



CASE STUDY OF EXISTING AND PROPOSED MANAGEMENT MEASURES FOR SEAMOUNT COMMUNITIES IN THE OSPAR MARITIME AREA

IEEP third party consultancy in the context of WWF Project on a network of marine protected areas in the North-East Atlantic

A. Introduction

Seamounts are defined as undersea mountains, with crests that rise more than 1,000 metres above the surrounding sea floor (BDC 04/14/1-E, Annex 9). Their shape (generally conical with a circular, elliptical or more elongate base) and steep slopes provide a striking contrast to the surrounding 'flat' abyssal plain, and lead to significant effects on the surrounding oceanic circulation. The enhanced currents that consequently occur around seamounts and the hard substrates provide ideal conditions for suspension feeders, concentrations of commercially important fish species, such as orange roughy, and spawning and feeding grounds for sharks, sea turtles, marine mammals and seabirds. A high proportion of the fauna and flora at seamounts is thought to be endemic. Human impacts have to date predominantly resulted from fishing, in particular using towed gear.

B. Geographical aspects

Seamounts occur in OSPAR Regions I (Arctic), IV (Bay of Biscay and Iberian waters) and V (Wider Atlantic). Analysis of narrow beam bathymetric data shows that seamounts are relatively frequent in the North Atlantic, with more than 810 seamounts currently identified. The majority occur along the Mid-Atlantic ridge between Iceland and the Hayes fracture zone, and in clusters away from the Mid-Atlantic Ridge, such as those along the south west of the Rockall Bank and west of Portugal on the Madeira-Tore Rise. It is thought that 47 per cent of globally identified seamounts fall inside the Exclusive Economic Zones (EEZs) or equivalent of nation states, and 53 per cent occur in international waters (Alder & Wood 2004).

Seamounts have been identified in the territorial seas and/or the EEZs (or equivalents) of Portugal (Azores), Spain, the United Kingdom (UK), Ireland, Norway¹, Iceland,

¹ Several underwater heights that may be classified as seamounts have recently been identified on multibeam bathymetry data from the Norwegian Petroleum Directorate.

and Denmark (Greenland/Faroes), and in the international waters of the Arctic Ocean and Wider Atlantic.

C. Threats

Human impacts on seamounts have arisen almost solely from commercial fishing, and in particular the physical impact of towed gears. Threats arise mainly from the physical impact of fishing gears on benthic habitats and communities, and from the removal of pelagic species through overfishing and by-catch. Evidence from Tasmania (Koslow *et al.*, 2001) suggests that an estimated 0.1 to 2 per cent of surface damage may occur during a single pass of a trawler.

Possible impacts of the exploitation of seamounts on the wider ocean ecosystems are not yet fully understood. The overall structural integrity of individual seamounts is not thought to be significantly affected by the impact of bottom gear. That said, threats from erosion and topographic change of the seascape are to date little documented, and may require additional investigation.

Threats are listed in order of priority.

i) threats from fishing

- destruction and smothering of benthic fauna, in particular corals and sponges;
- unsustainable by-catch of non-target species, including sea turtles, sharks and cetaceans, in long-lines and other fishing gears;
- over-exploitation of easily targeted seamount associated fisheries;
- suspected indirect effects on community structure and ecosystem health through the removal of biomass and key species; and
- scarring of the slopes and summits of seamounts, notably by bottom trawlers and other bottom-set gears.

ii) threats from activities other than fishing

(It should be noted that most or all of the threats listed below need to be regulated at larger geographical scale, going beyond individual seamounts.)

- *global climate change and associated changes in ocean currents* – thought to be a growing problem with potentially severe impacts on the functioning of deep sea ecosystems. However, there is thought to be enough knowledge about the possible or potential effects of global climate change to call for a precautionary approach to marine management;
- *the commercial extraction of minerals, oil and petroleum* – thought to pose a significant future threat to seamounts, although this will depend on technological advances and international regulation for the deep sea. In general, extraction activities are related to direct physical impacts and indirect effects due to increased sediment movement;

- *bio-prospecting* – thought to be of growing concern in the marine environment in general, with regulation needed to limit activities to sustainable level. More knowledge is needed to assess threats and impacts;
- *water pollution* – of general concern in the marine environment. There is limited knowledge of impacts but some studies indicate a risk to deep sea species, and would seem to support a precautionary approach;²
- *CO₂ sequestration* - thought to pose a future threat to seamounts, though the extent of problems will depend on technological advances and international regulation for the deep sea. More information is needed to assess impacts and risks;
- *shipping and accidents at sea* – thought to be potential threat with respect to direct physical impact, and air and noise pollution; and
- *research and leisure activities* – if unregulated and irresponsibly managed these activities may cause considerable damage.

D. Monitoring

While a number of recent research initiatives have provided better insights into seamount ecology and distribution in the OSPAR Maritime Region, there appear to be few (regular) seamount monitoring programmes. Only two seamounts in the Azores (Formigas and Castro bank) are thought to benefit from ongoing and continuous research. Results from these initiatives are informing discussions on seamount protection, and could be considered as a first step towards monitoring. However, this work is not undertaken as part of a wider monitoring strategy for seamounts. There is an obvious need for more reference data and adequate seamount monitoring, particularly at a broader geographical scale.

Experience in seamount monitoring may also come from:

- Australia - which is undertaking monitoring of the Tasmanian Seamounts (see Annex II); and
- the European Research Project OASIS³ - which may provide the basis for future monitoring in the OSPAR Maritime Region, notably in the context of two initial case studies involving seamounts around the Azores and Madeira.

E. Management Measures

It is possible to distinguish two approaches⁴ to seamount management:

- i) the designation and management of Marine Protected Areas (MPAs); and
- ii) activity-based management measures.

² Borghiand, V., Porte, C. (2002) Organotin Pollution in Deep-Sea Fish from the Northwestern Mediterranean. In *Environmental Science Technology*, Vol. 36, No. 20, 15 October 2002, and M. Solé, C. Porte y J. Albaigés. (2001). Hydrocarbons, PCBs and DDT in the NW Mediterranean deep-sea fish Mora moro. *Deep Sea Res.* 48(2): 495-513.

³ <http://www.rrz.uni-hamburg.de/OASIS/Pages/page1.html>

⁴ The effectiveness of the first is arguably dependent on the use of the second.

i) Experience with regard to MPAs

MPAs in waters under national jurisdiction

Legal and administrative competencies are generally simpler in waters under national jurisdiction than in international waters. Even so, only one statutory MPA has been declared for the protection of seamounts in OSPAR waters under national jurisdiction to date – the Formigas Islets & Dollabarat bank Nature Reserve (Azores). In addition, a number of *potential* MPAs⁵ have been identified, notably:

- Formigas Islets & Dollabarat bank proposed SAC (3,542 ha, Azores),⁶ approved as a Site of (European) Community Importance;⁷
- The D. João de Castro bank (1,643 ha, Azores), approved as a Site of (European) Community Importance;
- additional seamount site proposals are currently expected from Portugal (Azores), Spain and the UK.

Various tools are being used to designate and manage seamount MPAs, including spatial zoning, size considerations, mapping, enforcement and policing etc. These are summarised in the WWF Offshore Toolbox Report⁸. A summary of international experience in seamount management is provided in Annex II.

Instruments for the designation and protection of MPAs in OSPAR waters under national jurisdiction include:

- the EU Habitats and Birds Directives, which provide for the national designation of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), respectively, in the territorial waters and EEZs or equivalent (by political agreement) of the EU Member States;
- national fisheries and nature conservation legislation – EU Member States, Norway and Iceland also have national legislation for the designation of MPAs, whether or not this is linked to the EU Directives. To date, no MPAs have been designated specifically for the protection of seamounts.⁹ However, Norway

⁵ In EU waters (ie not Iceland, Norway and Switzerland), the principal designation of MPAs is likely to take the form of Special Areas of Conservation (SACs) or Special Protection Areas (SPAs) designated under the EU Habitats Directive and Birds Directive respectively. In the case of seamounts, MPAs are likely to be considered under the reef category (Annex I of the Habitats Directive). There is still a question as to whether the term seamount will be explicitly mentioned in the refined definition of marine Annex I features, currently being developed by a Marine Expert Group under the EU Habitats Directive.

⁶ Note that the 'seamount' breaks the surface, and thus may not qualify as a seamount.

⁷ Note that both the Azorian sites have been approved as part of the Community list of sites for the Macaronesian Region at EU level; the first biogeographical list to be adopted. Portugal now has up to six years to formally designate the site as an SAC. There could thus be further delays in the management of these sites.

⁸ http://www.ngo.grida.no/wwfneap/Projects/Reports/Offshore_Toolbox.pdf

⁹ Norway is in the process of reviewing its national plan for marine protection.

- protects reefs, and Iceland has at least one MPA for underwater structures made from leaking gases; and
- international (non-EU) instruments or measures international (see below).

MPAs in international waters

The legal and administrative situation for MPA designation in international waters is comparatively more complex than in national/EU waters. To date, there are no High Seas MPAs, with the exception of the recently adopted trans-boundary Mediterranean MPA, designated within the context of the Barcelona Convention.

International instruments that may, if further developed, be used to promote the protection of MPAs in international waters include:

- *the Convention on Biological Diversity (CBD)* and the related Jakarta Mandate (Decision II/10 of 1995), and Decision VII/5 of 2004 - Article 4 of the CBD extends the Convention beyond national jurisdictions for processes and activities undertaken by Parties. The Jakarta Mandate and Decision VII/5 include calls for the establishment of MPAs;
- *Regional Seas Conventions* – such as OSPAR (Annex V) and OSPAR Recommendation 2003/3 on a network of MPAs; and
- *UNESCO's World Heritage Convention and Man and the Biosphere programme* - although this is thought to be protection than potential CBD provisions.

Alder and Wood (2004) provide a useful list of further international instruments that may also be used to protect sites (see Annex I).

In addition, there are a number of initiatives and political processes that call for the protection of MPAs, these include:

- the UN established open-ended Informal Consultative Process (UNICP) (General Assembly resolution 54/33);
- the renewed commitment to 'establish representative marine protection networks by 2012', set out in and the t the World Summit for Sustainable Development (WSSD) Plan of Implementation (2002);
- the International Coral Reef Initiative; and
- the World Parks Congress, and in particular Resolutions 2.20 and 5.23 (on High-Seas MPAs and Marine Conservation) and WWF/IUCN High Seas Marine Protected Areas Action Plan.

ii) Activity-based management measures

To date, few activity-based management measures have been taken specifically for the protection of seamounts in the OSPAR Maritime Region. None have been taken outside MPAs (existing or proposed). Portugal (Azores) is the only OSPAR member thought to have in place management measures for seamounts. No measures have been taken to date to protect seamounts in international waters. The Norwegian

government, however, is in the process of preparing a submission to NEAFC, proposing a general trawling ban on all identified seamounts in international waters.

A summary of international experience in seamount management is provided in Annex II.

Instruments and agreements for the regulation of fisheries and related impacts in the OSPAR Region

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

- *national fisheries and conservation legislation** – all OSPAR Members are thought to have relevant national legislation in place to allow seamount protection in their territorial waters in principle. Some countries like the UK are in the process of extending aspects of their legislation to areas beyond 12 nm to include the EEZ or equivalent;
- *the Common Fisheries Policy (CFP) for the regulation of fishing activities in EU waters and by EU vessels outside EU waters** – can include any number of measures eg gear and effort restrictions, seasonal or spatial closures, emergency measures to protect sites or resources (more detail is given in Annex III);
- *the NEAFC Convention* – the North East Atlantic Fisheries Commission (NEAFC) is the regional fisheries management organisation with competencies to recommend measures to Contracting Parties to promote the rational exploitation of fisheries beyond areas under national fisheries jurisdiction;
- *UN Convention on the Law of the Seas (UNCLOS Part VII and XII) and related Agreements* – impose on all Parties a general obligation to protect and preserve the marine environment, through a range of possible measures, in particular the UN Fish Stocks Agreement, the moratorium on the use of certain driftnets etc, similar measures could be taken in the case of bottom trawling;
- *UN FAO Compliance Agreement*¹⁰ in conjunction with the FAO Code of Conduct for Responsible Fisheries, the latter being voluntary;
- *UN FAO International Plan of Action on Illegal, Unreported and Unregulated Fishing (IPOA-IUU)* – a voluntary plan to prevent, deter and eliminate IUU fishing;
- *the Convention on Migratory Species (CMS)* – aims to conserve terrestrial, marine and avian migratory species throughout their range, and could provide the basis for measures such as the Agreement on the Conservation of Small Cetaceans of the Baltic and North Sea (ASCOBANS);
- *UNFAO International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks)* – a voluntary plan, identifying action required for sharks within the context of the FAO Code of Conduct for Responsible Fisheries;

¹⁰ The Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas

- *Memorandum of Understanding on the protection of sea turtles (in preparation)* under the auspice of the Convention on Migratory Species, this is likely to cover Portugal, Spain and the UK; and
- *the International Convention on the Conservation of Atlantic Tuna (ICCAT)* – in relation to tuna fisheries, if relevant;

It should be noted that for EU Member States, there is some discussion as to whether they can take unilateral measures within or outside the CFP to regulate fishing where this is solely for the purpose of protecting sensitive sites within waters under their jurisdiction.

Instruments and agreements for the regulation of impacts from activities other than fishing in the OSPAR Region

In the case of other pressures, such as shipping or mineral extraction, respective sectoral measures apply, including:

- *international maritime law* - International Maritime Organisation (IMO) rules apply to the regulation of shipping, amongst others on marine safety, vessel emission and the provision for spatial restrictions and site designations for ecological reasons amongst others, notably Particularly Sensitive Sea Areas (PSSAs);
- *Regional Seas Conventions* – generally cover marine pollution by marine and terrestrial sources;
- *extractive activities* - are governed by national law, as long as they take place in the EEZs and by UNCLOS when occurring in the High Seas (administered by the International Seabed Authority); and
- *UN Convention on Climate Change* - addresses global climate change; and
- *EU legislation concerning maritime transport, climate, etc* – the EU has adopted a raft of measures, to transpose international commitments into EU law which is then binding on the Member States. This includes legislation relating to maritime transport pollution and climate change. Once they enter into force, such measures are binding on all Member States – they do not require prior ratification by national parliaments, although they may have to be transposed from EU into national provisions.

It should be noted that the international regime governing the seabed is distinct from that governing living resources and the water column.

Other supportive measures promoting the appropriate management of seamounts

- education and awareness raising;
- stakeholder involvement;
- development of enforcement strategies;
- marine spatial planning;
- strategic and environmental impact assessment;

- economic incentives and disincentives;
- development of codes of conduct; and
- research on and monitoring of effectiveness.

F. Effectiveness of Management Measures

There are few management measures specifically addressing the protection of seamounts in the OSPAR Maritime Region, 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. Where management does occur (ie in the Azores), there is some evidence that illegal fishing continues.

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.

G. 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. Note that the OSPAR's specific role in this context is specified in Section I below.

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.

Recommendations 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;
- 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;
- 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 Organization (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.

H. Competent Authorities

Table 1 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, ie they are legally binding without further ratification and transposition into national law.

Table 1: Relevant Authorities for the Protection of Seamounts in the OSPAR Maritime Region		
<i>Activities</i>	<i>Legal basis</i>	<i>Relevant authority</i>
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*, or national legislation within the CFP, or EU level CFP legislation*	national ministries/agencies; European Community, or the Commission in case of emergency measures
fishing (EEZs or equivalent)	national legislation*, or for EU Member States the CFP*	national ministries/agencies; European Community, or the Commission in case of emergency measures
fishing (High Seas)	NEAFC Convention	NEAFC

	national legislation*, or for EU Member States the CFP*	national ministries/agencies; European Community; or 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

I. Role of OSPAR

The role of OSPAR in promoting the protection of seamounts in the OSPAR Maritime Region could include:

- maintaining the political momentum for and commitment to the designation of MPAs, including in international waters;
- developing and adopting guidelines for the protection and management of seamounts;
- taking a lead role in bringing the different competent authorities together in developing a seamount management strategy for the North-East Atlantic;
- where management activities are outside the remit of OSPAR, request and advise the relevant authorities of desired conservation actions;
- developing and adopting a code of conduct with responsible sectors for the management of seamount ecosystems; and
- raising awareness of the conservation status and needs of seamount ecosystems.

References and other useful sources:

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- WWF (in preparation) *The Offshore Toolbox: Implementing Marine Protected Areas in the North-East Atlantic Offshore – A Seamounts Case Study*. OASIS/WWF

The material in the case study is based on a review of the scientific literature and a number of policy papers, as well as communications with officials and NGO experts from most of the relevant OSPAR Parties. It was not possible to speak to officials in Denmark and France, and consequently, some information contained in this case study may be incomplete.

- Institute for European Environmental Policy (IEEP) third party consultancy in the context of WWF Project on a network of marine protected areas in the North-East Atlantic -

ANNEXES TO THE OSPAR SEAMOUNTS CASE STUDY

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Annex 1: INTERNATIOANL INSTRUMENTS FOR THE PROTECTION OF SEAMOUNTS

Table 11: International Instruments and their Application in Managing and Protecting Seamounts

Instrument	Potential for Seamount Management and Protection
Binding	
UNCLOS-Mining Agreement	Under Article 162.2.x of UNCLOS the International Seabed Authority may disapprove an area for exploitation where substantial evidence exists that mining activities pose a serious risk to the marine environment. Article 145 provides for the protection and conservation of the natural resources of the Area and the prevention of damage to the flora and fauna in the marine environment.
UNCLOS – Pollution	Under Part XII of UNCLOS States are obliged to protect and preserve the marine environment, especially ‘rare or fragile ecosystems as well as the habitat of depleted threatened or endangered species’ and to take measures individually or collectively to not cause pollution within and beyond their jurisdictions.
UNCLOS - Fisheries	UNCLOS obliges States to cooperate and conserve the living resource of the high seas. The States that are party to the Convention can take whatever measures are necessary to ‘maintain or restore populations of harvested species at levels which can produce the maximum sustainable yield’ and measures such as marine protected areas are not prohibited.
Fish Stocks Agreement	This Agreement addresses the shortcomings of UNCLOS in dealing with straddling and highly migratory stocks and is very relevant to fish on seamounts. The Agreement requires States to adopt compatible management measures without specifying which measures prevail in the case of disagreements (de Fontaubert, 2001). The Precautionary Principle also features prominently in the agreement and obliges States to be more cautious when information is inferior and not to use a lack of information as justification to avoid taking appropriate conservation and management measures
Regional Fisheries Agreements/Conventions	Most agreements contain provisions to undertake a range of fisheries management options that could be used to protect and manage seamount resources including closing areas to fishing, restricting the use of specific gear (e.g. trawls) and the size of species caught. Agreements, which restrict the range of species they can manage may need to be amended to include seamount species.
Convention on Biological Diversity and Jakarta Mandate	Article 4 extends the Convention beyond national jurisdictions for processes and activities undertaken by member States while the Jakarta Mandate includes calls for the establishment of MPAs.
Convention on the International Trade of Endangered Species (CITES)	CITES could be used to the management and protection of selected seamount species. Currently there are no seamount species listed, however, there have been calls to add the Patagonian toothfish to the list (Willock, 2002).
London Convention and IMO Particularly Sensitive Sea Areas	Waste disposal at sea is managed through this convention. The activities of ships, including discharges in the vicinity of seamounts can also be managed using Particularly Sensitive Sea Areas (PSSAs).
World Heritage Area Convention	The Convention stipulates that World Heritage Areas must be contained within national boundaries and therefore of limited use in managing and protecting seamounts in international waters.
Regional Seas Programs	Some of the treaties that establish specific Regional Seas Programmes extend into the high seas. In addition some treaties have provisions and protocols to protect areas and wildlife.
Non Binding	
FAO Code of Conduct	The Code can be used to manage fisheries on seamounts.
Agenda 21 and World Summit on Sustainable Development (WSSD)	The international initiatives have called for the establishment of marine protected areas on the high seas. The WSSD called for a network of Marine and Coastal Protected Areas within and beyond national jurisdiction by 2012.
FAO International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing	Seamounts are considered major centres of IUU fishing and therefore addressing the issue of IUU will contribute to managing and protecting seamounts (Rigg, 2004).

Annex 2: INTERNATIONAL EXPERIENCE IN SEAMOUNT MANAGEMENT

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- 1 Generic management issues
- 2 Summary table of management measures
- 3 Detailed Case studies
 - a. Australia - The Tasmanian Seamounts Marine Reserve
 - b. United States - Cordell Bank National Marine Sanctuary
 - c. New Zealand - New Zealand Seamount Fisheries

More information is available in WWF (in preparation) *The Offshore Toolbox: Implementing MPAs in the North-East Atlantic Offshore – Seamount Case Study*. OASIS/WWF

http://www.ngo.grida.no/wwfneap/Projects/Reports/Offshore_Toolbox.pdf

1 Generic management issues

Spatial zoning

The tool of spatial zoning, both vertical and horizontal, has been used widely by countries with seamount MPAs, generally reflecting the different management objectives for pelagic and benthic features. This form of three-dimensional protection provides important opportunities for differentiated management of the benthic communities and the water column around and above seamounts. Zoning is thus reflected in the associated activity-based management measures.

Both vertical and horizontal zoning has been used to manage fishing and other activities within MPAs (see table), ranging from core or no-take zones (full protection), to multiple use zones. Generally, the site management plan would identify adequate zones in relation to the conservation objectives.

Vertical zoning, which takes into account the management need at different water depth (three-dimensional), has been a more recent tool. Unlike the (two-dimensional) horizontal zoning, it allows a differentiated management of eg fisheries activities, eg where certain gears have a significant benthic impacts.

MPA size

The size of MPAs is another important factor in the selection and designation of sites. Seamounts are generally large features, in terms of absolute area and depth covered, and likely require relatively large areas of designation. The size depends on the dimensions of individual seamounts or seamount ranges. ICES noted that in order to prevent the depletion of local populations the proper management of species that form local aggregations around seamounts should be at ‘seamount’ scale (ICES, 2002).

MPA boundaries

MPA boundaries are often drawn using simplified criteria and straight lines. In case of the Darwin Mounds trawling ban under the CFP (Council Regulation 602/2004), for instance, straight lines were drawn around the area including the entire seamount and a buffer zone of 2.2 km. This facilitates mapping, locating of seamounts and hence compliance.

Control and Enforcement

Vessel Monitoring Systems (VMS) provide one means of monitoring compliance with access restrictions. Other means include the use of patrol boats and plane, onboard observers, etc. Moreover, cooperation with stakeholders and awareness raising are also key to the success of any management strategy.

2 Summary table

MPA	Management tool	Specification
Formigas Bank (Azores-Portugal)	Statutory MPA & core zone designated under the EU Natura 2000 scheme	<ul style="list-style-type: none">• designated for the protection of natural resources and the biodiversity from exploitation;• all extractive and fishery activities are prohibited, except tuna fishing using hand-lines or poles and lines, under the condition that boats are fitted with satellite monitoring system;• access consent is required;• diving is allowed and encouraged;• dumping of waste and the introduction of alien species is strictly prohibited;• research is permitted, but some activities require a permit;• removal of extracts of geological or archaeological value is strongly prohibited;• fines can be imposed and gear confiscated;• further improvements to the regulations in place are in preparation;• no zoning is foreseen within site boundaries.

D. João de Castro Bank (Azores-Portugal)	Proposed MPA & designated under the EU Natura 2000 scheme	Zoning proposal in preparation	<ul style="list-style-type: none"> • currently only protected by the decree that transposes the EU Habitats Directive into Portuguese law, and by general fisheries regulations established by national and regional law; • no-take zones are part of the zoning proposal; • possible use of a code of conduct for users
Tasmanian Seamounts Marine Reserve (Australia)	MPA with zoning strategy	Highly Protected Zone (500 m depth to 100 m below the seabed)	<ul style="list-style-type: none"> • managed primarily for scientific research and environmental monitoring • trawling and Danish seining closures are in place on selected seamounts • extractive operations (other than exploration in certain circumstances) are not permitted • access is allowed on a permit basis only
		Management Resource Zone (0 – 500 m depth)	<ul style="list-style-type: none"> • managed to ensure the long-term protection and maintenance of natural processes; • non-trawl fishing is allowed within vertically zones subject to TACs and ITQs • shipping is allowed as per the freedom of navigation under UNCLOS
Cordell Bank National Marine Sanctuary (US)	MPA with regional fisheries management, but no specific commercial fisheries management plan		<ul style="list-style-type: none"> • salmon is managed using seasonal restrictions, quotas and bag limits; • groundfish are managed using conservation areas, seasonal and depth restrictions, and gear modifications to reduce by-catch; • gillnetting is prohibited
New Zealand Seamount Fisheries	Seamount strategy, using some horizontal zoning and fisheries management		<ul style="list-style-type: none"> • around seamounts fishing is restricted within 50 m of the sea floor; • no-take zones and trawling bans are also in place; • ITQs for coastal and deepwater species

3 Detailed Case studies

a. The Tasmanian Seamounts Marine Reserve (Australia)

Australia provides some useful experience in seamount management. Australian MPAs are routinely assigned to one of the following IUCN criteria:

- strict nature reserve,
- wilderness area
- national park
- natural monument
- habitat/species management area
- protected landscape/seascape; and
- managed resource protected area.

Within the overall site designation, individual zones may be assigned a different level of protection, eg going beyond the overall designation. In the case of seamounts, vertically stratified zoning has been used to put in place activity-based measures. The Tasmanian Seamounts Marine Reserve (38,900 ha) was declared in 1999, notably to protect a sample of the unique benthic communities of the region. It has been assigned to the category ‘strict nature reserve’, and is managed within the framework of a management plan. This identifies two vertically stratified zones (ie depth-dependent) within the MPA:

- i **Highly Protected Zone** (500 m depth to 100 m below the seabed) – with the objective of the full protection of the benthic biodiversity, and managed primarily for scientific research and environmental monitoring, and
- ii **Management Resource Zone** (0 – 500 m depth) – managed to ensure the long-term protection and maintenance of natural processes.

In the HPZ, fishing and extractive operations (other than exploration in certain circumstances) are not permitted, and an access permit is required to enter the reserve at or below 500 metres water depth. In the MRZ, access to commercial pelagic fleets using non-trawl methods is given on a permit (or equivalent) basis. Shipping is allowed as per the freedom of navigation under UNCLOS.

Measures taken to support enforcement of these restrictions include information and awareness raising activities. In addition, vessels with a permit to target orange roughy in areas outside the reserve are required to have a Vessel Monitoring System (VMS), providing information on vessel movements in the vicinity of the MPA. The relevant authorities have also committed to developing a compliance and enforcement arrangement plan, which will draw on the use of agencies, such as Customs and Defence. The Coastwatch also undertakes surveillance flights over the reserve.

Moreover, a research and monitoring programme is integral to the implementation of the management plan.

b. Cordell Bank National Marine Sanctuary (United States)

The marine sanctuary was created in 1989. There is no specific commercial management plan. Groundfish and salmon fisheries are, however, subject to management by the Pacific Fishery Management Council – salmon is managed using seasonal restrictions, quotas and bag limits, and groundfish are managed using conservation areas, seasonal and depth restrictions, and gear modifications to reduce by-catch. Gillnetting is prohibited .

c. New Zealand Seamount Fisheries

In 1986, the New Zealand Ministry of Fisheries introduced an Individual Transferable Quota (ITQ) management system for national coastal and deepwater fisheries. ITQs provide individuals with a transferable or tradable right to harvest a specific proportion of the total allocated surplus production of a stock. In parallel, several levels of management were developed, including zoning and/or depth restrictions on specific seamounts, restricting fishing within 50 metres of the seabed, trawling closures, and no-take zones. Moreover, in 2000, 19 seamounts were included in a seamount management strategy.

Annex 3 SEAMOUNT MANAGEMENT IN THE CONTEXT OF THE COMMON FISHERIES POLICY

In the case of fishing in EU waters and by EU vessels, the management framework is provided by the Common Fisheries Policy (CFP). Any number of activity-based measures can be taken under the CFP, including those targeted at site management. These include both permanent restrictions - the proposed Azores bottom trawling ban (see below) is one example - and short term emergency measures.¹¹ In case of the Darwin Mounds, an area of sand volcanoes in offshore waters north of Scotland (Council Regulation 602/2004), emergency measures preceded the permanent ban on bottom trawling, for instance.

Although still within the CFP, Member States are also able to take measures applicable to vessels flying their flag, as well as measures applicable within territorial waters. Member States can also, under certain circumstances take short-term emergency measures.

In 2004, the European Commission proposed a general trawling ban under the CFP for certain areas around the Azores (COM(2004)58), notably to protect deep-water coral reefs, including those on seamounts. The proposal seeks to maintain the *de facto* trawling ban that has been in place around the Azores as part of a general fisheries access regime, which is to end in August 2004. There is, however, concern that the proposed ban will not be in place in time to prevent fishing after August. As a consequence, the Portuguese government has reportedly request emergency measures by the European Commission, which could close the area to bottom trawling for an interim period (initially six months).

Apart from site-based measures, the integration of environmental considerations into the CFP is intended to improve its focus on the wider marine environment in general. By providing for the regulation of fishing activity more broadly, notably through effort reduction, the setting of catch and by-catch limits, the use of incentives to promote gear modifications etc, the CFP may thus also have an indirect impact on

¹¹ Note that emergency measures can be taken by the Commission, or in certain cases individual Member State, to protect a natural habitat, including seamounts, from fishing. However these measures are temporary, up to six months.

seamount management. This includes measures to avoid the impact on non-target species through the development of a long-term strategy for the protection of vulnerable species, such as sharks (including skates, rays and chimaeras). EU prohibitions on shark finning (Regulation 1185/2003) are one example. The EU is also in the process of developing an EU Shark Plan.

In addition to Community and national legislation developed under the CFP, as well as 'softer' measures such as the shark plan, there is some discussion as to whether EU Member States can take unilateral measures outside the CFP to regulate fishing for the sole purpose of protecting sensitive sites within waters under their jurisdiction.