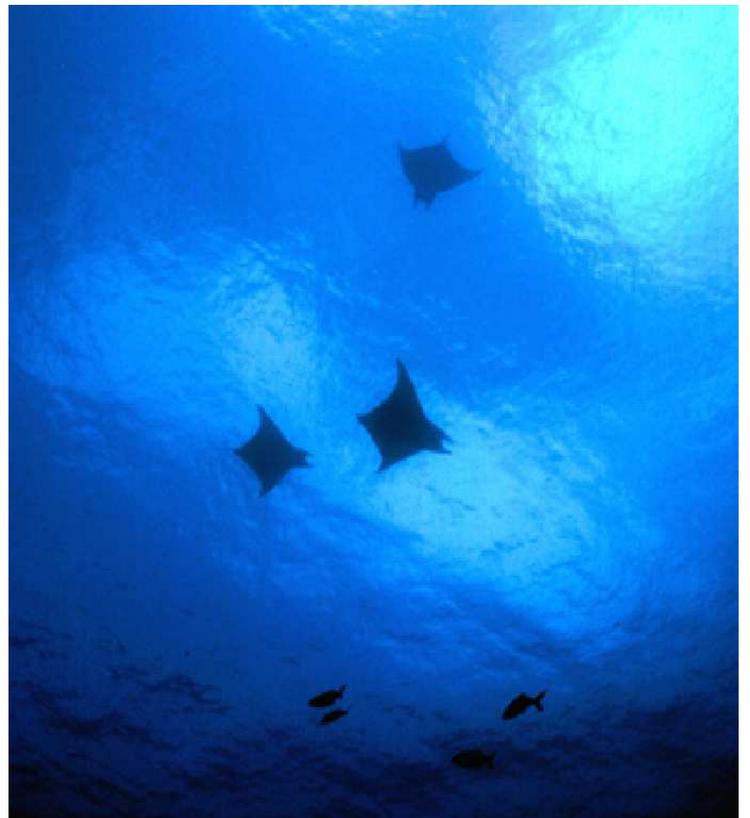




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The Offshore MPA Toolbox

Implementing Marine Protected Areas in the North-East Atlantic Offshore: Seamounts – A Case Study



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Preface

Deep down in the ocean, but nonetheless within human reach, seamount communities and ecosystems have repeatedly been shown to be highly vulnerable to the impact of human activities. Globally, seamount and cold-water coral habitats and species which are frequently associated with each other, are considered a priority for developing conservation and sustainable management measures in the marine environment within and beyond national jurisdiction. Apart from the implementation of regulatory controls of sectoral activities for a wider sea area, seamounts may be good candidates for site-based management measures including marine protected areas, due to their singularity and isolation.

The ultimate goal will be to link a network of seamount marine protected areas into the envisaged global representative network of marine protected areas, as agreed by the World Summit on Sustainable Development (WSSD) in Johannesburg 2002. However, there is still a long way to go.

Currently, there are 346 seamounts under protection in 84 marine protected areas worldwide, all located in areas under the sovereignty of a coastal State. This corresponds to only a small fraction of the estimated 10,000-50,000 seamounts rising higher than 1,000 m from the seafloor. In the Atlantic, only two seamounts have been designated up to now, though without being successfully managed as a marine protected area.

The *"Offshore MPA Toolbox"* seeks to compile the most important information relevant to the selection, designation and, in particular, the management of protected areas at seamounts in the North-East Atlantic, including a summary of legal issues. We hope that it will contribute to enhance the establishment of well-managed marine protected areas offshore, especially for seamounts and offshore banks which face similar problems.

The EU-funded project OASIS (OceAnic Seamounts: an Integrated Study) aims to provide a holistic, integrated assessment of seamount ecology in the NE Atlantic using two sites as case studies, and to apply the scientific knowledge to developing possible options for sustainable management. A site-specific, mass-balanced seamount model and management plan for the two example sites shall lay the ground for legislative protection at a later stage, but also provide ideas how to practically advance the designation of marine protected areas for seamount habitats with limited data availability.

The *"Offshore MPA Toolbox"* is a product of the OASIS project, following a comprehensive description of the *"Seamounts of the North-East Atlantic"* in 2003. As a next step, more specific management recommendations will be included in the final, updated OASIS Seamounts Report to be published in 2005/2006.

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OASIS project coordinator

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WWF

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1. Introduction

The exploitation of marine resources is commonly regulated by two different methods, activity-based management measures and marine protected areas (MPAs), which are commonly used in order to prevent overexploitation and to ensure the conservation of the ocean and its natural features.

Activity-based management measures are sector-based regulations like those formulated for the fishing industry, *i.e.* catch size or effort limitations, or for oil and gas activities in the form of spatial mining restrictions by licensing schemes. While these activity regulations may be a suitable tool for the management of individual operations and sectors, they are rather insufficient regarding the conservation of ecosystems as a whole. They tend to poorly address the interrelation with other activities focussing on the same area or the same species. Quite often, the regulation mechanism does not consider effects on the natural correlations within ecosystems, for example those existing between different species in food webs. Therefore, they cannot ensure sustainable resource management and conservation in the marine environment alone but should be used in combination with other tools such as marine protected areas (MPAs).

MPAs have proven to be valuable tools for the conservation and sustainable management of ecosystems and related human activities in many cases

(*e.g.* CBD COP 7 decision VII/5¹, Salm *et al.* 2000, WWF 2003).

The actual experiences with the designation and enforcement of MPAs in the open ocean, however, are scarce. Of the 1597 MPAs listed for the North-East Atlantic in 2000, only 36 were located more than 12 nm offshore and only one of these was designated for the protection of natural values other than fish (WWF & AID Environment 2000²). Approximately 84 seamount MPAs exist worldwide, all of them within EEZs, coinciding with at most 5% of the seamounts that have been identified within EEZs (Alder & Wood 2004). Only two of them, the Formigas Islets & Dollabarat Bank Nature Reserve, and the D. João da Castro Bank in the Azorean EEZ are in the North-East Atlantic. Table 1 gives an exemplary list of existing and proposed offshore seamount MPAs.

Table 1: Examples of existing & proposed seamount MPAs

- Australia: The **Tasmanian Seamounts Marine Reserve**, declared in 1999
- Australia: **Lord Howe Island Marine Park** declared in 1998
- Canada: A pilot MPA on the **Bowie/Sgaan Kinghlas Seamount**, announced in 1998 (consultations to consider regulatory designation are ongoing)
- Netherl. Antilles: **Saba National Marine Park**, established in 1987
- New Zealand: **Seamount Management Strategy** and fisheries measures since 2000
- USA: The **Cordell Bank National Marine Sanctuary**, declared in 1989 (management plan currently undergoing revision)
- Portugal/Azores: The **Formigas Islets & Dollabarat Bank Nature Reserve** established in 1988, designated SAC since 2002, management in progress
- **D. João da Castro Bank**, designated SAC since 2002, management in preparation

¹ UNEP/ CBD/COP7/L.31 2004
<http://www.biodiv.org/decisions/default.aspx?m=COP-07&id=7742&lg=0>

² OSPAR BDC 00/8/2-E

One reason for the low degree of protection could be that there is no risk to seamount biodiversity in the North East Atlantic. However, Gubbay (2003) who provides a first regional baseline report for the North East Atlantic, reviewing the scientific information about seamount characteristics, ecosystems and threats, identifies commercial fishing as a major threat to the seamount habitats and communities, which are evidently highly vulnerable. MPAs are seen as a key to ensuring the sustainability of natural seamount ecosystems. It could also be a lack of experience in implementing offshore MPAs, and the fact that there are no practical guidelines available for doing so in the North-East Atlantic.

However, the decline of the natural marine resources and the accompanying increasing political and scientific call for the protection and sustainable use of the sea in general urges riparian states to designate MPAs in their waters and to develop adequate measures for the open ocean as soon as possible.

The **Offshore MPA Toolbox** aims at promoting the establishment of offshore MPAs by providing guidance on the selection, designation and management of offshore MPAs in the North-East Atlantic using seamounts as a case study. It was developed in the context of the OASIS project (OceAnic Seamounts: an Integrated Study³).

Coordinated by the University of Hamburg, Germany and with the participation of several European scientific institutes and WWF, this project intends to deliver a holistic picture of seamount ecosystem functioning by investigating the oceanographic and biological characteristics of two seamount ecosystems in the North-East Atlantic. Based on the scientific results, ecosystem models and criteria will be developed that facilitate the conservation of seamount ecosystems and the sustainable management of associated human activities. Moreover, the project and its results are used to increase public knowledge about deep-sea features such as seamounts and the urgent need for their protection.

³ <http://www.rrz.uni-hamburg.de/OASIS>

The toolbox consists of three parts:

In the first part, general information about MPAs, the special conditions for offshore MPAs and for seamounts in particular is provided. Then an overview of the legal framework is given, emphasising the ruling conditions for seamounts in the North-East Atlantic. The existing legal frameworks that apply to the designation of MPAs in this region are evaluated in more detail and potential options within these frameworks are highlighted. In the last part, different aspects of the site selection process and the development of a management plan are discussed in more detail, based on experiences with existing seamount and other comparable offshore MPAs around the world. Additionally, general recommendations for seamount MPAs in the North-East Atlantic are provided in the Annex of this study.⁴

2. Seamounts

Seamounts can be defined as undersea mountains, which rise steeply from the sea floor to below sea level (Rogers 1994) but no internationally agreed definition exists.

They can be very large topographical features reaching from several thousand meters water depth close to the water surface having a diameter of up to several hundred square kilometres (Gubbay 2003, Figure 1).

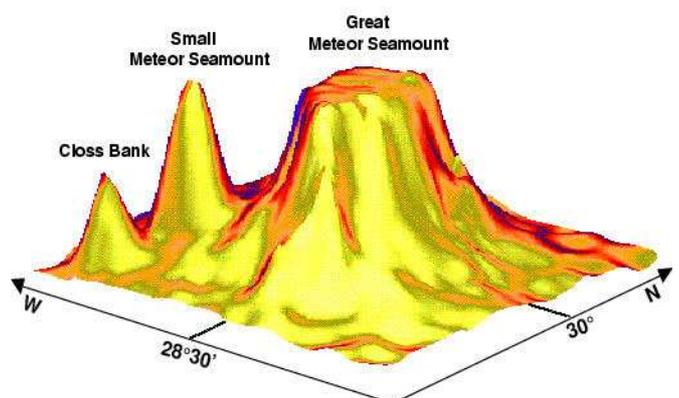


Figure 1: Topography of Great Meteor Seamount (© Mohn & Beckmann)

⁴ Excerpt from: Case Study of existing and proposed management measures for seamount communities in the OSPAR Maritime Area. IEEP, London. Report commissioned by WWF Germany

The majority of the seamounts are of volcanic origin and typically distributed most densely along converging plate margins and areas of vertical tectonic movement (WWF/IUCN/WCPA 2001). Some, however, so-called guyots are more isolated and found further away from the mid-ocean ridges. They are formed when islands sink below the water surface because of tectonic processes (Gubbay 2003).

Although their exact number is not known, seamounts

have been found in all oceans, the majority of an estimated 30,000 formations rising higher than 1000m from the seafloor being located in the Pacific (Smith and Jordan 1988).

According to Epp & Smoot (1989), about 810 seamounts have been recorded in the North-East Atlantic with the highest concentration between the Charlie-Gibbs fracture zone and the Azores, and north of Madeira (Figure 2).

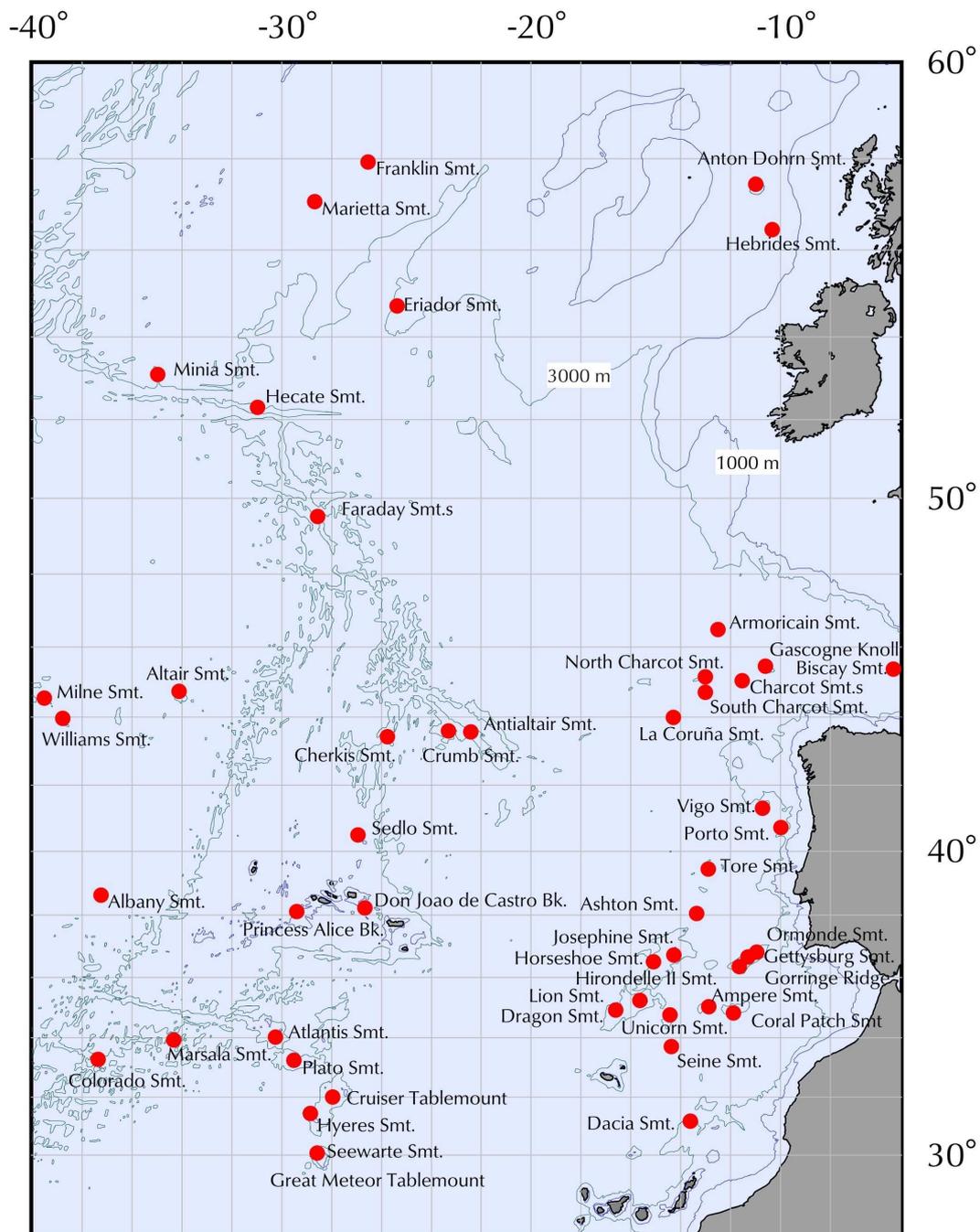


Figure 2: Distribution of known seamounts in the North-East Atlantic (Map by Bernd Christiansen, source GEBCO)

Depending on their size and shape, seamounts can have strong effects on the hydrography, for example by deflecting currents or creating localised upwellings and closed circulation cells known as Taylor columns (e.g. Roden 1987; Kunze & Sandford 1997; Dower *et al.* 1992). The enhanced currents around seamounts often remove the finer sediment and uncover otherwise rare hard-bottom substrate. Together with a higher particle flow this provides living space for many different sessile filter feeders such as sponges, ascidians and corals, as well as for other suspension feeders like molluscs, crinoids and asteroids (Rogers 1994, Gubbay 2003). Many of the invertebrate species identified on seamounts so far were new to science and some of them are possibly endemic to their place of discovery (Richer de Forges *et al.* 2000, Koslow *et al.* 2001).

Probably depending on the shape, depth and season, due to localised up- and downwellings and Taylor columns trapping small organisms and particles above seamounts, the plankton community often differs in quality and quantity around or above seamounts (Rogers 1994). In addition, a diverse and unique benthic fauna is often found on seamounts which, together, may explain the higher abundance of seabirds and many pelagic species including marine mammals, sharks and other fish species known to aggregate around some seamounts e.g. for feeding or spawning (Hui 1985, Blaber 1986, Hyrenbach *et al.* 2000). At several seamounts the pelagic community has been found to differ significantly from the surrounding ocean as well, not only in terms of concentration but also by species composition (reviewed by Rogers 1994), which makes seamounts to a kind of underwater islands in the open ocean.

Many species like redfish (*Sebastes* spp.) (Figure 3) found in the vicinity of seamounts are of commercial interest (Rogers 1994). Triggered by the declining coastal resources and accelerated by rapidly developing fishing and mining techniques, the exploitation of the offshore deep environment is constantly increasing in intensity and extent. Combined with other impacts, such as the predicted global climate change this development is putting the open ocean and its individual habitats like those on seamounts under an increasing pressure (Probert 1999, Butler *et al.* 2001).



Figure 3: *Sebastes* sp. resting near a branching soft coral at 450m in the North-East Atlantic Ocean (© WWF-Canon/Ian Hudson)

While the exploitation of their natural resources is rapidly expanding and causing damage which cannot be assessed in full scope, the scientific knowledge about seamounts and their associated ecosystems is still very limited and scattered over different disciplines and institutions. Still it is becoming more and more evident that seamount ecosystems play an important role in the marine realm.

In order to prevent or minimise already occurring irreversible damage, an ecosystem-based regulation of human activities and management measures including MPAs are urgently needed to conserve the full range of biodiversity associated with seamounts and the various functions seamounts play in the marine ecosystem.

3. Marine Protected Areas

Marine Protected Areas (MPAs) have been proven to be valuable tools in the sustainable management of marine resource uses, and in the maintenance and conservation of the oceans biodiversity and ecosystems (Salm *et al.* 2000, UNEP/ CBD/COP/7/L.31 2004).

MPAs are a common tool for the long-term conservation and restoration of biodiversity, food webs and ecosystem function in a particular sea area. The management of an MPA is a directive process which is guided by pre-formulated and regularly revised overarching conservation objectives.

A definition for MPAs, which has found wide acceptance, was developed by IUCN (1994) as follows:

“Any area of intertidal or subtidal terrain, together with its overlying waters and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment”.

Next to the general conservation of ecosystem structure, function and biodiversity, MPAs have demonstrated their usefulness to:

- Maintain or improve viable fisheries yields
- Reduce user conflicts
- Increase public knowledge of the oceans and related features
- Restore degraded areas and depleted stocks
- Facilitate the undisturbed study of natural processes and dynamics

However, the success of an MPA to reach its objectives in conserving a site and its natural features will also depend, *inter alia*, on external factors.

Ocean systems are interconnected, allowing for the efficient transmission and exchange of substances and forcing factors (in Kelleher 2001).

Therefore, an MPA will rarely succeed unless it is embedded in an ecosystem-based management regime. Such a regime should take all ecological and socio-economic aspects that affect one region into account, and involve relevant stakeholders in the decision-making process⁵.

The ecosystem-based approach is a strategy to integrate individual resource uses and activities that affect one region and balance these with conservation objectives towards a sustainable resource management (CBD 2000). It emphasises the connection between ecosystem health and human welfare (Ward *et al.* 2002).

Within this regime, spatial planning of human activities versus biodiversity hotspots is one of the main tools to balance conservation needs with natural resource use and other activities that impact the marine ecosystem.

A network of MPAs to protect sensitive habitats and species should be part of the spatial planning process. Based on ecological considerations, it should cover the full range of biodiversity, large-scale marine ecosystems and processes of the oceans.

Offshore MPAs

The designation, management, monitoring and enforcement of MPAs in the open ocean are likely to be more difficult and potentially more costly than for inshore areas. Management may also be more complex as such sites will not necessarily lie within national waters and may even cross several jurisdictional zones and be subject to a mix of legal and administrative regimes (Gubbay 1998).

Compared to MPAs in the coastal zone, offshore MPAs differ significantly in certain aspects due to the natural characteristics of the open ocean (Table 2). Addressing these aspects can be a vital criterion that may decide upon the success of an offshore MPA in reaching its objectives.

⁵ Compare UNEP/CBD/COP/7/3 L.31 (2004)
<http://www.biodiv.org/doc/meetings/cop/cop-07/official/cop-07-l-31-en.pdf>

Table 2: Relevant offshore marine features after Salm & Clark (1984)

- Ocean space is essentially continuous.
- Source and deposits of commercially valuable minerals are found in the water column and on or under the seabed.
- There is no permanent human inhabitation on the open sea.
- Bio-geographic zones are very large, fluid and imprecise.
- Deep currents circulate nutrients over vast distances.
- Migratory animals circulate nutrients between seas and hemispheres.

Due to the location of an offshore MPA, several aspects of the designation procedure and management will be more complicated than in coastal shallow water zones. In this respect, establishing and managing protected areas in the offshore area can be associated with specific challenges (WWF 2003) such as:

- Difficulties in defining and delineating boundaries
- Difficulties of access and surveillance
- The complexities of managing international resources
- The need to honour rights associated with Freedom of the High Seas
- Tracking and managing migratory species
- The poorly understood processes and oceanographic linkages of the open sea

Seamount MPAs

Seamounts can be defined as deep-sea features which are easily distinguished from the surrounding ocean and small in extent. They host endemic species and could readily be changed by human activities (Burnette *et al.* 1992).

Based on this characterisation, MPAs appear to be a suitable tool for their conservation. The following types are viable for seamounts depending on the particular objectives for the site.

Possible MPA-types for seamounts:

- Complete closure, for long-term monitoring of natural processes and as reference site
- Sustainable multi-use area
- Fisheries closure
- Research site
- Part of another management regime such as EEZ or fisheries management regime
- Restoration site

4. The Legal Framework

Several international agreements and conventions such as the Convention on Biological Diversity (CBD) and the United Nations Convention on the Law of the Sea (UNCLOS) legally oblige Contracting Parties to develop measures for the sustainable use and the conservation of the marine environment as a whole.

At regional level, both the OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic in its Annex V, and the European Union via its EC Habitats and Birds Directives aim at establishing a network of protected areas in the waters under the jurisdiction of their Contracting Parties and/or Member States. In addition, the OSPAR Convention sets a timeframe until 2010 for the establishment of an ecologically coherent network of well-managed MPAs in its Maritime Area.

The OSPAR Convention applies to all waters of Contracting Parties as well as the High Seas beyond national jurisdiction in the North-East Atlantic, the marine part being defined in the convention text as the OSPAR Maritime Area. The EC Habitats and Birds Directives apply to the territorial waters encompassing the zone from the low water line on the coast up to 12nm and the adjacent waters where a Member State exercises its sovereign rights. Therefore, the marine protected areas designated under both Directives shall form an ecologically coherent network protected areas of European importance, Natura 2000, in all waters of Member States.

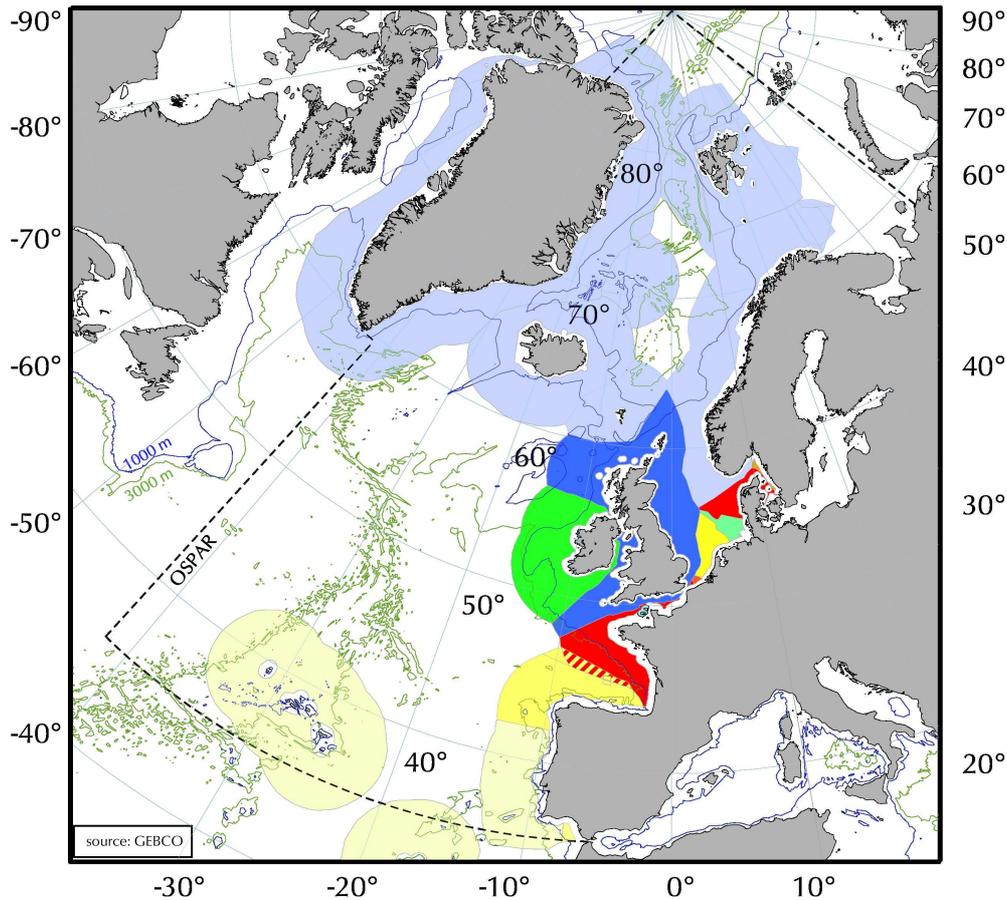


Figure 4: Map showing the OSPAR Maritime Area. The EEZs of EU Member States in full colour, other OSPAR Contracting Parties in light blue. (© WWF/Sabine Christiansen)

In recent years, global and regional conventions and agreements increasingly recognised the urgent need to focus more on reducing the risk from human activities to the biodiversity of seamounts and similar features of the open ocean.

The actual efforts undertaken so far, however, are concentrating almost exclusively on coastal zones while human activities are moving more and more towards the open ocean.

The following is a summary of the respective political initiatives as they are of interest for the North-East Atlantic modified after Gubbay (2003):

- Under UNCLOS (Part XII) there are general obligations to protect and preserve the marine environment (Art. 192).
- The UN General Assembly in its resolution 58/240 of 23 December 2003, paragraph 51, reiterated *“its call for urgent consideration of ways to integrate and improve, on a scientific basis, the*

management of risks to the marine biodiversity of seamounts, cold water coral reefs and certain other underwater features”; and *“invites the relevant global and regional bodies..., to investigate urgently how to better address, ..., the threats and risks to vulnerable and threatened marine ecosystems and biodiversity beyond national jurisdiction”*.

- The 7th Conference of the Parties of the convention on Biological Diversity (CBD/COP7 2004) stressed the need for rapid action to address the serious threats to marine biodiversity in areas beyond national jurisdiction, with particular reference to seamounts, hydrothermal vents, cold-water corals and other vulnerable ecosystems and certain underwater features and in keeping with precautionary and ecosystem approaches. It calls upon the UN General Assembly and other relevant international and regional organisations, ... to urgently take the

necessary short-term, medium-term and long-term measures to eliminate/avoid destructive practices, ... including the application of precaution, ... adversely impacting the marine biological diversity associated with the areas identified² above, and recommends that Parties also urgently take such measures to respond to the loss of biodiversity in such areas (Dec. VII/5, paras. 61-62).

- Additionally, the CBD included seamounts and cold-water coral reefs into its work plan for significant habitats at the 7th Conference of Parties in 2004⁶.
- The Environment Ministers of OSPAR Contracting Parties, in 2003, included seamounts in a regional priority list of threatened and/or declining species and habitats for developing conservation action.
- The Natura 2000 network of protected areas will comprise seamounts, to be designated as Special Areas of Conservation (SACs) under the EU Habitat Directive based on its dominant habitat type “reef”, which is listed as a natural habitat type of community interest.

At national level, it is difficult to give general recommendations on the legal framework for offshore MPAs because legislation differs between the individual countries. However, a list of essential attributes for national legislation for MPAs has been compiled by Kelleher (1999) as follows:

- Use of terms
- Management and zoning plans
- Public participation
- Preliminary research and survey
- Research, monitoring and review
- Compensation
- Financial arrangements
- Regulations
- Enforcement, incentives and penalties
- Education and public awareness

A detailed description of the individual aspects of this list can be found in “Guidelines for Marine Protected Areas” (Kelleher, 1999)⁷.

The following chapter outlines the respective procedures for the designation of MPAs under OSPAR and Natura 2000 with a particular emphasis on seamounts and associated species. Additionally, it gives a summary of further guidelines and recommendations as they have been formulated so far, e.g. for the management of MPAs within both frameworks.

5. Designation of Offshore MPAs in the North-East Atlantic

5.1 OSPAR Convention

The Convention and its objectives

The Convention for the Protection of the Environment of the North-East Atlantic (OSPAR Convention) is a regional seas agreement which came into force in 1998 after merging the Oslo Convention (1972) for the Prevention of Marine Pollution by Dumping from Ship and Aircraft and the Paris Convention (1974) for the Prevention of Marine Pollution from Land-Based Sources in 1992. The new OSPAR Commission was established to oversee the implementation of the Convention respectively.

The Maritime Area under the OSPAR Convention extends from the North Pole down to the 36° north latitude and the 42° west longitude, the Atlantic coast of Europe and the 51° east longitude in the Arctic Ocean and is subdivided into five regions. It includes the High Seas and the waters under the sovereignty and jurisdiction of the Contracting Parties but excludes the Baltic Sea, the Mediterranean Sea and the Belts lying to the south and east of lines drawn from Hasenore Head to Gniben Point, from Korshage to Spodsbjerg and from Gilbjerg Head to Kullen (Figure 4).

⁶ UNEP/CBD/COP/7/3 L.31 (2004)
<http://www.biodiv.org/decisions/default.aspx?m=COP-07&id=7742&lg=0>

⁷ The report can be downloaded under:
www.iucn.org/themes/wcpa/pubs/pdfs/mpa_guidelines.pdf

The overall goal of the OSPAR Convention is to safeguard human health and to conserve and to restore marine ecosystems via the prevention and elimination of pollution and the protection against adverse effects of human activities.

Annex V of the OSPAR Convention *on the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area* was adopted in 1998 accompanied by a strategy for its implementation⁸. Annex V entered into force in 2000 thus providing the legal basis for a recommendation adopted in 2003 with the purpose to establish the OSPAR Network of Marine Protected Areas and to ensure that, by 2010, it is an ecologically coherent network of well-managed marine protected areas.⁹ The envisaged network shall be consistent with and complementary to the Natura 2000 network and:

- Protect, conserve and restore species, habitats and ecological processes which are threatened, declining or in need of protection;
- Prevent degradation of, and damage to, species, habitats and ecological processes, following the precautionary approach;
- Protect and conserve areas that best represent the range of species, habitats and ecological processes in the maritime area.

Cooperation between both frameworks has been defined so far as follows:

Contracting Parties are responsible for contributing to the OSPAR network of MPAs. Where a Contracting Party is required to designate areas partly or wholly under the EC Birds Directive as SPA or the EC Habitats Directive as SAC, respectively, the party may report the area as OSPAR MPA to the OSPAR Commission, as if the party has selected the area as

such but without any obligation according to the provisions under the OSPAR Convention except sending a copy of any report which it makes to the EC about this area to the OSPAR Commission¹⁰.

Designation

The actual designation process for OSPAR MPAs consists of the following eight steps:

Step 1

The Contracting Parties identify possible sites in the waters under their jurisdiction according to the OSPAR *"Guidelines for the Identification and Selection of Marine Protected Areas in the OSPAR Maritime Area"*¹¹ and the ecological criteria/considerations listed in Annex I of the Guidelines and report them via the *"Proforma for compiling the characteristics of a potential MPA"* to the OSPAR working group on Marine Protected Areas, Species and Habitats (MASH) under the Biodiversity Committee.

If two or more sites have the same qualification, Contracting Parties are advised to establish a priority list of potential MPAs by reapplying the ecological criteria/considerations and in addition the practical criteria listed in Annex II of the Guidelines to all sites in question. Criteria to meet the aims of the OSPAR Network are given in Annex III of the Guidelines

An example for how different selection criteria may be combined in order to ensure selection of sites suitable for an ecologically coherent network of MPAs from Annex III of the OSPAR Guidelines is given in the Annex of this study.

An initial set of national nominations shall be received and considered by MASH as soon as possible, but 31 December 2005 at the latest. Nominations can be reported to MASH iteratively in annual sets.

⁸ Article 2 of Annex V: „...take the necessary measures to protect and conserve the ecosystems and the biological diversity of the maritime area, and to restore, where practicable, marine areas which have been adversely affected.“

⁹ OSPAR Recommendation 2003/3 on a Network of Marine Protected Areas 03/17/1-(A-B)-E Annex 9, Meeting of the OSPAR Commission, Bremen, 23-27 June 2003

¹⁰ § 3.5 of OSPAR Recommendation 2003/3 on a Network of MPAs, *ibid*.

¹¹ Guidelines for the Identification and Selection of Marine Protected Areas in the OSPAR Maritime Area, OSPAR 03/17/1-(A-B)-E Annex 10, Meeting of the OSPAR Commission, Bremen, 23 - 27 June 2003

Step 2

The working group MASH evaluates the national MPA proposals against the objectives for OSPAR MPAs and advises the Biodiversity Committee (BDC) with regard to their adoption.

Upon designation of a site, management plans for the areas shall be developed by the Contracting Parties and implemented according to the OSPAR provisions.

Step 3

After the BDC has conferred about the proposal it will report the outcome to the OSPAR Commission.

Step 4

Until 2005, the OSPAR Commission will annually evaluate, against the purposes of the OSPAR Convention, those proposals for MPAs that the individual Contracting Parties have reported in the preceding year, and designate suitable sites as OSPAR MPAs. Besides, the Commission will develop and maintain a database of all OSPAR MPAs.

Step 5

By 31 December 2005, Contracting Parties should report to the OSPAR Commission on their implementation of the recommendation in general¹². In 2006, the Commission will then carry out an overall review of the selection process to evaluate if the nominated MPAs are sufficient to constitute an ecologically coherent network of well-managed MPAs in the OSPAR Maritime Area. For this purpose, the OSPAR working group MASH is compiling a paper, which details theoretical background, aims and scope of the OSPAR network of MPAs.

Step 6

Identified gaps in the network will subsequently be filled by designating further MPAs until 2010.

Step 7

In 2009/2010, a second review of the ecological coherence and management efficiency of the OSPAR

network of MPAs will identify any shortfalls. The network shall be completed and maintained thereafter.

Step 8

Periodic evaluations shall demonstrate whether the aims of the network continue to be met.

Boundaries

There are no provisions regarding boundaries of an MPA under the OSPAR Convention.

Management

Following the “*Guidelines for the Management of Marine Protected Areas in the OSPAR Maritime Area*”¹³, the Contracting Parties shall develop a management plan for each identified area.

To achieve the aims for which the area has been selected, appropriate management measures shall be determined and those measures which fall within the national competence shall be established. Where the competence to adopt those measures lies with another authority, the Contracting Parties should take steps to seek the adoption by the respective authority and report the case to the OSPAR Commission.

Practical guidance on the application of the management guidelines and the assessment of the actual management effectiveness are under development.

A list of possible human activities and their potential effects was prepared by the OSPAR Commission advising on what kind of activities inside and outside an MPA might have an impact on the MPA, and might need to be regulated in order to achieve the objectives of the MPA designation.

Note: It should be mentioned here that the OSPAR Commission neither has the competence to adopt and implement management measures for fisheries nor for maritime transport¹⁴. However, the Commission can draw issues related to the objectives of the Convention to the attention of the respective authorities where it

¹² Using form in Annex 1 of OSPAR Recommendation 2002/3

¹³ Guidelines for the Management of Marine Protected Areas in the OSPAR Maritime Area, OSPAR 03/17/1-(A-B)-E Annex 11, Meeting of the OSPAR Commission, Bremen, 23 - 27 June 2003

¹⁴ OSPAR Annex V, Article 4

considers action to be desirable and cooperate with them where action within OSPAR's competence could complement or support their action.

Management plan

Management plans are seen as being valuable tools to achieve the objectives of OSPAR MPAs. As guidance for their development and structuring, the IUCN model is recommended (Salm *et al.* 2000). It will be introduced in the next chapter.

For MPAs within national jurisdiction, the Contracting Parties have to formulate national legislation to support the management of OSPAR MPAs within their EEZs.

Management plans shall be developed actively involving relevant stakeholders from the earliest stage onwards and be adaptive. Their effectiveness shall be evaluated on a regular basis.

Monitoring

There are no monitoring obligations specified for Contracting Parties. Marine Protected Areas which protect priority species and/or habitats will in future benefit from coordinated monitoring efforts under OSPAR. However there are no arrangements yet.

Funding

There are no provisions under the OSPAR Convention concerning financial support for the designation of MPAs or their management.

Designation of MPAs to manage human activities at and around seamounts

In contrast to the Natura 2000 network, which is limited to a defined set of species and habitats as listed in the Annexes to the EC Habitats Directive, the OSPAR network of MPAs can include all species and habitat types that qualify according to the OSPAR "Guidelines for the Identification and Selection of Marine Protected Areas in the OSPAR Maritime Area" For all species and habitats that fulfil the "Ecological criteria/considerations" as specified in Annex I of the Guidelines, protection measures such as the designation of an MPA can be applied. If considered to be an effective tool for improving the conservation status of some of the species and habitats on the OSPAR list, the establishment of such MPAs will be a priority.

Other options within the OSPAR framework

Next to the general selection criteria there is the "Initial List of Threatened and/or Declining Species and Habitats"¹⁵, which was established based on the Texel/Faial Criteria¹⁶. For the species and habitats on this list, the OSPAR Commission intends to develop general management and conservation measures for the relevant OSPAR region parallel to and/or *via* the MPA network.

Table 3: Exemplary list of species and habitats on the OSPAR list with potential relevance for the designation of seamount MPAs

<u>Species</u>	
Invertebrates	
<i>Megabalanus azoricus</i>	Azorean barnacle
<i>Patella ulyssiponensis aspera</i>	Azorean limpet
Fish	
<i>Hoplostethus atlanticus</i>	Orange roughy
<i>Dipturus batis</i>	Common skate
<i>Dipturus montagui</i>	Spotted ray
<i>Thunnus thynnus</i>	Atlantic bluefin/ tuna
Reptiles	
<i>Caretta caretta</i>	Loggerhead turtle
<i>Dermochelys coriacea</i>	Leatherback turtle
Cetaceans	
<i>Phocoena phocoena</i>	Harbour porpoise
<i>Balaenoptera musculus</i>	Blue whale
<u>Habitats</u>	
Carbonate Mounds	
Deep sea sponge aggregations	
<i>Lophelia pertusa</i> reefs	
Oceanic ridges with hydrothermal vents	

The initial OSPAR list is seen as a first step in a continuous process which will, by application of the agreed selection criteria (Texel/Faial criteria, OSPAR 2003) at a later stage result in a comprehensive list of species and habitats in need of protection and represent the full range of species and habitats of conservation concern in the North-East Atlantic.

¹⁵ Initial OSPAR List of Threatened and/or Declining Species And Habitats, OSPAR 03/17/1-(A-B)-E Annex 6, Meeting of the OSPAR Commission, Bremen, 23 - 27 June 2003

¹⁶ Criteria for the Identification of Species and Habitats in need of Protection and their Method of Application, OSPAR 03/17/1-(A-B)-E Annex 5, *ibid.*

The nomination procedure for the inclusion of further species and habitats is as follows:

- Contracting Parties and observer organisations to OSPAR may submit the justification for inclusion of further species and habitats in form of a standard case report to the OSPAR working group MASH.
- MASH will evaluate the case and send it for approval to the Biodiversity Committee (BDC) if appropriate.
- BDC may wish to ask the International Council for the Exploration of the Sea (ICES) for a scientific evaluation of the presented justification.
- Upon approval by BDC, a full set of proposed additions to the Initial List will be sent to the OSPAR Commission for approval.

5.2 Natura 2000

The network and its objectives

Natura 2000 is the envisaged coherent ecological network of Special Areas of Conservation (SACs) of the European Union (EU) as defined by Article 3 of the EC Habitats Directive¹⁷. It will also encompass the Special Protection Areas (SPAs) classified by the Member States pursuant to the EC Birds Directive¹⁸. Regarding the marine territory of the EU, both directives are fully applicable and enforceable up to the 200 nm offshore limit of Member States' jurisdiction¹⁹ (Figure 4).

The overall goal of the Natura 2000 network is to maintain and if necessary to restore a favourable conservation status for all naturally occurring species

and habitats across all EU Member States by establishing special protection for those natural habitats and wild flora and fauna of Community Interest listed in Annex I and II of the European Habitats and Birds Directives²⁰. These are the habitats and species considered to be most in need of conservation at a European level. However, there is consensus among marine experts that the Annexes I and II of the Habitats Directive will need to be amended in the future in order to fully represent all relevant marine habitat types and species.

Designation

The procedure for the designation of SAC consists of three steps:

Step 1

The Member States draw up a national list of sites based on an assessment of the relative national importance of priority natural habitats and species listed under Annex I & II of the European Habitats Directive and Annex I of the European Birds Directive respectively, following the criteria set out under Annex III of the European Habitats Directive. This list of proposed Sites of Community Interest (pSCI) is submitted to the European Commission, the site-specific information being compiled on the established standard data form²¹. The site designation process is exclusively based on scientific criteria.

The criteria differ between selection of habitats (as listed in Annex I EC Habitats Directive) and functional habitats for migrating species (as listed in Annex II of the EC Habitats Directive) as can be seen below:

¹⁷ Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora, OJ No. L206, 22.7.1992, pp. 0007-0050; as last amended by Council Directive 97/62/EC of 27 October 1997, OJ No. L305, 8.11.97, pp. 0042-0065.

¹⁸ Council Directive 79/409/EEC of 2 April 1979 on the Conservation of Wild Birds, OJ No. L103, 25.04.1979, pp. 0001-0018; as last amended by Commission Directive 97/49/EC of 29 July 1997, OJ No. L223, 13.08.1997, pp. 0009 – 0017.

¹⁹ Communication from the Commission to the Council and the European Parliament - Fisheries management and nature conservation in the marine environment, COM/99/0363 final of 14.07.1999, pp.10

²⁰ A Directive means that Member States are legally obliged to achieve a particular result while having the choice of how to do so. Article 23 of the European Habitat Directive requires the Member States to adopt appropriate laws, regulations and administrative provisions to comply with the Directive (within two years after its notification) on a national level.

²¹ Commission Decision 97/266/EC of 18 December 1996 concerning site information format for proposed NATURA 2000 sites, OJ No. L107, 24.04.1997, pp. 0001 – 0156

Site assessment criteria for habitat types

- Degree of representativeness of the natural habitat type on the site
- Area of the site covered by the natural habitat type in relation to the total area covered by the natural habitat type within the national territory
- Degree of conservation of the structure and functions of the natural habitat type concerned and restoration possibilities
- Global assessment of the value of the site for conservation of the natural habitat type concerned

Site assessment criteria for functional habitats

- Proportion of Member State population
- Conservation of features important for species' survival
- Isolation of species populations
- Global assessment

Some additional principles may be used for the site selection for both types of habitats (from McLeod *et al*, 2002²²):

- Priority/non-priority status
- Geographical range
- Special responsibilities
- Multiple interest
- Rarity

These criteria do not contain provisions for targeting the selection process towards establishing an ecologically coherent network of sites, by e.g. including functional characteristics like migration corridors or stepping stone function as strategic criteria. The European Commission (Marine Experts Group, Habitats Committee) currently develops guidelines for the practical approach to location and selection of future Special Areas of Conservation and eventually Natura 2000 sites.

Note: The Member States are advised to designate 60% of the total extent of the selected habitat type within their national jurisdiction as pSCIs.

Where the national list clearly covers <20% of the total national area of the habitat type under concern, this is considered as being insufficient. Nominations that fall between 20 to 60% of the total extent of the habitat type are open for discussion at the bio-geographic meetings of the Habitats Committee of the European Commission²³.

Step 2

The Commission adopts a list of sites of community importance (SCI) based on the national list in agreement with the respective Member State taking into account the purpose to form a European network of sites.

Table 4: Criteria for the assessment of Community Importance relevant for all sites containing priority natural habitat types as listed in Annex IV assessed on the basis of the selection criteria given above

- Relative value of the site at national level
- Geographical situation of the site in relation to migration routes of species in Annex II and whether it belongs to a continuous ecosystem situated on both sides of one or more internal Community frontiers
- Total area of the site
- Number of natural habitat types in Annex I and species in Annex II present on the site
- Global ecological value of the site for the bio-geographical regions concerned and/or for the whole of the territory referred to in Article 2, as regards both the characteristic of unique aspect of its features and the way they are combined

²² <http://www.jncc.gov.uk/ProtectedSites/SACselection/default.htm>

²³ European Commission (1997): Criteria for assessing national lists of pSCI at biogeographical level. The Habitat Committee (Hab. 97/2 rev.4)

Step 3

Upon adoption by the Commission, the Member States shall designate the declared SCIs as SACs as soon as possible, within six years later at the latest.

Boundaries

In general boundaries should be clearly defined spatially but the natural dynamics of the temporal and spatial range of species and habitats have to be taken into account when delineating the site and formulating management measures.

Dynamic processes have to be recognised as a key element of structure and function of a habitat or a species, and boundaries and management measures should be kept adaptive to natural changes. It is recommended to delineate a buffer zone that allows for changes in the spatial range.

The historical development of the natural range of a habitat or species is valuable information for site planning and management. When defining the favourable conservation status of a habitat or species, trends in its natural range are an important aspect, particularly important when assessing the effects of a planned activity following the requirements under Article 6 of the Habitats Directive.

Management

As soon as a site has been adopted as a SCI the provisions for the management and maintenance of Natura 2000 sites as defined in Article 6 of the Habitat Directive come into force. The Commission advises the Member States to ensure non-deterioration²⁴ of sites qualifying under Annex III and to apply Article 6 before sites have received SCI status.

Article 6 refers to the responsibility of Member States in terms of conservation and management of their

Natura 2000 sites²⁵. Member States are required to maintain or restore the selected sites at a favourable conservation status for the natural habitat which means:

- The habitats natural range and the areas it covers within the range are stable or increasing.
- The specific ecological structure and functions necessary for its long-term maintenance exist and are likely to continue to exist for a foreseeable future.
- The conservation status of its typical species is favourable.²⁶

While defining the conservation status, economic, social and cultural requirements and regional and local characteristics have to be considered both at the site and the network level²⁷.

Member States are required to assess the conservation status of habitat types and species listed under Annex I & II within a SCI, by installing monitoring programmes as well as by studies/data collection in order to take adequate measures to maintain/restore the favourable conservation status as defined under Article 1 of the Habitat Directive.

The conservation measures have to correspond to the ecological requirements of the habitat type/species under concern. The definition of common indicators for the conservation status of the habitat types and species under Annex I and/or II for each site individually is recommended based on sound scientific knowledge²⁸.

In this respect, the importance of surveillance of the conservation status as required by Article 11 of the Habitat Directive should be stressed.

²⁴ Deterioration means here reduction of the area covered by the habitat or the specific structure and functions necessary for the long-term maintenance or the good conservation status of the typical species which are associated with this habitat. The assessment is made according to the contribution of the site to the coherence of the network.

²⁵ European Commission, DG Environment (2000): The provisions of Article 6 of the "Habitats" Directive 92/43/EEC, 69 pp.

²⁶ Article 1 of Council Directive 92/43/EEC

²⁷ Article 2 of the Council Directive 92/43/EEC

²⁸ Note: The intergovernmental exchange of information about the ecological requirements of the listed habitats and species is recommended by the Commission.

Monitoring & Assessment

Reporting and monitoring are essential for the assessment of the conservation status and its development subsequent to the management measures applied to the site. It is recommended to identify a representative number of key indicators that represent the condition of the habitat and its associated species and processes. Indicators should be easy to measure, cost-effective and sensitive to changes in the system.

In addition, the Member States have to establish and use statutory, administrative and/or contractual measures to achieve the given objectives.

Following the precautionary principle, Member States are required to take measures to prevent deterioration connected to a predictable event potentially affecting the habitat for which the SAC has been declared. Measures should take into account events inside as well as outside the SAC and include the assessment of any activity which might have a significant impact on the site as defined in Article 6 of the Habitat Directive.

The required assessment is similar to the general environmental impact assessment (EIA) procedure defined by Directive 85/337/EEC²⁹ as amended by Directive 97/11/EC (the EIA Directive). Information concerning the planned activity and its potential impacts affecting a site is gathered by project or plan proponents, relevant authorities, nature conservation and other agencies, non-governmental organisations (NGOs) and the public and provided to the competent authority for consideration and evaluation. The competent authority then determines the outcome of the assessment and takes a decision.

It has become generally accepted that the assessment requirements of Article 6 establish the following stage-by-stage procedure:

- Screening
- Appropriate assessment

- Assessment of alternative solutions
- Assessment where no alternative solutions exist and where adverse impacts remain

Each stage determines whether a further stage in the process is required. If, for example, the conclusions at the end of Stage 1 are such that there will be no significant impacts on the Natura 2000 site, there is no requirement to proceed further.

Each stage is completed with a report or matrix to provide evidence of the assessments that have been carried out³⁰.

If the planned activity is likely to have a negative impact in relation to the conservation objectives of the site and there are no alternatives, it can only proceed for imperative reasons of overriding public interest. In such a case the Member State is obliged to take compensatory measures to ensure the overall coherence of the Natura 2000 network.

Management plan

It is optional for Member States to establish and implement a management plan for a SAC either as an independent document or as part of other management plans. If a Member State decides to establish a management plan for a site it has to ensure that it meets the ecological requirements of the site and address all foreseen activities.

The elaboration of a management plan is not foreseen until stage three in the designation process hence following the establishment of an SCI list. From that status onwards, the site is officially subject to the Habitats Directive and the Member States have another six years to protect the sites as SACs and if appropriate to draw up management plans for them. It is recommended that a management plan is established prior to the selection of appropriate conservation objectives and measures. Structure and content of the management plan is left to Member States yet the

²⁹ Council Directive 85/337/EEC of 27 June 1985 on the Assessment of the Effects of Certain Public and Private Projects on the Environment, OJ No. L175, 05.07.1985, pp. 0040 – 0048; as last amended by Council Directive 97/11/EC of 3 March 1997 on the assessment of the effects of certain public and private projects on the environment, OJ No. L073, 14.03.1997, pp. 0005 – 0015.

³⁰ A detailed description of the process can be found in: European Commission (2001). Assessment of Plans and Projects Significantly Affecting Natura 2000 sites - Methodological guidance on the provisions of Article 6 (3) and (4) of the Habitats Directive 92/43/EEC, 76 pp.

Commission gives the following recommendations concerning elements and structure of a management plan (see tables 5 and 6).

Table 5: Recommended elements of a management plan
<ul style="list-style-type: none"> • The plan structure • Data collection • Aims and strategies • Implementation and consultation • Review and monitoring

Table 6: Recommended structure of a management plan
<ul style="list-style-type: none"> • Policy statement with reference to Article 6 of the Habitats Directive • Site description, including a historical land use analysis • Statement of objectives, including short-term and long-term goals • Statement of the constraints, including identification of the actors involved • List of realistic implementation actions, with time schedules and financial (and work power) planning • A detailed consultation process • Monitoring and evaluation

A management plan should be clear and concise making it accessible to all concerned parties, including the full range of stakeholders. There should only be one plan addressing all concerns for the site in order to prevent regulation conflict. At least, baseline information about a site should be available before the plan is developed so that further information needs can be identified and possible objectives for the sites formulated. For larger sites, a system of zoning the site according to management requirements could be considered. Objectives for the site should be as realistic and quantifiable as possible bearing in mind all relevant groups of interests.

They should optimise benefits in terms of the conservation objectives and socio-economic activities (with conservation objectives having priority).

Relevant stakeholders should be regularly consulted throughout the development of the management plan in order to develop realistic objectives and get as much external support as possible. There should be a formal system of appeal against elements in the plan.

A management plan should be a vital and operational guideline for managers and other relevant bodies. Therefore, it should include short-term objectives next to long-term goals including resource estimates for the various proposed activities, setting a time limit on their implementation. They should be revised on a regular basis.

Funding

Overall, the financial responsibility for the Natura 2000 network rests with Member States. However, there is the possibility for co-financing of the required measures and activities through the Commission³¹. The most suitable source for financial support is LIFE, the Financial Instrument for the Environment. It consists of three different programs, LIFE Nature, LIFE Environment and LIFE Third Countries, with the first one solely aimed at supporting the implementation of the nature conservation policy and the Natura 2000 network. It is about the most suitable one for financing management related actions.

In addition, it might also be possible to apply for co-financing at the Financial Instrument for Fisheries Guidance “FIFG”³², the European Regional Development Fund “ERDF”, or the European Social Fund “ESF”. It will depend on the actual reason of the funding proposal as to which financial instrument will be the most appropriate³³.

It should be mentioned here that the existing framework for co-financing options of Natura 2000 is under review at present, due to the exceptional financial burden of the Natura 2000. A provisional short-term

³¹ Article 8 of the Council Directive 92/43/EEC

³² European Fisheries Fund (EFF) from 2007 onwards

³³ For further information go to http://europa.eu.int/comm/secretariat_general/sgc/aides/index_en.htm

adjustment of the available financial framework is expected for the mid-term review of the financial programs in 2003-4. Subsequent long-term adjustments are intended for 2006 onwards.

Note: Scientific research and monitoring projects in relation to ecosystem health and conservation might also be eligible for funding under the European framework programmes for research.

A detailed and comprehensive overview of EU funding possibilities for environmental projects under the various environmental funding instruments of the European Commission and through the European Investment Bank can be found in the "Handbook for Environmental Project Funding" published by the European Commission in 2004.³⁴

Designation of MPAs to manage human activities at and around seamounts

Seamounts are not explicitly listed as open sea natural habitat type of community interest under Annex I of the Habitats Directive.

Reefs, however, are listed by the Interpretation Manual of European Union Habitats³⁵ as open sea natural habitat type of community interest with the following definition:

"Submarine, or exposed at low tide, rocky substrates and biogenic concretions, which arise from the seafloor in the sub littoral zone but may extend into the littoral zone where there is an uninterrupted zonation of plant and animal communities. These reefs generally support a zonation of benthic communities of algae and animals species including concretions, encrustations and corallogenic concretions".

Animals associated with such reefs are referred to as *"mussel beds (on rocky substrates), and invertebrate specialists of hard marine substrates (e.g. sponges, Bryozoans and cirripedian Crustaceans)"*. According

³⁴ The handbook can be downloaded under: http://europa.eu.int/comm/environment/funding/handbook_2004.doc

³⁵ Interpretation Manual of European Union Habitats – EUR 15, October 1999, European Commission DG Environment

to this definition, seamounts can be selected as reefs under Natura 2000 Code 1170.

Other options within the European framework

Species that occur at seamounts

There are several species which are known to occur in association with seamounts and/or for which seamounts play a crucial role in their life cycle e.g. as feeding or mating ground. If these species are listed either under Annex II or under Annex IV³⁶ of the Habitat Directive they could be used to nominate a seamount as SAC.

Table 7 gives an overview of species listed under the Habitats Directive that might occur in association with seamounts and thus provide scope for the designation of a seamount MPA.

Table 7: Relevant species listed under the EU Habitats Directive	
<u>Annex II</u>	
<i>Tursiops truncatus</i>	Bottlenose dolphin
<i>Caretta caretta</i>	Loggerhead turtle
<u>Annex IV</u>	
<i>Caretta caretta</i>	Loggerhead turtle
<i>Chelonia mydas</i>	Green turtle
<i>Lepidochelys kempii</i>	Kemp's ridley turtle
<i>Eretmochelys imbricata</i>	Hawksbill turtle
<i>Dermochelys coriacea</i>	Leatherback turtle
All cetaceans	

Common Fisheries Policy

The Common Fisheries Policy (CFP) has defined the conservation and sustainable exploitation of fisheries resources as its overall priority in the reform 2002 and defines the limitation of environmental impacts through fisheries as one of its main objectives.

Although not a satisfactory long-term solution it should be mentioned that there is the possibility for a Member State to apply for and to implement emergency measures under Article 8 of the EC Common Fisheries Policy within its sovereignty or jurisdiction where fishing activities seriously threaten the conservation of marine ecosystems and require immediate action. These

³⁶ Animal Species of Community Interest in need of strict protection

measures have a maximum duration of three months and have to be approved by the Commission.

Article 7 of the same regulation allows the Commission to take emergency measures for the conservation of habitats and species against unsustainable damage caused by fishing activities either on request of a Member State or on its own initiative. These measures have a maximum duration of six months and the option to be extended up to one year to allow permanent regulations to be adopted.³⁷

The case of the Darwin Mounds has set a precedent in this regard. The Darwin Mounds are a field of several cold-water coral patches and reefs in UK offshore waters (equivalent to EEZ), north west of Scotland. As these mounds were under risk to be severely damaged by deep-sea bottom trawling, emergency measures were adopted in August 2003 upon request of the UK government. The emergency measures were extended up to the maximum period of one year and a permanent regulation, which prohibits bottom trawling in the area, was adopted thereafter³⁸. Moreover, the Darwin Mounds are on the UK candidate list of offshore SACs. Options to more directly draw up regulations, under the CFP, for the conservation of environmental features against adverse impacts through fishing activities are given under:

- Article 6, which provides the possibility to adopt management plans for certain fisheries in order to integrate provisions for the maintenance or improvement of the conservation status of marine ecosystems, as far as potential impacts on the ecosystem are related to fisheries.
- Article 4 on technical measures, which provides the possibility to prohibit fishing activities in certain zones for the protection of *e.g.* spawning and nursery areas.

An example where this has been implemented is the protection zone for juvenile hake in the Irish Sea designated in 2003.

However, it should be noted that the protection zones which are established under the CFP cannot be regarded as MPAs if they do not provide long-term protection for the wider environment.

³⁷ Council Regulation 02/2371/EC of 20 December 2002 on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy, OJ No. L358, 31.12.2002, pp. 0059-0080.

³⁸ Council Regulation (EC) No 602/2004 of 22 March 2004 as regards the protection of deep-water coral reefs from the effects of trawling in an area north west of Scotland

6. Planning & Management

Planning and management of an MPA is a strategic step by step procedure that usually starts with the selection of a site. It encompasses the assessment of the conservation status and needs of a site, and the development of strategies and activities to maintain or reach a favourable conservation status as defined in the objectives for this site. The suite of the chosen strategies and activities should be reviewed periodically. Effectiveness in reaching the actual objectives for the MPA should be evaluated and measures adapted when necessary in order to improve management for a site over time. Figure 5 gives a schematic overview of the different aspects of MPA planning, management and effectiveness evaluation (after Hockings *et al.* 2000).

Ecological considerations should have priority throughout the planning process according to the overall conservation objective of an MPA.

However, other site-related aspects such as manageability and/or socio-economic facts should not be neglected. Balancing these different aspects will be one of the biggest challenges in the process and will differ from site to site.

Planning and management of an MPA should be a transparent process, involving stakeholders from the full range of site-related groups of interest.

Stakeholder support can be a vital element providing a good source of information about the area and associated activities. Additionally, it may increase public acceptance and knowledge of the MPA and might even result in important support to enforcement and monitoring of the site. The different steps and aspects of planning and management for a site are usually described in the format of a management plan.

A good model for the structure and content of a management plan was developed by IUCN (Figure 6). This template has received wide acceptance as a model for a management plan and it is also recommended by OSPAR in their management guidelines as referred to in the previous chapter.

It is advocated as a template in the following chapters covering selection, designation and management of offshore MPAs.

It should be noted that parts of the template have been modified according to the purpose of this report to give guidance for offshore MPAs in general instead of crafting a management plan for a particular site.



Figure 5: The Management Cycle (Hockings *et al.* 2000)

Outline Structure for an MPA Management Plan

1. Executive summary

2. Introduction

2.1 Purpose and scope of plan

2.2 Legislative authority for the plan (national and international)

3. Description of the site and its features

3.1 Regional setting: location and access

3.2 Resources (facts pertinent to management; other data in an appendix or separate document)

3.2.1 Physical: *e.g.*, marine landscape features, currents, bathymetry, hydrology

3.2.2 Biological: ecosystems (*e.g.*, cold water coral reefs, seagrass beds); critical habitats (*e.g.*, feeding, spawning); species (*e.g.*, endangered, commercial, charismatic)

3.2.3 Cultural: archaeological, historical, religious

3.3 Existing uses (description, facilities, etc.)

3.3.1 Recreational

3.3.2 Commercial

3.3.3 Research and education

3.3.4 Traditional uses, rights, and management practices

3.4 Existing legal and management framework

3.5 Existing and potential threats and implications for management (*i.e.* analysis of compatible or incompatible uses, solutions)

3.6 Existing gaps of knowledge

4. The plan

4.1 Goals and objectives (general and specific)

4.2 Management tactics

4.2.1 Advisory committees

4.2.2 Interagency agreements (or arrangements with private organisations, institutions or individuals)

4.2.3 Boundaries

4.2.4 Zoning plan

4.2.5 Regulations

4.2.6 Social, cultural, and resource studies plan

4.2.7 Resource management plan

4.2.8 Education and public awareness

4.3 Administration

4.3.1 Staffing

4.3.2 Training

4.3.3 Facilities and equipment

4.3.4 Budget and business plan, finance sources

4.4 Surveillance and enforcement

4.5 Monitoring and evaluation of plan effectiveness

4.6 Time table for implementation

5. Appendices

6. References

Figure 6: IUCN model outline for an MPA site management plan based on Salm *et al.* (2000) and Kelleher (1999) recommended for an MPA of the OSPAR network.

7. Establishing and Implementing the Management Plan

7.1 Introduction

A management plan can be defined as a working document to be reviewed and adapted periodically (*i.e.* Salm *et al.* 2000). It provides an overview of the area, its natural features, human activities and stakeholders and identifies further information needs. Based on this site assessment the plan outlines an explicit set of goals, objectives and activities that will be undertaken over a specified period of time and area, and it articulates how the conservation strategy being used is designed to address the threats present.

While not all MPAs require a complete management plan to begin operation, eventually a comprehensive plan will be needed to guide the long-term goals and development of the area (Pomeroy *et al.* 2004 and literature referenced therein). In the introduction, a short summary should be given, including the purpose and scope of the plan and its legislative authority.

7.1.1 Purpose and scope of plan

Developing the purpose and scope for the management of an MPA is one of the first steps.

Based on the current status of the site, the existing legal and management framework and the existing threats and their effects, preferably all parties and stakeholders interested in a site should develop a vision for the MPA. This is an important process as the vision will set the long-term goals and objectives for conservation and eventual human use of the area.

A vision shall be illustrative and easy to understand in describing a desired ecological and socio-economic state of the site selected for being managed as an MPA.

Pomeroy *et al.* (2004) provide a summary of the properties of good goals and objectives ³⁹(see table 8):

Table 8: Properties of good goals and objectives of an MPA

A **goal** is a broad statement of what the MPA is ultimately trying to achieve. A useful goal is

- briefly and clearly defining the desired long-term vision and/or condition that will result from effective management of the MPA
- typically phrased as a broad mission statement
- simple to understand and communicate

An **objective** is a more specific measurable statement of what must be accomplished to attain a related goal. Attaining a goal is typically associated with the achievement of two or more corresponding objectives. A useful objective, *acc.* Margolius and Salafski 1998 in Pomeroy *et al.* 2004, is one that is:

- specific and easily understood
- written in terms of what will be accomplished, not how to go about it
- realistically achievable
- defined within a limited period
- achieved by being measured and validated

Goals and objectives are preferably developed in a participatory manner to reflect a balance of the needs and desires of all stakeholders involved in the management of the MPA and use of marine resources.

Poorly designed and/or articulated goals and objectives can be a serious problem for MPA managers. A set of goals and objectives that have been appropriately developed and are useful for management purposes (as defined by the criteria listed above) will improve the likelihood of the MPA being effectively managed.

While a vision should be operative for at least 20 years, goals are to be set for periods of approximately 10 years, objectives for 5 years. On an operational basis, annual or bi-annual targets can be set, cumulatively leading to achieving the objectives.

³⁹ <http://effectivempa.noaa.gov/guidebook/guidebook.html>

A few examples of goals set for seamount and other offshore MPAs in different proximities to the coast are provided to show the range of possibilities:

The **Saba Marine Park** (Schultz *et al.* 1999), which covers some seamounts close to Saba Island, pursues a range of goals from preservation of a wide range of marine values described in the management plan to providing opportunities for the development of tourism, diving in particular, local community integration, scientific research and education.

The management goals of the **Cordell Bank** National Marine Sanctuary (Anon. 1989, currently under review) also cover:

- Resource protection - given the highest priority, so all ongoing activities need to be compatible with this goal,
- Research - for improving the understanding of the environment resources,
- Interpretation - for broadening support by increasing the understanding, and
- Visitor use - which is encouraged as long as it is sustainable.

Whereas the two management plans above include the propagation of some human activities, both the Bowie Seamount pilot MPA and the Tasmanian Seamounts Marine Reserve primarily focus on the conservation, research and monitoring of the natural ecosystem. The draft management plan for the **Bowie Seamount** Pilot MPA (Fisheries & Oceans Canada 2001a) outlines a vision:

As an MPA, the Bowie Seamount Area contributes towards the protection and conservation of a representative shallow seamount ecosystem in the Northeast Pacific Ocean, with its dynamic marine ecosystem, unique habitat, specialised biota, regionally-valued commercial fisheries resources, high biodiversity and biological productivity.

Next to three more general objectives as defined in Canada's Oceans Act, the plan mentions three management objectives in detail, with current and planned management action being specified:

- Conserve and protect the unique habitat, biological productivity and diversity, and the commercial and non-commercial fishery resources in the Bowie Seamount area.
- Develop and implement a research and outreach strategy.
- Monitor compliance and the state of the ecosystem.

The draft management plan for the **Tasmanian Seamounts Marine Reserve** (Commonwealth of Australia 2002) details four overarching objectives focussing on the preservation of the reserve itself, research and on its contribution to a National Representative Network of Marine Reserves (ANZECC 1998) and the southern Tasmanian seamounts ecosystem. Only this management plan addresses the protected area as part of the wider ecosystem and possible network of protected areas. The management effected under the objectives is facilitated by a zoning scheme which applies the IUCN management categories.

7.1.2 Legislative authority for the plan

The range of associated legislative authorities should be addressed well in advance of the designation, because the legal power for individual aspects might rest with different institutions including some that are not involved in the MPA process directly.

If, for example, specific regulations for human activities are not defined in agreement with the responsible authority or legislation they might neither be accepted nor have any legally binding power. Therefore, it is necessary to clarify the position of all relevant authorities early in the process and to build consensus about the MPA and its objectives.

Addressing the legislative framework for a site and associated activities might also reveal that for certain activities no general rules have been established.

It is important to be aware of existing legal gaps. Strategies to fill these gaps, including voluntary commitments by resource users, need to be developed to minimise the risk of management failure with regard

to achieving the conservation goals and objectives. Legal gaps should not preclude an authority from designating an MPA, in particular if other legally non-binding management measures to regulate activities within or around an MPA may be possible. In addition, the MPA designation itself may be a tool to promote the development of the missing legislation. Once relevant laws and responsible institutions are identified, it is recommended to integrate the respective authorities into the further development process of the MPA.

The legislative international frameworks in the North-East Atlantic which set the stage for the designation of MPAs as part of representative and ecologically coherent networks of protected areas were introduced in Chapter 4 of this manual. As far as it concerns the Territorial Seas and the EEZs within the area, the legislative power rests with the respective coastal states although in case of the EU Member States there are supra-national policies and regulations such as the Common Fisheries Policy, which regulates fisheries of the Member States beyond the Territorial Seas.

Within the High Seas segment of the OSPAR Maritime Area, MPAs can be designated under Annex V of the OSPAR Convention on the basis of OSPAR Recommendation 2003/3 as described in Chapter 5 and further outlined in the OSPAR Biodiversity Strategy⁴⁰. Measures aiming at the conservation and management of human activities in a High Seas area, however, can presently only be implemented by different international global and regional authorities such as the International Seabed Authority (ISA), the International Maritime Organisation (IMO) and the North-East Atlantic Fisheries Commission (NEAFC). However, no High Seas MPA has been declared in the North-East Atlantic yet and no site-specific regulations of resource use activities have been defined in detail so far.

For a general overview of the present legislative framework and the allocation of responsibilities for different aspects like mining or fishing activities in the High Seas, the following three reports are recommended:

- The status of natural resources on the High Seas (WWF/IUCN/WCPA 2001)
- Towards a Strategy for High Seas Marine Protected Areas (Young *et al.* in Gjerde & Breide 2003)
- International Ocean Governance: Using International Law and Organisations to Manage Marine Resources Sustainably (Kimball 2001)

7.2 Site description

The site description should include the general natural characteristics and features of the site, its socio-economic significance, a state-of-the-art report on the existing legal and management framework and existing gaps of knowledge as they have been known or emerged while collecting information about the site. The IUCN plan model provides a comprehensive list of the individual aspects that should be included in the description of the site.

Information about a site should be collected with great care as this will form the basis for the development of goals and objectives for the site and respective management measures and regulations. The more detailed this description is the more specific management provisions can be drafted and additional information needs identified.

Sites nominated for inclusion in the OSPAR network of MPAs need to be described using the Proforma given in Annex IV of the "*Guidelines for the Identification and Selection of Marine Protected Areas in the OSPAR Maritime Area*". The information will be compiled in an OSPAR MPA database. A similar procedure is required for the nomination of Sites of Community Interest (SCIs) to the European Commission: the characteristics of a site given in a standard data format are collected and evaluated by the European Topic Centre.

As this manual does not serve the description of a particular site, individual aspects of a site description are not further discussed. Instead, in the following sections information and guidance is provided on how sites should be selected and how the respective information can be collected. In addition, existing and

⁴⁰ §4.4 of the OSPAR Biodiversity Strategy as revised in 2003, OSPAR 03/17/1-(A-B)-E Annex 31, Meeting of the OSPAR Commission, Bremen, 23 - 27 June 2003

potential use of seamount resources are presented including some information about the effects they have on the seamount ecosystem.

7.2.1 Site selection

Site selection implies that there is the choice among several sites of equivalent value and function. However, most often in the past and probably also in the future, the first consideration of an offshore area as a possible protected area starts off with some incidental scientific data, photographs or other reporting of unusual occurrences. Thus, the existing seamount MPAs are singularities and generally not considered as part of a functional ecological network. As scientific information on ecosystem functioning is scarce, this problem will probably continue to exist in the near future. **The New Zealand Seamount Management Strategy** (Brodie & Clark 2004) is a true exception.

What can be done towards a representative suite of sites is, however, a national and/or regional compilation and mapping of existing data on:

- Seamounts occurrence and distribution based on bathymetric maps
- Geological and physical, oceanographic information
- Any kind of biological information
- Type and extent of human activities

Guidelines on procedures for this type of assessment and selection process are presently being developed by the European Commission (Marine Experts Working Group, Habitats Committee).

It may be assumed that the ecosystems at and around seamounts differ depending on the overall bio-geographic area, the surface production regime, the current patterns, the depth of the summit (inside or below the euphotic zone) and topography. The results of the OASIS project will give some indications for this at the end of 2005. Consequently, a preliminary rough classification of seamount types, starting off with the bio-geographic zone, could be done based on existing data. From these, data availability will probably determine which seamounts will be further considered.

It is not clear yet to what degree similarities between seamounts occur.

Even neighbouring seamounts can have a completely different fauna at the same depth (Richer de Forges *et al.* 2000). It will therefore take some more research before one can determine a truly representative and ecologically coherent network of seamount MPAs, if the current theories and concepts developed for shallower waters can be applied at all.

In any case, network function characteristics like connectivity, larval dispersal patterns, stepping stone function for sedentary species and life history function for migrating species have to be taken into account and need to be investigated, also in the site selection process for individual sites.

For the collection of existing data, all stakeholders such as scientists, fishers, mining companies, recreation industry, coast guards and/or the navy should be contacted not only because they might be able to provide valuable information but also because such a process provides a first possibility to identify and integrate stakeholders relevant to the project. In near-coastal sites, the coastal or island community should be integrated into the process from early on as it may provide locally available knowledge.

Collecting new scientific data from seamounts is costly and time-consuming as it will usually require the use of ocean-going ships and highly specified gear. Therefore, data requirements should be well planned in advance. An efficient way of coordinating research needs is to first compile a preliminary list of goals and objectives for candidate sites, assess information needs and align further data gathering with them.

Departing from the information requirements listed in the IUCN management plan template (Figure 6, modified after WWF 2003, IUCN 1984), the following list specifies the most important information contributing to a status-quo site description and assessment for seamount ecosystems.

Physical oceanography
<ul style="list-style-type: none"> • Bathymetry • Hydrographic processes controlling the circulation, mixing and exchange of water at and near the seamount
Biological oceanography
<ul style="list-style-type: none"> • Chlorophyll distribution and primary production patterns • Standing stocks and production of the main fauna groups/key species (plankton, fish, benthos) • Food web dynamics / trophic pathways • Function for migratory species, e.g. turtles, mammals • Function for seabirds
Socio-economic information
<ul style="list-style-type: none"> • Actual activities • Prospective activities • Stakeholder inventory • Potential effects of MPA designation

In order to be able to determine appropriate boundaries for seamount MPAs, investigations should include, as far as possible, some of the surrounding deep-sea area. Whenever possible, ecological regions should be used for determining the set of MPAs required to represent the full range of ecological and functional diversity. A preliminary list of candidate sites should be based on ecological considerations. In a second step socio-economic and technical considerations should be integrated into the final selection of candidate sites. Based on the ecological and socio-economic description of a potential site, a first management proposal including possible objectives for the MPA should be drafted. The proposal will facilitate a more strategic assessment of information gaps and be a good basis for public discussion about the intention regarding a certain site. There is no rule about how many data are enough to justify the selection of sites. If there are several proposals, in general, there should be enough data to do at least a pre-selection of sites. It will not always be necessary to have data about all different aspects of the habitat and its association with the surrounding ocean as the information from comparable sites may be used

as a preliminary basis. Often expert judgement will provide a good basis for decision.

One of the most decisive factors will be the political will and commitment to put certain sites under protection. Some may be chosen for precautionary reasons; in other cases it might be the case that the fisheries resources are known to be overexploited.

Both, the OSPAR regime and the Natura 2000 give selection criteria for the identification of sites according to the overall intention to establish an ecologically coherent and well-managed network of MPAs (see the chapters 5.1 and 5.2 for further information on the procedures).

Otherwise, the list of selection criteria compiled by Kelleher (1999) and Salm *et al.* (2000) can be given as a guideline, which was developed in order to support the selection of a representative network of MPAs within one oceanic region.

Ecological Criteria	Social & Economic Criteria
<ul style="list-style-type: none"> • Biodiversity • Naturalness • Integrity • Dependency • Representativeness • Uniqueness • Productivity • Vulnerability 	<ul style="list-style-type: none"> • Acceptance • Recreational value • Conflict of interest • Education & research value • Cultural value • Economic benefits • Importance to fisheries • Tourism
Regional Criteria	Pragmatic Criteria
<ul style="list-style-type: none"> • Regional significance • Subregional significance 	<ul style="list-style-type: none"> • Urgency • Degree of threat • Size • Feasibility • Effectiveness • Restorability • Availability • Opportunism

7.2.2 Existing and potential uses

Any type of resource use in a protected zone should be regulated according to the conservation objectives for a site. Potential effects should be assessed before permission is granted to the resource user.

However, for certain activities it will not be necessary to assess their actual impacts on each MPA individually, but experiences will be transferable from comparable sites where the effects of a certain activity have already been addressed. In this sense, it is recommended to establish, at a very early stage of site management considerations, a list of existing and potential activities, their known and likely impacts on the natural features of the area and the respective management measures which are already in place.

In the following, different types of activities either known or likely to have an impact on seamount ecosystems are discussed and respective management measures from existing seamount MPAs are introduced.

Recreational uses

Most seamounts are submerged at larger depth and/or far offshore from the coast. Therefore recreational activities such as diving or recreational fisheries will generally not be an important factor.

Around the Azores, however, a number of seamounts in the vicinity of the islands come relatively close to the surface. For example, the management plan proposal for **Formigas Islets** and **Dollaborat Reef** foresees access only for diving, scientific investigations and passage of ships to the island. All other activities, in particular recreational fishing and collecting, including spear fishing, shall be prohibited because of the problems associated with surveillance of any other type of access regulation (Tempera & Santos 2003).

In most other seamount MPAs, recreational activities have not been addressed or they are classified as low priority because they are either occurring to a negligible extent or do not take place at all.

Where recreational activities are discussed, like in the management plan for the **Bowie Seamount Pilot MPA** or for the Tasmanian Seamount Reserve, these activities are generally permitted as long as they do not

cause irreversible damage and are conducted in alignment with the objectives of the MPA. In case of their occurrence, regulation will depend on the likely effects on the MPA (Fisheries & Oceans Canada 2001a, Commonwealth of Australia 2002).

Commercial uses

Fisheries

Many commercially valuable fish stocks are found around seamounts and fishing takes place at many of them. Globally, fishing represents the most intense activity around seamounts and poses the greatest threat to seamount ecosystems, species and habitats. Fish species of commercial interest around seamounts consist of surface aggregating species like tuna and swordfish, smaller pelagic mid-water species like alfonsino and seabream, and to a large extent demersal deep-water fish.

While the large tuna and swordfish species are threatened by the mere intensity of fishing, both pelagic mid-water species and benthopelagic deep-water species are particularly at risk because fishing usually exploits seasonal aggregations of these often locally restricted populations, thus impacting a much larger fraction of the populations.

Furthermore, deep-water species such as orange roughy (*Hoplostethus atlanticus*) or redfish (*Sebastes* spp.) that aggregate around seamounts and offshore banks are often characterised by a long life span, slow growth, late maturity and low fecundity, which makes them very sensitive to overexploitation (e.g. Morato *et al.* 2004). A recent report on the deep-water fisheries for orange roughy showed that in nearly half of the investigated cases fishing had overexploited the stocks, while for others the status of the stocks remains unknown (Lack *et al.* 2003).

Where commercially exploited, most deep-water fish stocks including those around seamounts have been driven outside safe biological limits within short time periods (ICES 2002, WWF 2003) mainly because of unsustainable fishing levels and the lack of a scientifically based stock management.

Since 1999, ICES has recommended an immediate reduction in fishing mortality in general, and annually

provided a stock-specific advice for the European Commission and the North-East Atlantic Fisheries Commission as responsible management authorities in the North-East Atlantic.

In addition to the direct impact on fish stocks, fisheries on seamounts can also have severe effects on the benthic fauna. One of the methods frequently applied in deep-water fisheries is bottom trawling, where the trawling gear may come into direct contact with the seafloor on the top and flanks of a seamount. Today, very heavy "rock hopper" bottom trawls, especially built for rough terrain, are used for deep-water trawling. The mere weight of the gear destroys the fragile epibenthic fauna when swept over the ground (Wattling & Norse 1998, Freiwald *et al.* 2004).

A study on the impacts of bottom trawling on benthic seamount communities by Koslow *et al.* (2001a) gave evidence for the devastating effect on *i.e.* the associated coral communities, which were effectively removed from their habitat. The effect can be seen in Figure 7.



Figure 7: Cold-water corals destroyed by bottom trawling
(© Jan Helge Fosså, Institute of Marine Research Norway)

The impact of deep-sea trawling on cold-water corals is believed to be so severe that ICES recommended the complete closure of reefs to deep-water trawling in European waters in 2002⁴¹. Moreover, there are indications for other fishing techniques such as long-lining and gill-netting to impact the benthic fauna as well. When the gear gets

lost or caught in the benthic structure formed *e.g.* by corals and sponges it can break up parts of the fragile bottom fauna or build permanent traps on the ground *e.g.* for demersal fish species (Freiwald 2004, Grehan *et al.* in press, ICES 2002, Morgan & Chuenpagdee 2003).

Examples of fisheries management:

As fishing is the most frequent activity around seamounts, pertinent regulations have been established in most seamount MPAs.

In the **Tasmanian Seamounts Marine Reserve** the area has been vertically zoned and different conservation measures defined for the two zones. The lower zone is closed to fishing while bottom trawling is prohibited in the whole reserve due to the sensitivity of the benthic fauna.

The horizontal boundaries of the reserve were chosen in order to minimise the risk of indirect impacts such as sedimentation caused by the movement of the bottom gear over the ground in the surrounding of the reserve (Commonwealth of Australia 2002).

Pelagic fishing in the upper zone down to a water depth of 500m has been identified as being without any long-term impact to the reserve and is therefore permitted (Environment Australia 2002). The pelagic fishery is regulated either by the national fisheries legislation or by a permit system under the national conservation law. Government and fishing industry are planning to work together in order to address by-catch and pollution issues in the reserve and to develop a sustainable stock management regime for the fisheries in the reserve.

Additionally, it is planned to investigate species interactions and the benthic communities partly to quantify the effects of the pelagic fisheries onto the lower zone of the reserve for the preparation of the next management plan for the reserve (Commonwealth of Australia 2002).

The rapid development of the seamount fisheries in New Zealand waters during the 1990s, and the increasing awareness of the nature of seamounts and the related effects of fishing was the main reason for the Ministry of Fisheries to develop a **Seamount Management Strategy for New Zealand**.

⁴¹ See ICES Press Release of 08.08.2002 under www.ices.dk

In developing this strategy, a first step was to close a representative sample of 19 seamounts to commercial trawling in 2001 in order to address the impacts of fishing on seamounts. As long-lining does not have a direct impact on the bottom fauna it is still allowed in the closed sites. Initially it was intended to regulate the closure via voluntary measures such as a code of practice for the fishing industry. Unfortunately the industry was not able to develop this and therefore the closures are implemented by regulations until suitable voluntary measures will be defined (Brodie & Clark 2004).

According to the first management objective of the draft management plan proposed for the **Bowie Seamount Pilot MPA, Canada**, to “*Conserve and Protect the unique Habitat, Biological Productivity and Diversity, and the Commercial and Non-commercial Fisheries Resources in the Bowie Seamount Area*”, fishing activities are allowed within the site as long as they will not result in damage, disturbance or alteration of the habitat within the area. Within the enclosed harvest refugium, fishing is generally prohibited.

The commercial sablefish fishery is the only active fishing activity in the area at present. The sablefish fishery is regulated through the Integrated Fisheries Management Plan for Sablefish which is part of the management for the offshore seamount fisheries under the national fisheries regime. The offshore seamount fishery is restricted to the use of passive fishing gear such as traps and hook and line gear (Fisheries and Oceans Canada 2001). Fishing vessels wishing to fish the northern seamount area submit a license amendment application. One vessel per month (May through October) is granted a license amendment based on a limited draw entry system. This license amendment requires the vessels to carry a vessel monitoring system (VMS) or a certified observer and to collect biological samples for research purposes regarding sablefish stock dynamics (WWF 2003).

Next to the commercial sablefish fisheries, there is also some scientific rockfish fishery taking place as part of the Fisheries and Oceans Canada research. This fishing activity is managed through scientific permits under the Fisheries Act (Fisheries and Oceans Canada 2001).

In the **Cordell Bank National Marine Sanctuary, USA**, fishing is the most important human activity but no site-specific management plans have been developed until recently. Both commercial and recreational fisheries are regulated by the groundfish and salmon fisheries management plans prepared by the Pacific Fisheries Management Council (Anon. 1989).

Within the current review of the management plan for the sanctuary, a working group has been established to address fishing activities with the intention to better understand their impacts on the sanctuary and to define fishing activities that are compatible with the sanctuary goals and ecosystem health. In order to translate their findings into management actions, a working relationship with the Pacific Fisheries Management Council will be established in the future (NOAA 2003).

Mining

So far, mining is not a prominent threat to most seamounts as exploitation in other regions is still more profitable. However, this might change in the future if exploitation techniques evolve and other resources decrease (WWF/IUCN/WCPA 2001). Preliminary investigation for manganese crust mining and associated environmental impacts have already been conducted *e.g.* at Cross Seamount close to Hawaii (Grigg *et al.* 1987).

The exploration and exploitation of petroleum and mineral resources is always accompanied by disturbance of the benthic and pelagic communities including acoustically sensitive fauna, and pollution of the water column. Impacts can sometimes cover a large area. Oil, gas and mineral mining are considered as destructive and ecologically unsustainable activities and thus contradict the declaration of a particular site as a protected area.

Examples of mining management

Mining operations are prohibited in the benthic zone of the **Tasmanian Seamounts Marine Reserve, Australia**, in accordance with its status as Highly Protected Area under the IUCN categorisation system.

Also in the **Bowie Seamount Pilot MPA, Canada**, activities that damage, disturb or alter the habitat, such

as non-renewable resource exploitation and extraction are planned to be generally prohibited within the site (Fisheries & Oceans Canada 2001a).

In the **New Zealand Seamount Management Strategy**, human impacts other than fisheries are not covered by the MPA management provisions because the responsible institution, the Ministry of Fisheries, does not have authority about other activities, such as mining. Therefore, no site-specific mining regulations have been defined within the strategy. But the Ministry has undertaken initiatives to ensure that compatible measures are taken by other government agencies (Brodie & Clark 2004).

Within the scope of the management plan for the **Cordell Bank National Sanctuary, USA**, no definite regulation has been put in place concerning mining activities for the zone below 91m water depth, despite two different alternatives being discussed. Mining was considered to have a low priority because it was neither undertaken at that time nor planned within the next few years within the area.

In consideration of this fact, the preferred alternative was to identify the National Oceanic and Atmospheric Administration (NOAA) as the regulating body which would evaluate potential mining plans. In case that permission would be granted, this could then include an obligation for scientific monitoring. Additionally, NOAA would be able to implement emergency regulations in the case of risk or damage to the sanctuary.

The second alternative would constitute a general prohibition of any oil and gas related activity within the Sanctuary (Anon. 1989).

In the current review of the management plan, mining is not under discussion, as far as known to the author.

Research

Scientific research and survey is a precondition for MPA designation, as the scientific data form the baseline for:

- Site selection
- Assessment of conservation status
- Definition of conservation goals and objectives

- Definition of boundaries and zoning schemes
- Elaboration of management measures
- Monitoring
- Measurement of management effectiveness

Once an MPA is established, continuing basic research, supplemented by directed research requests, should describe the temporal development of the associated ecosystems, give indications for the success and effectiveness of the management measures taken and, in harvest refugia, deliver indications for the natural state and variability of the ecosystem. Thus research will:

- Increase knowledge about the site
- Serve to improve management measures
- Serve to adjust the conservation objectives
- Provide indications for reference sites
- Be a potential source of income to the MPA
- Increase publicity around the MPA and similar features

Academic scientific research is not regulated actively. However, while research in an MPA needs to be carried out independently it should nonetheless be coordinated in order to reduce disturbance to the site *e.g.* from extractive research activities. Additionally, research coordination will reduce the risk of different research projects interfering with each other. Effects of incompatible activities can be minimised, for example by spatially separating sites for long-term monitoring studies from research activities or other activities which actively modify or influence the natural processes.

Depending on the type of MPA, research may be regulated in either site-based or activity-based manner. Especially fisheries-related investigations such as on stock dynamics can be regulated by the type of fisheries and its respective national/international agreements instead of being coordinated by the MPA authority. However, the MPA authority should always be consulted before research takes place.

As general measures for the regulation of research activities, *inter alia*, the following are available:

- Access authorisation process
- Permit system
- Code of conduct

Access authorisation processes or permit systems are usually developed and implemented by the management authority for the MPA.

A code of conduct, however, could either be recommended by the management authority of the MPA or elaborated on a voluntary basis by the scientific disciplines and institutions. An example for the latter is the voluntary code of conduct for scientific activities at and near hydrothermal vents by InterRidge, an international, science-coordinating organisation (Dando & Juniper 2001).

In all existing seamount MPAs, scientific data have been the impetus behind their designation, either because data indicated a rich and unique biodiversity in the area or because scientific observations showed unsustainable exploitation of seamount resources *e.g.* deep-sea fish.

Research is allowed in all existing seamount MPAs and usually promoted as an important part of current and prospective management objectives and activities.

Examples of research management

In the **Tasmanian Seamounts Marine Reserve**, scientific surveys of the southern seamount area (Koslow *et al.* 1994) were the reason for closing an Interim Protected Area of 15 unfished seamounts to the fisheries for further investigations in 1995. Subsequently, a three-year research programme was initiated in order to evaluate the conservation significance of the seamounts.

Based on these results, this area was declared the Tasmanian Seamounts Reserve in 1999 and a respective management plan was elaborated. Part of the plan is to develop a research and monitoring programme together with research institutions and other stakeholders using non-invasive research techniques. It is intended to further increase scientific knowledge about the site, *i.e.* in terms of the relationships between the two distinguished vertical zones, and to assess the performance of the full set of management measures (Commonwealth of Australia 2002).

In the **Bowie Seamount Pilot MPA**, scientific information drawn from various resources built the basis for the declaration of the Bowie Seamount as a pilot MPA in 1998. The lack of specific knowledge

about the seamount was taken into account but did not hinder the initiation of the designation process. Following the declaration, an ecosystem overview was compiled in order to form a basis for developing management strategies, objectives and activities during the subsequent and continuing consultations towards considering regulatory designation.

At present, the only regulated research activities are the regular stock assessments conducted under the authority of Fisheries and Oceans Canada (Fisheries & Oceans Canada 2001a) in this area. Within this framework, fishing vessels are required to collect biological samples for research purposes while fishing in the seamount area (WWF 2003). Following the provisions under Canada's Oceans Act, the development of a research strategy is envisaged in the ongoing process of the elaboration of a management plan for the MPA itself. The objectives for this strategy will be to increase the understanding of the seamount as an ecosystem, the influence of permitted activities in the area and consequently to evaluate the use of harvest refugia as a fisheries and resource management tool. Multidisciplinary research projects focussing on the understanding of ecological, cultural and research management aspects around seamounts will be encouraged (Fisheries & Oceans Canada 2001a).

The management plan for the **Cordell Bank National Marine Sanctuary** is currently under review connected to the management review of the two adjacent sanctuaries, Gulf of the Farallones and Monterey Bay. In the past, research and monitoring have had a high priority in the previous management regime and hence will continue with a focus on the development of a coordinated and integrated research programme and the development of a long-term monitoring plan.

The specific research objectives will be (NOAA 2003):

- Collection of oceanographic baseline data
- Assessment of human impacts
- Incorporation of research results into the outreach and education programs
- Encouragement of information exchange among respective agencies and institutions

So far, the management body of the sanctuary has prepared an annual Sanctuary Research Plan, integrating interested scientists and their respective ideas and research proposals. The plan monitors the progress of research to ensure that scientific activities are directed to the resolution of management issues and concerns.

In addition, funding has been available via the management body for a number of projects to promote investigations of priority concerns. In case research proposals include activities which are prohibited within the sanctuary, a permit is required (Anon. 1989).

Within the framework of **New Zealand's Seamount Strategy**, research has been an important element in the development and future planning of the strategy. Scientific projects were funded by the government to investigate the distribution, ecology and functioning of seamounts and related fishing impacts in the New Zealand EEZ. Since the closure of 19 seamounts to fisheries in 2000, research activities have concentrated on these closed seamounts to collate further relevant information for designing a network of representative seamount MPAs (Brodie & Clark 2004).

The **OASIS project** itself is not part of an existing or planned management system for a seamount MPA.

However, it should be briefly mentioned here as a good example for a holistic, multidisciplinary research project whose different scientific results will form the basis for the design and management of the areas as envisaged for the seamounts under study.

Bioprospection, the collection of samples for commercial purposes such as the development of new drugs or industrial products is a growing field in the deep-sea, too. For example, deep-sea coral and sponge species are explored for new drugs against heart diseases and asthma.

Several expeditions have brought promising results leading to the discovery of new compounds with a high medical potential *e.g.* for antitumor agents or pain killers and the issuing of new patents (Wright 2002 in NOAA Ocean Explorer, Faulkner 1992 in NOAA 2003).

The extent of research activities with an emphasis on bioprospecting and their impact on seamount ecosystems is not known and has not previously been discussed in the existing or proposed management plans for seamounts. Impacts might be negligible as actual field sampling for bioprospection is usually small-scale as long as the interesting chemical compounds can be reproduced in the laboratory.

Still, regulation measures like a code of conduct and an access authorisation process are recommended as for other types of research in the previous chapter. The collection of data and/or samples needed for site monitoring could be a mandatory part of such regulation measures. Moreover, as long as it is in alignment with general provisions given for genetic resources and their use as defined for national waters under the CBD⁴², permission for bioprospection within an MPA could be used as a source of income *e.g.* via license fee schemes.

7.3 The plan

7.3.1 Goals and objectives

As for every MPA, the objectives should be formulated as precisely as possible, with reference to their potential for realisation within a set time-frame. They should be precise outcome-oriented goals with an achievable strategy behind them, such as the rebuilding of a certain fish stock within a given period of time based on the population dynamics of this species (Vanderklift & Ward 2000).

The “conservation of natural processes and biodiversity”, for example, is not an objective but possibly an overall strategic goal of an MPA which would be described under ‘Purpose and scope of plan’ in the introduction chapter. In case the time period to meet an objective exceeds the life time of a management plan, it is advisable to define subsidiary targets that can be evaluated at the end of a planning period.

Good examples for objectives for a seamount MPA are the ones that have been developed for the **Tasmanian Seamounts Marine Reserve** and the **Bowie Seamount**

⁴² CBD Article 15 (see www.biodiv.org)

Pilot MPA. In both cases, overarching management goals were defined together with respective detailed management prescriptions, strategies how to reach the goals and indicators to evaluate the efficiency of the developed management tactics.

An example from the management plan for the **Tasmanian Seamounts Marine Reserve** is shown in the table below.

Table 9: Management plan for the Tasmanian Seamounts Marine Reserve	
Strategic objective	<ul style="list-style-type: none"> • Protect the unique and vulnerable benthic communities of the seamounts
Management goal	<ul style="list-style-type: none"> • Protect the benthic ecosystems of the reserve from adverse human impacts
Management prescriptions	<ul style="list-style-type: none"> • Fishing and mining are prohibited in the benthic zone
Management strategies	<ul style="list-style-type: none"> • Educate users of the conservation values and location of the reserve • Develop enforcement strategies • Monitor efficacy of protection through a follow-up survey
Indicators	<ul style="list-style-type: none"> • Indicators for benthos health • Water quality/turbidity • Vessel movement

7.3.2 Management tactics

Advisory committees

Advisory committees are a vital element for the management of MPAs covering a range of components such as advising on objectives for a site, enforcement strategies, as well as reviewing progress and evaluating management effectiveness.

In addition, advisory committee members can provide useful information and facilitate contact with the outer expert world *e.g.* by initiating workshops to address certain issues, or providing relevant literature to the administration of the MPA. An advisory committee should be established prior to or during the MPA site planning process and supported and empowered by adequate legislation as well as a budget for the organisation of regular meetings. Members are usually appointed by the MPA administration for a set time period between two to three years. Candidates for such

a committee are eligible from all relevant stakeholder groups such as science, industry, environmental organisations and governmental bodies.

The actual composition of the committee should ensure an even representation of all the different groups of interest and be limited to a set number of people.

Experts such as managers from other offshore MPAs can have a useful role in an advisory committee. When necessary, temporary sub-committees can be established in order to address particular aspects of the MPA which cannot be covered by members of the committee.

Depending on logistics and practicability, advisory committees can be established either for an individual site or for several MPAs.

A good example for an advisory committee for an individual site is the Management Committee as described in the Draft Management Plan for the **Bowie Seamount Pilot MPA** (Fisheries & Oceans Canada 2001a). The committee consists of six members, including representatives from the MPA administration and relevant stakeholder groups such as conservationists, traditional users and governmental institutions.

The functions and responsibilities of the committee are described as follows:

- Provide input towards the development of programmes, processes and priorities in support of the management objectives for the MPA.
- Identify and evaluate emerging or critical issues involving the use of resources found within the MPA and serve as a liaison from non-governmental sectors to Fisheries and Oceans Canada managers regarding the impact of Bowie Seamount Management.
- Review proposed plans for research and other activities within the MPA and provide timely advice to Fisheries and Oceans Canada managers regarding the appropriateness of the activities and any recommended conditions regarding them.

- Identify educational opportunities that could potentially increase public knowledge and understanding of the MPA.
- Provide advice to Fisheries and Oceans Canada on the development and evaluation of the management plan for the MPA.
- Participate in scheduled, open, public meetings, to provide input on all of the above issues.
- Meet annually (or as required) to review applications for research and other activities within the MPA and to review progress made by the government regarding other aspects of the management of the area and of information derived from it.

Interagency agreements (or arrangements with private organisations, institutions or individuals)

Due to the remote character of offshore MPAs, the lack of scientific knowledge regarding their natural features and the often complex legal situation, it is unlikely that one agency alone will have the full range of responsibility or capacity to establish, manage, monitor and enforce an offshore MPA. The success of an MPA to reach its conservation goals will therefore depend on collaboration, cooperation and partnerships with relevant governmental or non-governmental institutions (after Gubbay 1998).

The following list (after Kelleher 1999) gives an exemplary overview of benefits that can emerge from this kind of agreements:

- Reduction of enforcement and monitoring costs
- Increase of public awareness
- Greater compliance with the MPA regulations
- Decrease of stakeholder conflicts based on better knowledge and sense of responsibility
- Decrease of external interest in resource exploitation due to stakeholder alliances

Management and monitoring will be complicated to implement as they will partly require very expensive and specific gear which might not be available or affordable for the administrative body.

Consequently, cooperative agreements with institutions such as the Coast Guards, the Navy, research centres or the industry can be recommended as these are the most likely to having the adequate resources to conduct monitoring or enforcement activities in the open ocean and/or the deep sea.

Cooperation may also promote the evolution of common interests, and as a consequence facilitate the implementation of data and sample collection requirements feeding into the monitoring of ecosystem health or fish stock dynamics within the MPA.

An example is the sablefish management regime around the Bowie Seamount. In this fishery, the issuing of a fishing permit is connected with the requirement to collect biological samples regarding stock dynamics (WWF 2003).

Boundaries

Defining boundaries for an MPA is an important step in the development of the management regime. The ecological delimitations, including its sphere of influence and exchange with the adjacent ocean and/or the associated species under concern should be used as the priority criteria when delineating boundaries for an MPA. However, in reality there will frequently not be enough scientific data to determine the ecological boundaries of a seamount as an ecosystem or its associated species. But a seamount is a distinct topographical feature and there is likely to be data about its geographical extension.

This will allow seamounts to be located and their spatial limits determined for the definition of preliminary boundaries until further information is available.

In addition, existing information about comparable seamounts from elsewhere can be used to define preliminary boundaries.

For the **Tasmanian Seamounts Marine Reserve**, ecologically sound boundaries could not be defined when the reserve was established in 1995 because respective scientific data had not yet been collected. Instead, preliminary boundaries were defined,

encompassing 15 pristine seamounts that were known to be too deep for present fishing methods.

After a following three-year research period, these interim boundaries were confirmed in 1999 allowing the description of the ecosystem to be finalised. The current boundaries are mainly based on localised benthic observations with the intention to minimise potential impacts from legally occurring trawling in the surrounding area of the reserve (Commonwealth of Australia 2002).

For the **Bowie Seamount Pilot MPA**, observations from other seamounts chains, which indicated their function as 'island-groups' supporting a single ecological community, were used as the basis to develop preliminary boundaries advocating the inclusion of the two neighbouring seamounts, Davidson and Hodgkin's seamount. Those were included although no ecological data existed that could prove the ecological coherence between all three sites at the time when the boundaries were defined. In order to facilitate the management of the MPA, the boundaries were delineated in a fairly regular rather than a convoluted shape as the form of the seamounts would have suggested (WWF 2003, Fisheries & Oceans Canada 1999).

The management plan proposal for **Formigas Bank** (Tempera & Santos 2003) aims at establishing a marine reserve in an area of 16*12nm delineated by straight boundaries and encompassing the respective banks and the surrounding deep sea to depths of 2000 m.

As discussed earlier, ecological considerations should also have priority for the delineation of MPA boundaries. Still socio-economic and feasibility aspects will also have to be taken into account, as well as input and suggestions from stakeholders.

An example list of relevant aspects to be considered for boundary delineation is as follows:

- Ecological boundaries
- Socio-economic interests & activities
- Objectives for the MPA
- Type of MPA
- Manageability
- Enforcement
- Monitoring

The definition of various options for boundaries can be used to balance ecological and socio-economic needs in a sustainable way.

Different boundaries options were examined in relation to faunal distribution and management logistics for the **Cordell Bank National Marine Sanctuary**. Eventually, the largest option was chosen with the bank in the centre and an extensive buffer zone around it as it was determined this would provide the best conservation effect (Anon. 1989).

Modifications of the boundaries are being evaluated now as part of the ongoing review of the management plan. A working group will identify and analyse different boundary options via literature review, biogeographic information and research needs assessment. Criteria for the modification of the boundaries are based on the potential to improve the fulfilment of MPA objectives such as conservation, sustainable use of the marine environment, public education and scientific research (NOAA 2003).

Zoning plan

Seamounts usually cover a large area and cross several depth zones in the water column, which may range from depths of several 1000 m to a few meters below the sea surface.

Thus the seamounts considered as MPAs will often encompass a large variety of ecological zones, species and habitats with different conservation needs and existing or prospective human activities that might interfere with each other or with conservation objectives of the MPA.

Zoning within an MPA is a common method to reduce user conflicts and their impact on the area and to address individual conservation needs of different habitat types and species. The subdivision of an MPA should be determined by means of a zonation plan where the different areas and their respective objectives and permitted activities are defined. According to IUCN (Kelleher 1999, Salm *et al.* 2000) the main objectives of a zoning plan can be summarised as follows:

- To separate incompatible human activities.
- To protect the natural and/or cultural qualities

of the MPA while allowing a spectrum of reasonable human uses.

- To reserve suitable areas for particular human uses, while minimising the effects of those uses on the MPA.
- To establish a core conservation area (*i.e.* for sensitive areas, critical habitats of threatened species or special research areas) as sanctuaries where disturbing uses are prohibited.
- To facilitate the set aside of damaged areas to recover.

Similar to the actual selection of MPA sites, the zonation should follow a number of subsequent steps:

- Information gathering concerning the biogeography of the area and associated human activities
- Mapping of the area according to conservation objectives, sensitivity and human activities
- Drafting of a zonation plan
- Public participation and/or consultation
- Review of the draft
- Finalisation of the plan

(Modified after Kelleher 1999):

Zoning means that different parts of an area can be set aside for different purposes. IUCN (1994) usefully defines 6 categories between strict nature reserves (1a) and managed resource protected area (VI) which will help design the necessary management measures.

A **vertical zoning** scheme was used for the **Tasmanian Seamounts Marine Reserve**. Here the MPA is divided into two vertically stratified zones. In accordance with the primary goal of the reserve to protect the benthic environment, the lower zone (500m down to 1,000m below the sea surface) was designated as a Highly Protected Zone (IUCN category Ia) where fisheries and mining operations are prohibited and research is regulated via a permit system.

The upper zone, reaching from the sea surface down to 500m received the status of a Managed Resource Zone (IUCN category VI) where certain fishing activities are allowed (Commonwealth of Australia 2002).

A **horizontal zonation** is under evaluation at the **Bowie Seamount Pilot MPA**. Conservation of the ecosystem and its different components including the fisheries resources is the overarching goal for the site. Therefore, a harvest refugium shall be included in the MPA where only research might be permitted.

Various options regarding dimension and location of this no-take zone within the MPA are under discussion, reaching from enclosing the 200m isobath of Bowie, the whole of Bowie Seamount, over including the two other seamounts as well, to encompassing the whole MPA (Fisheries and Oceans Canada 2001).

Regulations

Regulations are a common way to manage human activities within an MPA in order to minimise the human impact by prohibiting unsustainable activities and to temporally and spatially control the extent of others.

Regulative measures are for example:

- Gear restrictions
- Area closures
- Catch/extraction limitations
- Codes of conduct
- Permission/licensing schemes

Beyond the control of activities within an MPA, enforcement and monitoring can be improved or supported by regulations if the permission for a particular activity is combined with obligations like:

- Observer presence
- Data/sample collection
- Data and information provision for MPA data base

In chapter 7.2.2 on “*Existing and potential uses*”, examples of activity regulations in existing seamount MPAs are provided which illustrate how enforcement and monitoring activities can be integrated.

Incentives

Incentives are another way to regulate activities. Especially when the legal framework for regulations is

missing, they might be an alternative option to manage activities within the area. But it has to be kept in mind that they function on a voluntarily basis, which means stakeholder support for the MPA will be of utter importance. Moreover, they will create extra costs that need to be included in the planning process well in advance. In general, incentives are rather unsuitable as a means to manage activities in the long-term but might be a possibility as a short-term or interim measure.

Social, cultural, and resource studies plan

Management effectiveness will strongly depend on the quality and availability of environmental and socio-economic data about the site as well as human activities taking place, as this information forms the basis for the development of management objectives and strategies.

While existing knowledge gaps will be assessed in the description of a site, study plans need to be set up in order to identify the information required to fill these gaps and to develop strategies how this information can be obtained via research and monitoring activities (Salm *et al.* 2000).

As mentioned before, data collection, such as on the environmental status of an offshore MPA and associated impacts of human activities will be difficult and cost extensive. It is therefore advisable to seek possibilities for cooperation with other institutions or to publish research calls for scientific aspects that need to be addressed and might exceed the capabilities of the MPA management.

In this respect, the design of a database for storing and sharing information is an important consideration.

Websites, which are a useful tool for public outreach and education, could be used as a gateway to the information base available to decision makers, stakeholders and MPA users, and as a platform where *e.g.* research calls or changes in the access regime can be announced. For further information about online databases please refer to the section on *Information management*.

Resource management plan

When species or minerals, for example, are commercially exploited, they are commonly defined as

a natural resource. In order to use them sustainably, a resource management plan should be formulated as part of the MPA management plan.

Based on the status of the natural resources of the site and the effects of associated activities, strategies should be developed under which specific management actions are defined in order to maintain the natural resources at a favourable conservation status and in alignment with the overall goals and objectives for the site (modified after Salm *et al.* 2000).

Examples on how this can best be done can be found in the chapter on “*Existing and potential uses*” where activities are described together with management approaches as they have been chosen in existing seamount MPAs.

Education and public awareness

Individual perception of natural values and conservation needs depends on the personal interest in the environment and components thereof, as well as the knowledge about it in terms of its ecological function, sensitivity and resilience. The increase of environmental awareness of stakeholders, decision makers and the wider public can be an important tool to improve the general support for conservation and therefore help achieve the MPA’s specific conservation goals.

Next to awareness building, public education can also be a tool to increase the level of compliance with site regulations, minimise impacts and promote cooperation and other kinds of support for an MPA.

Due to the remote location of offshore MPAs, some of the commonly used tools for awareness building and education, like guided tours in the area will not be suitable. Hence the focus has to be on finding possibilities how to bring the information to the people not *vice versa* (after Gubbay 1998). Good locations for providing information will be aquaria, museums, research institutes or schools, as well as places which are frequented by the main user groups.

Presentations *e.g.* for stakeholders, school classes and other interested groups are another way of spreading information about an MPA to a wider audience.

Activities for education and awareness building in relation to an offshore site are likely to address people from a wide spatial range. Electronic media like the internet are a suitable option in this respect. A webpage can be used to give people general information about natural features of the site, as well as reasons and objectives of the MPA designation and the associated measures.

Pictures and video footage can be used to show wildlife and habitat of the deep sea that most people will never be able to see on their own behalf. An electronic newsletter can be used to update information.

For the existing seamount MPAs, the development of education and public outreach programmes has been stated as one of the objectives for the site.

The **Tasmanian Seamounts Marine Reserve** has developed a communication strategy working closely with stakeholders to ensure that resource users are aware of the reserve and conservation objectives (Commonwealth of Australia 2002). Indicators for the strategy were identified as:

- Number of publications
- Frequency of website and pamphlet updates
- Effectiveness indicators, *e.g.* public response, website links

At the **Bowie Seamount Pilot MPA**, the development of an outreach and education program will focus on financial granting agencies and researchers. This shall build cooperation with researchers and funding agencies to support the achievement of goals and objectives of the management plan for the MPA. In addition, outreach projects will engage schools, educators and the general public either via direct or virtual involvement (Fisheries & Oceans Canada 2001a)

Potential projects are given as:

- Development of lesson modules for delivery by educators in the classroom environment
- Development of interactive online information sources with material pertaining to the MPA
- Development of display materials, videos or other information resources of an education and outreach nature

In the Azores, the proposed management plan for the **Formigas Bank** (Tempera & Santos 2003), in concert with the other designated marine protected areas of the archipelago (Special Areas of Conservation SACs under the EC Habitats Directive), details next to a wide range of information materials also the installation of an exhibition centre and regular meetings and events organised with stakeholders and children. It is proposed to get feed-back from the population and users by means of a questionnaire.

Information management

A large variety of information about the site, its biotic and abiotic environment and *e.g.* human activities will need to be compiled. In order to be able to structure and update the information, it should be organised in an MPA data base. Preferably, as much information as possible should be geo-referenced and plotted on maps, *e.g.* by using GIS technology. Maps are an important tool for communicating complicated messages to a wider audience. Overlay maps are particularly useful to illustrate cumulative site-based facts such as the co-occurrence of a particularly vulnerable habitat with several human activities.

As mentioned before, MPA authorities and stakeholders are likely to be located in different places. In order to make an MPA data bank accessible to everybody it concerns, it is thus recommended to connect it to an MPA webpage. Via the establishment of an intranet access to information, resources can be limited to a defined group of people in case this would be necessary. A webpage also provides the possibility to publish general information about the site like changes in conservation measures or research calls for scientific projects to collect MPA relevant data and to link to other information sources in relation to the site.

A good example in this respect is the planned Information Centre for the **Endeavour Hydrothermal Vent MPA** (Fisheries & Oceans Canada 2001b).

When information about the vent field was collected it appeared that information about the vent field was maintained isolated in different locations typically containing data about a broader context than that relevant to the vent field and its management. The

objective for the centre is to bring together existing information and filter it for its relevance regarding the vent field MPA.

The aims of the Information Centre are:

- Inform researchers planning on carrying out activities in the MPA.
- Provide resources for education and outreach initiatives.
- Provide complete and detailed descriptions of marine resources including their condition and trends over time.
- Allow for the advancement of research in the area through information sharing, cooperation, and reduce duplication of research.
- Identify research gaps, providing guidance for further research in the area.
- Provide a repository for confidential information submitted by researchers as part of the authorisation and cruise reporting process.

Regarding digital databases about seamounts, the existing online information system ‘**SeamountsOnline**’⁴³ should be mentioned here. SeamountsOnline is a web-based dynamic online source of information on seamount ecosystems worldwide. Scientists, managers and other people can contribute to and search the data base for information regarding species distributions, undertaken sample efforts at seamounts and existing literature on seamounts and related aspects (Stocks 2004).

7.3.3 Administration

The administration of an MPA has to ensure that strategies and activities in relation to the site are implemented according to the goals and objectives for the MPA.

This responsibility can include tasks like:

- Coordinating and/or implementing management activities
- Revising and updating management plans

- Addressing logistical requirements including human and financial resources
- Undertaking or directing surveillance and monitoring activities

Individual aspects of administration should be described as precisely as possible in a management plan so that involved parties are fully aware of their tasks and responsibilities, misunderstandings can be minimised and obstacles to management and enforcement can be better identified and addressed.

In contrast to coastal MPAs, an offshore MPA will probably have only a few users like the fishing industry or scientific researchers visiting the site on a low frequency, which means an individual administration on a permanent basis is probably not necessary. Moreover, an offshore site is difficult to access and/or to monitor therefore requiring either extensive logistical tools or cooperation with other agencies and/or institutions as mentioned before.

It might be more advisable either to create an administrative body responsible for all offshore MPAs within a region or juridical unit or to integrate an offshore MPA as a whole or at least its administrative requirements in the framework for an existing MPA within the same area.

An example for the latter approach is under discussion for **Davidson Seamount**. This seamount is situated about 45nm off the Californian coast and about 15nm outside the boundaries of the Monterey Bay National Marine Sanctuary (MBNMS).

As Davidson Seamount does meet with several sanctuary designation standards its respective designation is under discussion for inclusion within the existing MBNMS as one possible boundary option. If this option is chosen, the MBNMS administration would take care of Davidson Seamount by developing an individual action plan for the seamount but without establishing an own permanent administrative unit for the site (NOAA 2001⁴⁴).

⁴³ <http://seamounts.sdsc.edu>

⁴⁴ <http://oceanexplorer.noaa.gov/explorations/02davidson/background/missionplan/plan.html>

In Canada, the overall administrative responsibility for the two pilot offshore MPAs Endeavour Hydrothermal Vent Field and **Bowie Seamount MPA** rests with the National Authority, Fisheries & Oceans Canada. For both sites, Fisheries & Oceans Canada is supported by a Management Committee composed of stakeholders of a range of governmental and non-governmental agencies.

The main task of the committee is to give advice on management and also execute management activities such as to review proposals for research and other activities within the sites and to evaluate management effectiveness for the MPAs (Fisheries & Oceans Canada 2001a). An overview of the tasks of the Bowie Seamount Management Committee is given in Chapter 7.3.2 on *Advisory Committees*, as an example.

Budget and business plan, finance sources

Financial planning is an essential element of the MPA planning process because lack of sufficient financial resources is often the main reason for MPAs failing to reach their conservation goals (Salm *et al.* 2000). Therefore, available and potential financial resources vs. the estimated costs of the MPA should be assessed early in the process in order to identify the most suitable funding options for short, medium, and long-term needs (IUCN 2000).

Most costs associated with MPA management should be covered by the responsible authorities. For seamount MPAs in the North-East Atlantic this would be the respective government and their agencies in most cases. However, certain activities like monitoring of ecosystem health, research projects and or education programmes to increase the knowledge about the site might either not be covered by this budget or exceed the available financial resources.

Expenditures for investigations to improve the understanding of the seamount ecosystem and its reaction to human interventions will be a vital element for the effectiveness of an MPA and should not be prevented by budget limitations. It is a regular part of MPA management to minimise costs and to identify further financial resources where required. A good option for offshore MPAs to minimise costs will be cooperations and interagency agreements.

Following a business approach to financial management one option to raise further revenues for the MPA can be to identify the goods and services it provides and use their ecological and socio-economic value as a source of income for management and establishment costs as they are not covered by the national budget (WWF 1999, IUCN 2000, Spergel & Moye 2004).

At site level, direct uses such as fishing, bioprospecting and research activities can be combined with license fees and/or the requirement to take over certain activities like monitoring of stock dynamics (IUCN 2000).

For intrinsic values of seamount ecosystems such as the habitat function or the importance for biodiversity in general and the linked MPA, it is more difficult to create financial compensation mechanisms. At national level, taxes, however, might be an option here as they are already commonly used *e.g.* in context of terrestrial wildlife conservation (Spergel 2001).

Donations or grants from private foundations or NGOs can also be a valuable source of income, which can either facilitate single short-term projects or, when a trust fund is set up for example, provide a sustainable long-term resource for the MPA management (IUCN 2000, Spergel 2001). In order to use these sources, parts of the public awareness programme can be focused on raising revenues and/or funding proposals for specific projects can be developed for example.

7.3.4 Surveillance and enforcement

The main purpose of surveillance and enforcement of an MPA is to increase compliance with the MPA regulations and laws. The lack of an efficient enforcement programme is often the main reason for an MPA to fail its conservation goals as restricted or forbidden activities take place without control or penalties for infringements. Therefore, enforcement will be a key factor for the success and the credibility of the MPA (after Sutinen 1988 & Gubbay 1998).

Common surveillance tools for MPAs are:

- Air patrols
- Sea patrols
- Onboard observers
- Harbour inspections
- Vessel permits
- Satellite monitoring (VMS)

Due to the remote location, cooperation with other agencies or the integration in an existing system of surveillance and enforcement has been used in existing seamount MPAs. For the enforcement of fishing regulations for the **Tasmanian Seamounts Marine Reserve** for example, cooperative arrangements with National Coastwatch and Defence Forces were set up to monitor fishing activities in the Reserve. Infringements of the provisions for the MPA are sanctioned by penalties under the Environment Protection and Biodiversity Conservation Act (1999)⁴⁵.

In a similar way, enforcement of the **Bowie Seamount Pilot MPA** will be integrated in the existing surveillance structure for Canadian waters enforced by Fisheries and Oceans Canada, the Department of Foreign Affairs and International Trade and the Canadian Department for National Defence. This includes, among others, routine coast guard patrols, aerial surveys and a foreign vessel clearance request process including onboard observers and post-cruise reports. In case vessels of interest are identified during these routine surveys, more directed enforcement activities might be conducted on request of the MPA authority (Fisheries and Oceans Canada 2001).

Due to the size and geographical settings of an offshore MPA it is, however, rather unlikely that surveillance will ensure direct observation of all MPA infringements and facilitate comprehensive control of illegal activities. Therefore, most MPA plans include the objective to increase compliance with the conservation measurements in order to reduce the risk of infringements (Gubbay 1998).

A good strategy to increase compliance is awareness building with respect to the conservation measures of the MPA (see the section on *Education and public awareness*) and the direct involvement of stakeholders and other users in the MPA designation process, its enforcement and monitoring. Stakeholder approaches have been successful in many MPAs (Salm *et al.* 2000). However, it should be noted that most of these MPAs have been coastal MPAs, which differ significantly in type of stakeholder groups, interests and relations to the MPA and general characteristics of the site like its accessibility.

Penalties are another possibility to increase compliance. In order to reduce the number of infringements effectively they should be calculated based on the possible benefit an illegal activity would provide.

It may be assumed that the threshold to breach the rules will be higher if penalty exceeds the actual benefit of an infringement. However, penalties can only be effective in combination with surveillance and their actual amount should also be set in relation to the frequency of controls. The lower the frequency of controls is the higher a penalty should be to increase the effect of getting caught.

Penalties can also provide an additional source of income for the management of an MPA. But they cannot be part of the financial planning for a site because the actual revenue within a planning period cannot be predicted.

7.3.5 Monitoring and evaluation of plan effectiveness

“Managing MPAs is a continuous, iterative, adaptive, and participatory process comprised of a set of related tasks or elements that must be carried out to achieve a desired set of objectives” (Pomeroy *et al.* 2004).

In order to improve management practices over time, the management plan should be reviewed on a regular basis regarding the success of chosen management strategies and activities in achieving the conservation and resource management objectives for a site.

⁴⁵ <http://www.deh.gov.au/epbc/>

The performance of an established management system is measured by indicators that facilitate the qualification and quantification of management success over time. Indicators should be selected in a way that they cover the whole performance range including ecological, socio-economic and governance aspects. The evaluation of management effectiveness should follow a defined procedure and be undertaken on a regular basis, latest at the end of the lifetime of a management plan.

Favourably, the evaluation is undertaken by an external person or group like an advisory committee because the management authority itself might lack the necessary distance (Salm *et al.* 2000).

Hockings *et al.* (2000) compiled the first guidelines on how management effectiveness can be evaluated: “*Evaluating Effectiveness: A Framework for Assessing the Management of Protected Areas*”.

In 2004, Pomeroy *et al.* published a guidebook of natural and social indicators for evaluating MPA management effectiveness. The study aims at assisting MPA managers in the field in evaluating the success of management measures towards achieving the conservation aims. The proposed biophysical, socio-economic and governance performance indicators were tested and improved in dedicated MPA case studies around the world. Due to the lack of offshore MPAs in

the North Atlantic, no pilot study for testing the indicators in temperate Atlantic waters could be done.

Prior to the actual selection of sites and periodically thereafter, another question regarding effectiveness should be raised, namely the question if the MPA ‘can’ actually be effective. Due to the linkages within the ocean and with the atmosphere and the terrestrial environment, there are several external stressors which affect the marine environment such as global warming or pollution.

If an MPA site is subject to degradation from external sources uncontrollable by the MPA authorities, an MPA cannot be effective in reaching its objectives, independent of its management strategies. This illustrates clearly that no marine protected area can be successful on its own if impacts continue to exist beyond its boundaries. Non-site based impacts should be reduced in a regional framework, taking also account of the conservation aims of the protected areas therein. However, the influence of existing and potential external factors should be another criterion for selecting the most suitable site for an MPA, for implementing appropriate management measures and in any effectiveness review thereafter (after Jameson *et al.* 2002).

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Annex

Marine Protected Area Definitions

IUCN (1994)	<i>Any area of intertidal or subtidal terrain, together with its overlying waters and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment</i>
OSPAR (2003)	<i>“marine protected area” means an area within the maritime area for which protective, conservation, restorative or precautionary measures, consistent with international law have been instituted for the purpose of protecting and conserving species, habitats, ecosystems or ecological processes of the marine environment.</i> ⁴⁶
EC Habitats Directive (1992)	<i>special area of conservation means a site of Community importance designated by the Member States through a statutory, administrative and/or contractual act where the necessary conservation measures are applied for the maintenance or restoration, at a favourable conservation status, of the natural habitats and/or the populations of the species for which the site is designated.</i> ⁴⁷

Table 10: Annex III of the OSPAR Guidelines

Aims of the OSPAR Network	Protect, conserve and restore species, habitats and ecological processes which are adversely affected as a result of human activities	Prevent degradation of and damage to species, habitats and ecological processes following the precautionary principle	Protect and conserve areas which best represent the range of species, habitats and ecological processes in the maritime area
Ecological considerations	(1.1) High priority habitats & species which meet the Texel-Faial criteria of ‘Decline’	(1.1) High priority habitats & species which meet the Texel-Faial criteria of ‘high probability of a significant decline’ (1.2) Important habitats & species which meet the other Faial criteria (global importance, local (species)/regional (habitats) importance, rarity, sensitivity, keystone species, ecological significance) (1.6) Sensitivity	(1.3) Ecological significance (1.4) High natural biological diversity (of species within a habitat and of habitats in an area) (1.5) Representativity, including the biogeographic regions (1.7) Naturalness
Practical considerations	(2.1) Size (2.2) Potential for restoration (2.3) Degree of acceptance (2.4) Potential for success of management measures (2.6) Scientific value	(2.1) Size (2.3) Degree of acceptance (2.4) Potential for success of management measures (2.6) Scientific value (2.5) Potential damage to the area by human activities	(2.1) Size (2.3) Degree of acceptance (2.4) Potential for success of management measures (2.6) Scientific value

Note: Numbers in brackets refer to the specific criteria in the Guidelines for the Identification and Selection of MPAs in the OSPAR maritime area (see Appendices 1 and 2).

⁴⁶ OSPAR Recommendation 2003/3 on a Network of Marine Protected Areas, Article 1.1. (see <http://www.ospar.org/documents/dbase/decrecs/recommendations/or03-03e.doc>)

⁴⁷ Council Directive 94/92 EEC, Article 1 I (see <http://europa.eu.int/comm/environment/nature/habdir.htm>)

Recommendations with Regard to Seamounts in the North-East Atlantic ⁴⁸

Effectiveness of management measures

There are few management measures specifically addressing the protection of seamounts in the OSPAR Maritime Area, and those that have been taken, predominantly regulate fishing and are relatively recent. As a consequence, their effectiveness has generally not been assessed, least of all at a broader geographical scale. [...]

Some generic observations can be made, however:

- insufficient knowledge of the marine environment still creates uncertainty in the identification of threats, and delays protection measures;
- the complex jurisdictional and legislative situation, notably in international waters, hinders a speedy approach to MPA designation and the implementation of activity-based measures;
- even within reasonably clear legal frameworks, such as the EU Habitats and Birds Directives, the selection and designation of MPAs is subject to significant delays;
- while some supra-national initiatives for the protection of seamounts have been established, there is still a lack of binding instruments;
- the slow pace at which protection measures are secured, coupled with the fact that fishing activities in particular are generally managed on a reactive rather than proactive basis, means that seamounts are particularly vulnerable to rapid increases in exploitation patterns. The EU Commission's emergency powers could provide a partial solution, however;
- the transmission interval of many VMS, and in particular those required under the CFP, is not frequent enough to allow surveillance at a small geographical scale, causing difficulties in policing access restrictions effectively; and
- international legal regimes for the regulation of bioprospecting and CO₂ sequestration are still missing, although bioprospecting is partially covered by UNCLOS and the CBD.

On the whole, effectiveness should be assessed against the conservation objectives of the MPA and the efficiency with which measures can be taken. Zoning and preventive approaches to management would appear to be an effective tool to support differentiated management.

Recommendation for further measures and activities

The effectiveness of current arrangements is highly variable, and frequently dependent on the capacity and resources of national or regional authorities and organisations. A supra-national approach to seamount management would appear to be preferable, not least given the number of seamounts occurring in international waters. Pivotal to any seamount management is the political commitment and availability of sufficient implementing and enforcement resources.

The following section summarises recommendations for general supportive measures, for the designation of MPAs, and for activity-based management measures.

⁴⁸ Excerpt from: Case study of existing and proposed management measures for seamount communities in the OSPAR Maritime Area. Institute for European Environmental Policy, IEEP, London. Report commissioned by WWF Germany. http://www.ngo.grida.no/wwfneap/Publication/Submissions/OSPAR2004/IEEP_WWF_seamnt_case_study.pdf

Recommendations for supportive measures

- research programmes should be continued and extended, notably to provide sufficient knowledge on distribution, and reference data to provide the basis for monitoring and management;
- the inclusion of seamounts as a representative ecosystem for deeper marine waters in existing or planned international monitoring and assessment programmes, such as the Global Ocean Observing System (GOOS), the Global Marine Assessment (GMA), and relevant programmes under Regional Seas Conventions and Action Plans;
- precautionary regulations and management measures should be adopted in the absence of sufficient knowledge, this should include interim prohibitions where appropriate;
- the co-ordination of management approaches at the international level should be improved;
- the mandate of regional fisheries bodies and regional seas bodies should be reviewed, so that they can develop a co-ordinated approach to the management of seamounts.
- the exchange of good practice should be encouraged;
- guidelines for responsible and sustainable management of seamounts and associated biota should be developed;
- the use of other policy instruments for the protection of seamounts should be explored and extended, notably Environmental Impact Assessment (EIA), Strategic Environmental Assessment (SEA), and ocean and coastal planning; and
- stakeholders should be consulted and informed of the state and management of seamounts.

Recommendation for the designation of seamount MPAs:

- more resources should be dedicated to supporting research on seamounts, including mapping and modelling;
- the three-dimensional protection of seamounts through MPA zoning is thought to be an effective tool for the management of nature values as well as sustainable fisheries, and should be encouraged;
- provisions for seamount protection should be integrated into national and regional MPA networks, including under the EU Habitats Directive, ensuring adequate representation of seamount habitat and species;
- time effectiveness is an important factor in the protection of seamounts, and the use of emergency measures may be necessary to protect previously untrawled seamounts; and
- MPAs and relevant legislation should be developed for the protection outside national jurisdiction, consistent with UNCLOS and other international agreements.

Recommendations for fisheries management measures for seamounts

- more resources need to be dedicated to the collection of fisheries data, including on bycatch;
- measures should be taken to address the impacts of bottom and pelagic gears (on target species and the wider environment⁴⁹);
- bottom trawling should be prohibited on seamounts, including in a buffer zone around the mount;
- other gear restrictions and effort reduction should be used to decrease by-catch of seamount associated fauna;
- the conservation of deep water sharks should be raised with the European Commission and NEAFC;
- deep water fisheries should be managed in accordance with the precautionary approach;

⁴⁹ added by WWF

- no-take areas should be implemented as a long-term measure in some or all MPAs;
- new legal instruments to regulate impacts on seamounts and the wider marine environment at the international level should be developed, including emergency measures available to the European Commission;
- the fishing industry and fishing fleets should be encouraged to comply with the Code of Conduct for Responsible Fisheries of the Food and Agriculture Organisation (FAO) of the United Nations;
- illegal, unreported and unregulated fishing (IUU) should be addressed as a matter of urgency, notably by putting into place enforcement and surveillance provisions; and
- the feasibility of Vessel Monitoring Systems should be assessed and legal requirements for their use extended, notably to include all relevant fisheries and to require signal transmission intervals which are frequent enough for the purpose of policing MPAs.

Recommendations for the management of activities other than fishing around seamounts:

- more research should be undertaken to improve our understanding of the influence of non-fishing activities on seamounts;
- codes of conducts should be established for research and leisure activities around seamounts;
- new legal instruments to regulate bioprospecting and CO₂ sequestrating in the deep sea should be developed; and
- the exploitation of the sea bed should be regulated at sustainable levels.

Other policy instruments that could be used to protect seamounts are:

- Environmental Impact Assessment;
- Ocean and coastal planning; and
- Strategic Environmental Assessment.

Competent authorities

Following table provides a useful list of relevant authorities and international instruments that may, if further developed, be used in the protection of seamounts in international waters.

It should be noted that only those marked with * are directly applicable to the member countries, *i.e.* they are legally binding without further ratification and transposition into national law.

Table 11: Relevant Authorities for the Protection of Seamounts in the OSPAR

Activities	Legal basis	Relevant authority
Designation of MPAs (Territorial waters)	National legislation* or national legislation in conjunction with the EU Habitats and Birds Directives*	National ministries/agencies; European Community
Designation of MPAs (EEZs or equivalent)	National legislation* or national legislation in conjunction with the EU Habitats and Birds Directives*	National ministries/agencies; European Community
Designation of MPAs (High Seas)	CBD	CBD COP
	OSPAR	OSPAR MOP
	UNCLOS	International Sea Bed Authority
Fishing (Territorial waters)	national legislation*; national legislation within the CFP; EU level CFP legislation*	National ministries/agencies; European Community; Commission in case of emergency measures
Fishing (EEZs or equivalent)	national legislation*; for EU Member States the CFP*	national ministries/agencies; European Community; the Commission in case of emergency measures
Fishing (High Seas)	NEAFC Convention	NEAFC
	National legislation*; for EU Member States the CFP*	National ministries/agencies; European Community; the Commission in case of emergency measures
	UNCLOS, the UN Fish Stocks Agreement and other associated agreements	United Nations General Assembly UNFA – Informal consultations of the Parties to the FSA
Fishing (General)	UN FAO Code of Conduct for Responsible Fisheries and FAO Compliance Agreement	FAO
	IPOA-IUU	FAO
	IPOA-Sharks	FAO
Tuna and billfish fisheries	ICCAT	ICCAT
By-catch of migratory species	CMS & ASCOBANS	CMS COP
Mineral, petroleum, gas and oil extraction	UNCLOS	National ministries/agencies for the legal continental shelf; International Sea Bed Authority for the Area
Bioprospecting	UNCLOS	National ministries/agencies for the legal continental shelf; International Sea Bed Authority for the Area
	CBD	CBD COP
Pollution	OSPAR	OSPAR Secretariat & MOP
Climate change	UNFCCC	UNFCCC COP
Shipping	UNCLOS & IMO instruments	IMO, MEPC, MSC and Assembly

Acronyms

BDC	Biodiversity Committee (OSPAR)
CBD	Convention on Biological Diversity (1992)
CFP	Common Fisheries Policy of the European Union
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EC	European Community (prior to Maastricht contract 1992)
EFF	European Fisheries Fund
ERDF	European Regional Development Fund
ESF	European Social Fund
EU	European Union
FIFG	Financial Instrument for Fisheries Guidance
GIS	Geographic Information System
ICES	International Council for the Exploration of the Sea
IMO	International Maritime Organisation
ISA	International Seabed Authority
IUCN	The World Conservation Union (formerly the International Union for the Conservation of Nature)
MASH	Working Group on Marine Protected Areas, Species and Habitats (OSPAR)
MBNMS	Monterey Bay National Marine Sanctuary
MPA	Marine Protected Area
NATURA 2000	Ecologically coherent European network of SACs and SPAs
NEAFC	North-East Atlantic Fisheries Commission
NGO	Non-Governmental Organisation
NOAA	National Oceans and Atmospheric Administration (US)
OSPAR	OSPAR Commission for the Protection of the Marine Environment in the North-East Atlantic
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice (CBD)
SAC	Special Area of Conservation (as defined in EU Habitats Directive)
SCI	Site of Community Interest (as defined in EU Habitats Directive)
pSCI	proposed Site of Community Interest (as defined in EU Habitats Directive)
SPA	Special Protected Area (as defined in EU Birds Directive)
UNCLOS	United Nations Convention on the Law of the Sea
VMS	Vessel Monitoring System
WCPA	World Commission on Protected Areas
WWF	World Wide Fund for Nature

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