagic and bathypelagic fish populations.

2.3.2 **Benthopelagic Layer**

To protect, maintain and, where in the past impacts have occurred, restore where appropriate:

a. Historically exploited **fish populations** (target and bycatch species) at/to levels corresponding to population sizes above safe biological limits[7] with special attention also given to **deep water elasmobranch species**, including threatened and/or declining species.

b. Benthopelagic habitats and associated communities to levels characteristic of natural ecosystems.

2.3.3 **Benthos**

To protect, maintain and, where in the past impacts have occurred, restore where appropriate to levels characteristic of natural ecosystems:

a. The **epibenthos and its hard and soft sediment habitats,** including threatened and/or declining species and habitats such as seamounts and coral gardens.

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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 This includes synthetic compounds (for example PCBs and chemical discharge), solid synthetic waste and other litter (for example plastic) and non-synthetic compounds (for example heavy metals and oil).

7 “Safe biological limits” used in the following context: “Populations are maintained above safe biological limits by ensuring the long-term conservation and sustainable use of marine living resources in the deep-seas and preventing significant adverse impacts on Vulnerable Marine Ecosystems (FAO International Guidelines for the Management of Deep-Sea Fisheries in the High Seas, 2008).

b. The **infauna of the soft sediment benthos**, including threatened and/or declining species and habitats.

c. The **habitats associated with seamounts**.

2.3.4. **Habitats and species of specific concern**

Those species and habitats of special interest for the Milne Seamount-MPA, which could also give an indication of specific management approaches, are listed at Annex 1.

3. Status of the location

The proposed area is located beyond the limits of national jurisdiction of the coastal states in the OSPAR Maritime Area.

The international legal regime that is applicable to the site is comprised of *inter alia*, the UNCLOS, the Convention on Biological Diversity, the OSPAR Convention 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

OSPAR Region V of the Wider Atlantic

5. Biogeographic region

Atlantic Realm; Atlantic Subregion; Cool-temperate waters

6. Location

The features to be incorporated within the Milne Seamount Protected Area also include the surrounding cluster of un-named seamounts.

Boundary co-ordinates

Latitude	Longitude
45.30°N	41.22°W
45.30°N	39.10°W
44.18°N	39.10°W
44.18°N	41.22°W

7. Size

20,913 km^2

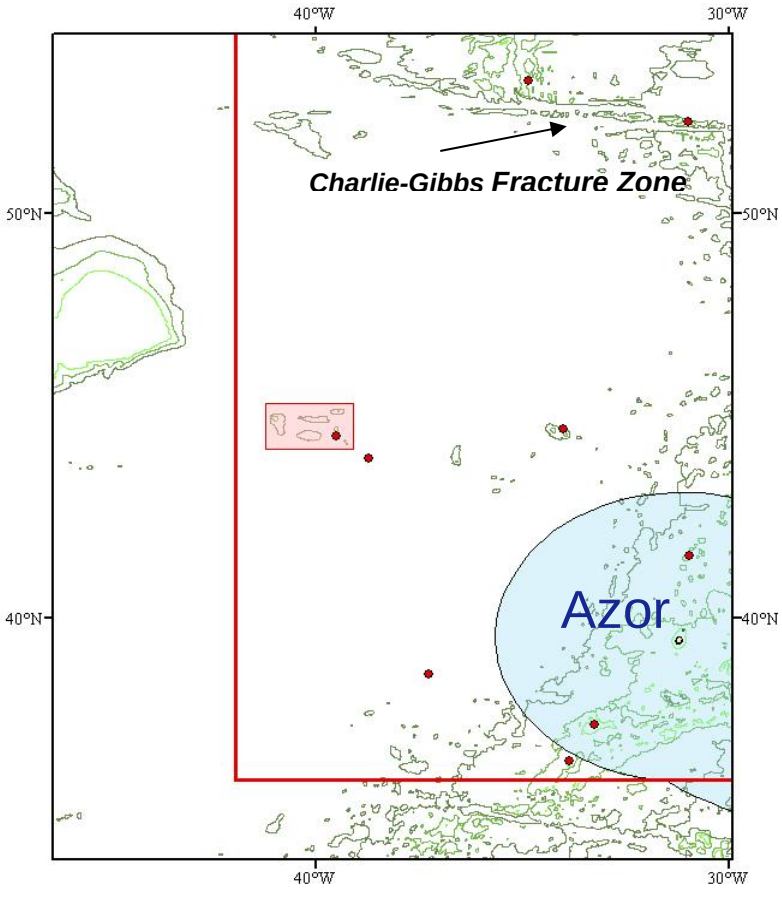

Figure 1. *Proposed marine protected area boundaries and location. Red circles represent known major seamount locations, blue shaded areas represent Exclusive Economic Zones and the red shaded area is the proposed Milne seamount protected area. The bold red line shows the southern and western OSPAR maritime boundary.*

8. Characteristics of the area

The Milne seamount (44º 30'N 39º 30'W) is located to the west of the Mid-Atlantic Ridge. It rises to within 1000 m of the surface and is associated with several other seamounts, including the nearby Williams peak (43º 95'N 38º 72'W) which rises to within 2000 m of the surface. An ICES (2005) report shows a cluster of unnamed seamounts around the Milne and Williams seamounts. Few scientific studies mention Milne seamount by name (Loudon *et al*, 2004) and little biological information is available.

Between 75 and 40 million years ago, the Milne area was a hotspot of excess volcanism, which has since declined. This has produced the cluster of neighbouring seamounts that exhibit an average isostatic crustal thickness of around 23 km (Loudon *et al*, 2004). It is therefore likely that the Milne seamount is made from the characteristic volcanic substrata with a complex structure, offering a variety of ecological niches (Epp & Smoot, 1989; Kitchingman & Lai, 2004). In addition, the neighbouring seamounts are of varying heights and depths (>2000 m from the surface), which will likely affect the species assemblages around them (ICES, 2005).

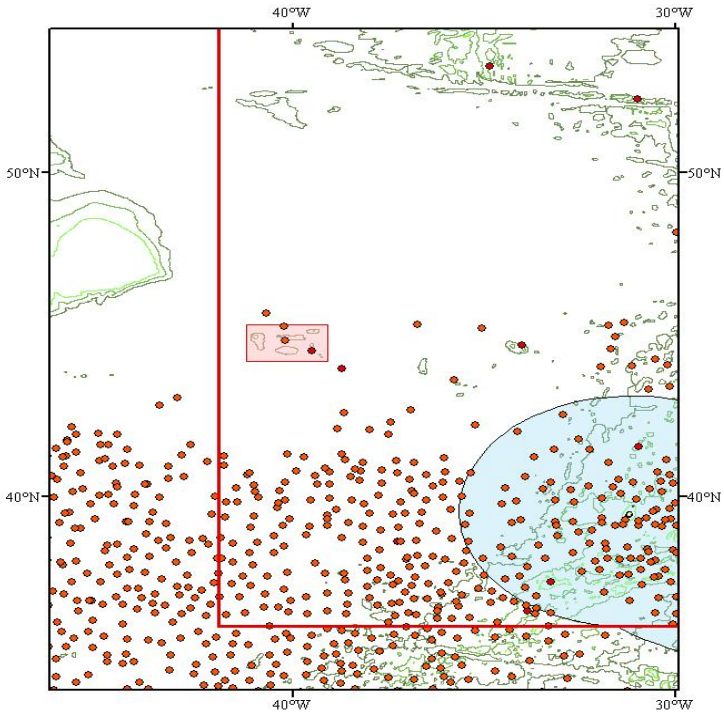

Figure 2. *Historical Sperm whale (Physeter macrocephalus) catch data (orange dots). The thick red line represents the western and southern OSPAR maritime boundary, blue shaded areas are Exclusive Economic Zones and the red shaded area is the proposed marine protected area. Data from Townsend 1935.*

Figure 2 shows historical Sperm whale (*Physeter macrocephalus*) catch data (19th and early 20th centuries) for the region around the proposed marine protected area. A few individuals of this cetacean species were once caught around the Milne seamount, although the map suggests the area was not especially important for them. However, individual Sperm whales may still frequent the area. Significant aggregations of Sperm whales were recorded feeding around the Charlie-Gibbs Fracture Zone of the Mid-Atlantic Ridge to the northeast (Skov *et al*, 2008). Other cetacean species are also likely to frequent the proposed area as well as other top-predators.

A recent, long-term study of breeding Cory's shearwaters (*Calonectris diomedea*) in the Azores found that they used a dual-foraging strategy (Magalhães *et al,* 2008). The Azores breeding population comprises between 50 000 and 90 000 breeding pairs, which constitutes more than 70% of the breeding numbers of the Atlantic subspecies *C. diomedea borealis* (Monteiro et al, 1996; Magalhães *et al*, 2008). The birds undertake on average three short (1 – 4 day) trips followed by a long trip of up to 20 days (Magalhães *et al,* 2008). *C. diomedea* on long trips headed north of the Azores to core areas of enhanced productivity resulting from cold water upwellings (Magalhães *et al,* 2008). One foraging area was the Milne seamount cluster (see Figure 3), with birds from western, central and

eastern regions of the Azores foraging there (Magalhães *et al.*, 2008). As an oceanic seamount cluster may be an important foraging area outside the Mid-Atlantic Ridge.

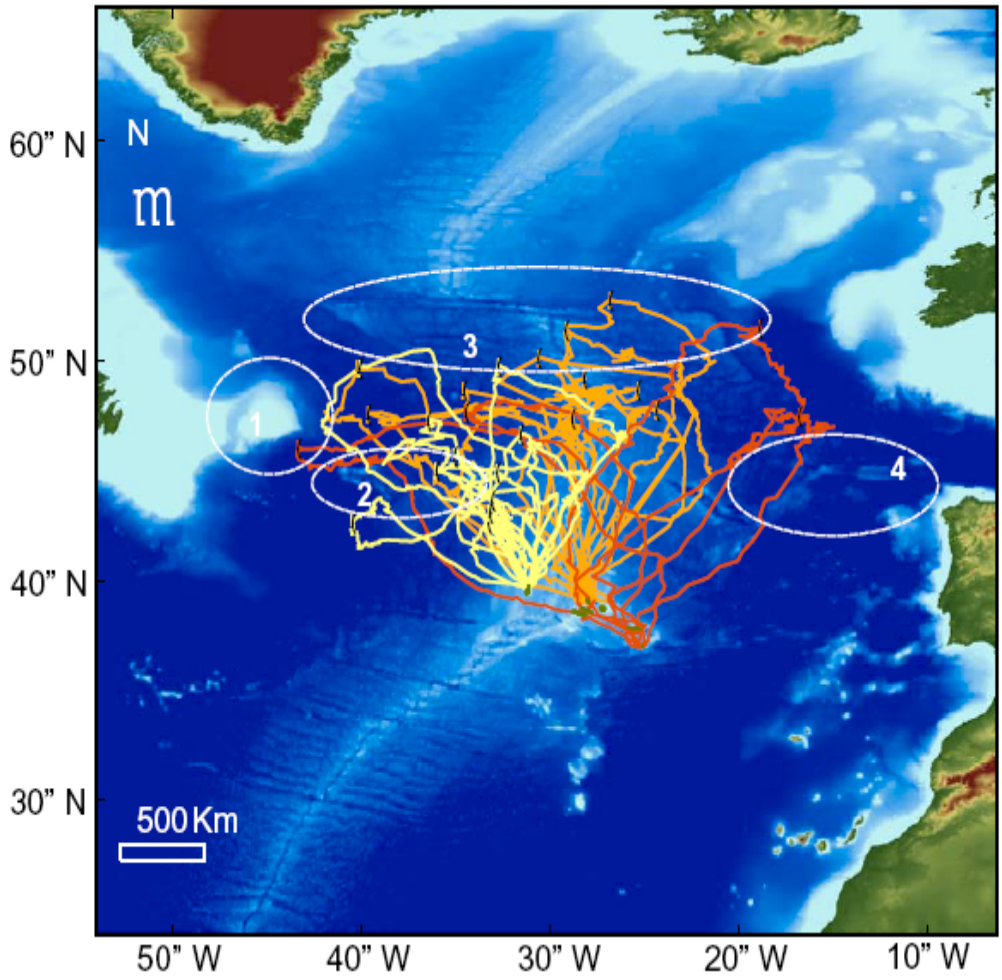

Figure 3. *Calonectris diomedea. Foraging ranges and destinations of long trips (5 – 18 days) from three islands in western (yellow), central (orange) and eastern (red) Azores. Circles mark maximum ranges for individual foraging trips. Oceanographic features: 1, Flemish Cap; 2, Milne Seamounts; 3, Charlie Gibbs Fracture Zone; 4, Charcot seamounts. Sea depths: pale, < 1000 m; medium, 1000 – 2000 m; dark blue, > 3000 m. Reproduced from Magalhães et al., (2008).*

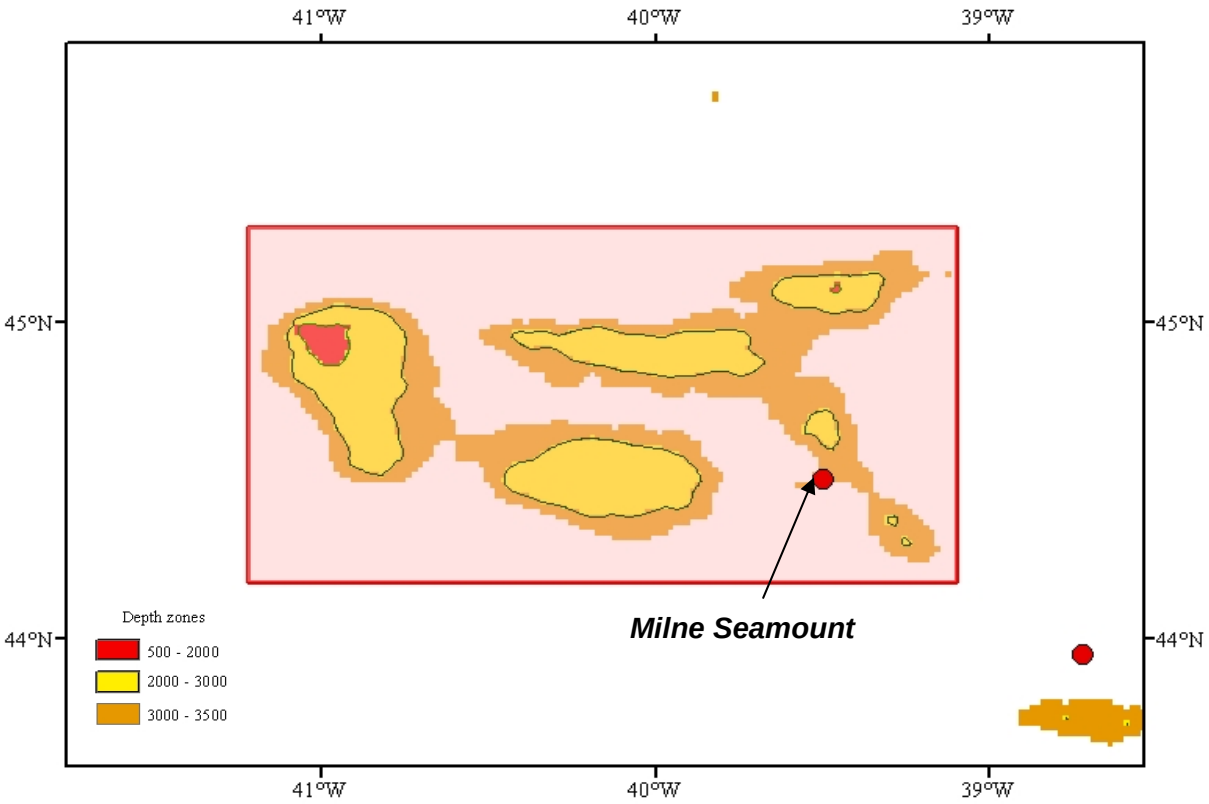

Figure 4. *The fishable zones within and around the proposed marine protected area. The white area around the proposed marine protected area represents depths greater than 3500 m. The two red dots are known seamount locations and the red shaded area is the proposed marine protected area.*

Given the lack of direct ecological knowledge about the proposed marine protected area, boundaries proposed for the MPA were chosen based on bathymetry. Boundaries were kept straight to allow ease of management and enforcement of regulations. Figure 4 shows that the boundaries incorporate all areas with a depth less than 3500 m, *i.e.* those areas accessible by fishing vessels. To the southeast of the proposed marine protected area, there is an unnamed seamount. This has not been included in the proposed marine protected area because the unnamed seamount is deeper than 3500 m and therefore cannot be classified as vulnerable to fishing pressure at present.

B. Selection criteria

a. Ecological criteria/considerations

1. Threatened and Declining Species and Habitats

The proposed area includes seamount habitat, which is listed as a priority threatened or declining habitat by OSPAR (OSPAR Commission 2003). Seamount habitat qualifies as a Vulnerable Marine Ecosystems in relation to high seas fisheries according to criteria developed by FAO (FAO 2007, Rogers *et al.*, 2008). Seamount communities are also listed as habitats that are examples of ecologically or biological significant marine areas according to criteria developed by the CBD for identifying candidate sites for protection on the high seas (UNEP 2007).

2. Important Species and Habitats

There is no available information about the benthic biological communities present at this seamount, although it can be expected that there are significant stands of coral and other bottom living organisms present based on research at the nearby Corner Rise Seamounts (Waller *et al.*, 2007). A recent study of breeding pairs of Cory's shearwater (*C. diomedea*) from the Azores found that both short and long foraging trips are made to the Milne seamount cluster (Magalhães *et al.*, 2008; see section A8 Characteristics of the Area and Figure 3 for further details).

3. Ecological Significance

There is little direct information about the ecological communities found within the proposed marine protected area.

To the east of the Milne Seamount area, the closest topographical features that have been studied are the seamounts of the northern section of the Mid-Atlantic Ridge running from the Charlie-Gibbs Fracture Zone (approximately 52 – 53°N) south to the Azores and the seamounts of the Azores' continental shelf. An example of a nearby seamount is the Sedlo seamount, located in the Azores sub area of the Portuguese EEZ. Sedlo is considered to be one of the better-studied seamounts in the OSPAR area. Hexacorrallia and sponges have been found dominating the summit benthic epifaunal community and the seamount is an important area for several commercial fish species, visiting marine mammals, seabirds and sea turtles (Menezes *et al.*, 2006). The northern section of the Mid-Atlantic Ridge is currently being studied as part of the Census of Marine Life MarEco project and several papers have recently been published. To the west, the nearest chain of seamounts is the Newfoundland chain, however no information is available about their biology is available. The Milne seamount area is likely to be similar to the topographical features in its surrounding area.

Seamounts are possible feeding stops along migratory routes for sea turtles. The knowledge of sea turtle associations with seamounts is primarily based on the Loggerhead turtle (*C. caretta*) (Santos *et al.*, 2007). Most of the loggerheads that are found in the North East Atlantic have been carried across the Atlantic Ocean via the Gulf Stream from nesting sites in the South East United States (Santos *et al.*, 2007). The loggerheads that frequent the waters around the Azores, Madeira and the Canary Islands are in the juvenile oceanic stage of development (Carr, 1986; Bolten *et al.*, 1998; Santos *et al.*, 2007). The possible reasons for sea turtles associations with seamounts include an increase in prey items and the fact that they use geomagnetic fields for navigation and may therefore use the magnetic signatures of seamounts for this purpose (Santos *et al.*, 2007). A few satellite tracking studies have been conducted within the OSPAR region and have shown that individuals can be found crossing the Atlantic in the vicinity of the proposed protected area (Hays *et al.*, 2006; Doyle *et al.*, 2008).

Seamounts are also known to attract large numbers of pelagic animals, such as marine mammals, tuna, billfishes and sharks (Gubbay, 2003; Morato *et al.*, 2008). As noted above, historical Sperm whale (*P. macrocephalus*) data show that this species was once caught within and around the proposed marine protected area (see Figure 2) and it is likely that individuals still frequent the area. Indeed significant Sperm whale feeding aggregations and other cetacean species, were observed on the Mid-Atlantic Ridge northeast of the proposed marine protected area (Skov *et al.*, 2008).

4. High Natural Biological Diversity

As there are no published accounts of this area, it is not possible to make site-specific comments about the biological diversity.

5. Representativity

The Milne seamount is relatively isolated from nearby regions and so may show a “typical” representation of an oceanic seamount habitat. The varying heights of peaks in the cluster could also support different types of species assemblages and niches.

6. Sensitivity

In general seamounts have been identified as threatened or declining marine habitats (OSPAR Commission, 2003) and the Milne Seamount is no exception. The recent closure of several seamounts within the OSPAR area by the North East Atlantic Fisheries Commission (NEAFC) (including Hecate and Faraday seamounts on the Mid-Atlantic Ridge, Altair and Antialtair seamounts) further exemplifies recognition of their sensitivity to the effects of commercial fishing.

Given its remote location in the middle of the Atlantic, the Milne Seamount and surrounding features may have had relatively little disturbance in comparison to less remote locations, although some peaks of the similarly isolated Corner Rise Seamounts have been seriously damaged by fishing (Waller *et al.*, 2007).

7. Naturalness

Due to its remote location, it is possible that the Milne seamount cluster is relatively undisturbed and may therefore represent a relatively pristine seamount example within the OSPAR area. This remains to be confirmed by direct study.

b. Practical criteria/considerations

1. Potential for restoration

Given the remote location of the Milne seamount cluster and the likely low past disturbance, protection rather than restoration is the aim of this proposal.

2. Degree of Acceptance

Seamounts have been identified as vulnerable ecosystems/habitats in many different fora and there are therefore strong scientific grounds warranting protection of this area. Fishing effort on the Milne cluster has not been quantified but, due to its remote location and relative size, it may be little fished at present. In addition recent NEAFC fishery closures have been implemented on several seamounts in the OSPAR region (ICES, 2007a). Therefore acceptance from the fishing community may be relatively high, although detailed consultation with any known stakeholders will be required.

3. Potential for Success of Management Measures

On the one hand, high seas marine protection will be more difficult to implement than in places closer to land, where patrols and enforcement measures can be easily administered. However, on the other hand, protection may be easier to achieve because the number of users of the areas a much more limited, and their activities can be monitored remotely and in a cost effective way by Vessel Monitoring Systems and satellites (Kourti *et al*., 2001; Marr and Hall-Spencer, 2002; Deng et al., 2005; Kourti *et al*., 2005; Murawski et al., 2005; Davies *et al.*, 2007; Rogers *et al.*, 2008).

4. Potential Damage to the Area by Human Activities

On the whole, the most damaging industry operating the North East Atlantic is deep-sea fishing (OSPAR, 2007). It is likely that as resources are depleted elsewhere, the exploration of seamounts in the OSPAR maritime area will continue and this could lead to the proposed area being impacted by fishing activity. As fisheries move into deeper waters the conditions are more conducive to net loss,

and there is strong evidence of net dumping and significant levels of ghost fishing in the deep water north east Atlantic fishery for shark and monkfish (ICES, 2007b).

Bioprospecting on seamounts for possible sources of biotechnology (for example bacteria on hydrothermal vents) may be another future threat (Gubbay, 2003). However, no information is known about bioprospecting within the proposed area and it seems more likely that this will occur around hydrothermal vent sites in the near future (Synnes, 2007).

In the future, exploitation of seamounts by humans could expand in scope. A possible threat could be mineral exploitation through mining for their cobalt crusts (Probert, 1999). However, no information is known about the mineral composition of Milne seamount and the surrounding area.

5. Scientific value

There is little information about the Milne Seamount cluster specifically. This highlights the need for more research in this region. As noted in the introduction, scientific knowledge of seamounts in general is poorer than for many other marine habitats (Gubbay, 2003). Therefore remote seamounts such as the proposed site have high scientific value. A research program to better understand high seas seamount habitats should accompany protection of this area.

C. Management issues

1. Human activities

The following actual or potential human activities in the area will or might need regulation through a management plan:

Deep sea and high seas fishing using fixed and mobile gears (both at the seabed and in the water column)

Vessel traffic

Seabed mining or other resource exploitation

Bioprospecting

Cable laying

Military sonar

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Annex 1

Species and habitats of special interest for the Milne Seamount Complex

A. Habitats

Threatened and/or declining Habitats[8]

- Seamounts
- Deep-sea sponge aggregations
- *Lophelia pertusa* reefs
- Coral Gardens

Other Features of special concern

- Deepwater and epipelagic ecosystems, including their function for migratory species
- Habitats associated with seamount structures, including their function as recruitment and spawning areas
- Benthopelagic habitats and associated communities, including commercially fished species
- Hard substrate habitats and associated epibenthos, including cold water corals and sponges
- Soft sediment habitats and associated benthos, including "coral gardens" of non-scleractinian corals

B. Species

Threatened and/or declining Species[9]

- Orange roughy (*Hosplostethus atlanticus*)
- Blue whale (*Balaenoptera musculus*)
- Leatherback turtle (*Dermochelys coriacea*)
- Portuguese dogfish (*Centroscymnus coelolepis*)
- Gulper shark (*Centrophorus granulosus*)
- Leafscale gulper shark (*Centrophorus squmosus*)

Other Species of special concern

- Cetaceans
- Deep water sharks
- Oceanic seabirds like Cory's Shearwater (*Calonectris diomedia*)

[8] As included on the OSPAR List of threatened and/or declining Species and Habitats (OSPAR Agreement 2008-6)

[9] As included on the OSPAR List of threatened and/or declining Species and Habitats (OSPAR Agreement 2008-6). The presence of these species is strongly suspected based on their known geographic distributions and habitat associations, but remains to be proven by direct observation.

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OSPAR's vision is of a healthy and diverse North-East Atlantic ecosystem, used sustainably

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