

# OASIS

Oceanic Seamounts: An Integrated Study  
A project funded by the European Commission  
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## Seamounts and Fisheries – Conservation and Sustainable Use First OASIS Stakeholder Workshop Horta, Azores 1 – 2 April 2004



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OASIS *report*

Seamounts and Fisheries –  
Conservation and Sustainable Use.  
First OASIS Stakeholder Workshop  
Horta, Azores  
1 – 2 April 2004  
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& B. Christiansen  
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Cover photograph: Exhibition of artisanal  
fishing in the old whaling station,  
Horta, Azores (S. Christiansen)

## *Preface*

In the last few decades, the diminishing fish stocks in many near-shore waters have caused the fleets to seek new fishing grounds in deeper waters. Despite the poor knowledge of seamount ecosystems, how they function and how they maintain their productivity, seamounts have become favourite targets of the deep-water fishery, because in their vicinity commercially valuable species are often far more abundant than in the surrounding ocean. However, available information on seamount fisheries show that even a moderate fishing effort quickly leads to a depletion of the stocks. Moreover, the fisheries impact on benthic communities and non-target species may be considerable.

The EU research project **OASIS** (Oceanic seamounts: an integrated study) combines studies in physical oceanography, biogeochemistry and biology in order to gain more insight into the processes which govern a seamount ecosystem. The results feed into ecological models and are to be applied, in close collaboration with stakeholders, to practical conservation, including generic and site-specific management plans.

The first **OASIS** stakeholder workshop in Horta, Azores, was an opportunity to inform stakeholders about the **OASIS** project and about the present knowledge of seamount ecology, and to discuss the expectations of stakeholders from the project. We are happy that more than 40 local, national and foreign participants from fisheries, governments, advisory bodies, NGOs and science attended the workshop and stimulated fruitful discussions.

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Marine Ecoregion Programme

# OASIS

Stakeholder Workshop, Horta, Açores  
April 1<sup>st</sup> - 2<sup>nd</sup> 2004

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### *Acknowledgements*

Many thanks in particular to the Regional Directorate of Fisheries of the Government of the Autonomous Region of the Azores for financial and logistic assistance, to OASIS and to the IMAR and the Department of Fisheries of the University of the Azores for organising the venue, as well as for ensuring the recording and translation of the contributions made in Portuguese. OASIS is a research project supported by the European Commission under the Fifth Framework Programme and contributing to the implementation of the Key Action “Sustainable Marine Ecosystems” within the Energy, Environment and Sustainable Development (Contract n°: EVK3-CT-2002-00073-OASIS).

**Muito obrigado!**

## Executive Summary

This report mirrors the presentations and discussions which took place during the first OASIS stakeholder workshop, April 1-2, 2004 in Horta, Faial, Azores.

**OASIS** (Oceanic Seamounts: An Integrated Study) is an EU-funded integrated seamount research project (2002-2005) **aiming to describe the functional interaction of all seamount ecosystem compartments**, except for the highly migratory visitors. OASIS also wants to improve knowledge which is required for taking management decisions. The research focuses on **two model seamounts** of different summit depth, topography and fishing pressure, the Sedlo seamount 100 nm north of the Azores and the Seine seamount 100 nm northeast of Madeira.

The results from these in-depth studies shall be generalized as far as possible, driving conceptual and numerical models for enabling the extrapolation to less well studied areas. As a first step with regard to conservation, a more generic management plan for a seamount conservation area was developed, the "Offshore MPA toolbox". In a second step, a model site-specific management plan will be developed for the Sedlo seamount which will be presented to all stakeholders for discussion in fall 2005. Ultimately, more general conclusions on seamount management shall be drawn.

The workshop was attended by some 40 regional, national and foreign participants from fisheries, government, advisory, NGOs and science. The first day of the workshop was an integral part of the annual Azores Fisheries Week, a major international meeting involving scientists, economists, politicians, lawyers, fishermen and fisheries representatives.

### The presentations

- introduced the OASIS project (Ana Martins, University of the Azores, DOP),
- reviewed the knowledge on seamounts and seamount ecology in the North East Atlantic (Susan Gubbay, Consultant),
- gave a scientific perspective on global and regional seamount fisheries (Telmo Morato, Gui Menezes, University of the Azores, DOP),
- shed light on the ecological relationship between seamounts and visiting turtles (Thomas Dellinger, University of Madeira),
- described the process of MPA designation on the example of Bowie Seamount (Kevin Conley, Fisheries and Oceans Canada),
- and reviewed past, present and future marine conservation scientific efforts in the Azores (Ricardo Serrão Santos, University of the Azores, DOP).

The **second day** of the workshop was dedicated to discussing the following issues:

- Seamount fisheries in the context of regional and European Fisheries legislation
- Management measures required for protecting seamounts (including MPAs)
- The knowledge base on Atlantic seamounts: trying to fill the gaps.

Until today, the **seamount fisheries of the Azores and Madeira** employ fishing techniques which are basically low-tech, small scale and labour-intensive. Due to the recently changed access regime to the former exclusive 200 nm fisheries zone of the Azores and Madeira (Western Waters Regulation, November 2003), a large part of the workshop discussions focussed on the fate of the island fisheries. The regional management system in place until now was considered to come quite close to a sustainable fishery taking account of the longterm health of the ecosystems supporting it. The EU Western Waters Regulation was seen as a top-down non-participatory, and scientifically not sound decision prioritizing the principle of equal access over the precautionary principle also inherent in the Common Fisheries Policy. Participants expressed their concern over the high probability of overfishing due to industrial fishing techniques and increasing fishing effort, resulting in significant consequences for the local Azorean economy.

**Management measures regulating seamount fisheries** were recommended to include effort and gear control in very specific, small-scale management units, rather than the statistical rectangles used at present. Pelagic fishing techniques were highlighted to cause high mortality rates of visiting sea turtles, cetaceans and seabirds. The pelagic fishing effort should also be quantified.

The existing **gaps in knowledge** on Atlantic seamounts were seen to call for more immediate measures being taken on a precautionary basis, since management failures would be more severe in a deep-sea environment. Most speakers regarded **MPAs as tools** that deliver risk reduction for species and habitats and offer integrated management of restricted resources, including fishes. However, surveillance problems were highlighted. A representative network of MPAs could resemble an investor's portfolio. The Azores, as the first European Region to have concluded a Management Sectorial Plan for the Natura 2000 network, are now involved in the preparation of new dossiers leading to the inclusion of deep-sea sites as SCIs under Natura 2000, some of which are individual seamounts. In view of this, **seamount management should, from the beginning, be developed in close cooperation with stakeholders.**

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# OASIS

Stakeholder Workshop, Horta, Açores  
April 1<sup>st</sup> - 2<sup>nd</sup> 2004

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## *Part I – Introduction - Framework and purpose of the meeting*

*Sabine Christiansen, WWF North-East Atlantic Marine Ecoregion Programme*

Global evidence for the immediate risk that seamount communities face from a young and as yet largely uncontrolled deep sea fishery was strong enough to make seamounts, like cold-water corals, flagships in the discussions and negotiations on the development and improvement of conservation measures for habitats and species in offshore and open ocean environments. In February 2004, the 7<sup>th</sup> Conference of the Parties to the Convention on Biological Diversity (CBD) responded to the call made by the UN General Assembly, stressing the need for rapid action to address threats to the marine biodiversity of deep sea areas including seamounts, hydrothermal vents, cold water corals and other vulnerable marine ecosystems and features within and beyond national jurisdiction. It called for the application of the precautionary principle in applying interim measures, like the prohibition of destructive practices known to have adverse impacts on the associated fauna and flora.

A high fishing intensity, combined with a high vulnerability of seamount-associated species and habitats and a very limited extent within fishing depths results in the very high probability for serious and probably long-lasting alterations of the ecosystems at impacted seamounts. One can only speak of probability, as there is a general lack of knowledge, in particular of the seamounts fauna other than fish, and no site-specific data are available on the impacts of offshore fisheries.

Seamounts are included in the '2004 Initial OSPAR List of Threatened and/or Declining Species and Habitats'. The listing is subject to further research, which is currently undertaken by ICES. Under the EU 'Habitats Directive', Seamounts probably qualify for the criterion of 'reefs'. Both legislative frameworks are to establish networks of Marine Protected Areas.

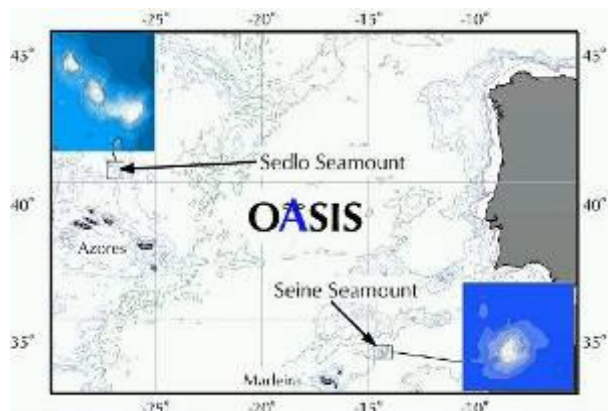
Research is extremely expensive and generally, there is limited interest in Europe to fund biological research offshore. So we are very happy that the European Commission decided to fund OASIS, an integrated seamount research project comprising all ecosystem compartments except for the highly migratory visitors. OASIS wants to improve knowledge, also required for taking management decisions, by research on two model cases, the Sedlo seamount 100 nm north of the Azores and the Seine seamount 100 nm north of Madeira.

The results from these in-depth studies shall be generalized as far as possible, driving conceptual and

### *Seamounts – in need of protection*



Industrial fisheries of Orange roughy  
©Australian Fisheries Management Authority



The OASIS research sites: Sedlo & Seine Seamounts  
© OASIS

*Products of the OASIS project*



For all OASIS publications go to  
<http://www.rrz.uni-hamburg.de/OASIS/Pages/page1.html>  
→ Publications

*We want to listen to you!*

*WWF acts as the interface between public, science and politics*

The OASIS website:  
<http://www.uni-hamburg.de/OASIS>:

numerical models for enabling the extrapolation to less well studied areas. The other way of trying to put the scientific results into more practical results is by applying the knowledge gained to design model management plans. In a first step, the legal framework and the instruments available for the selection, designation and management of seamount protected areas in the North-East Atlantic are compiled in the "Offshore MPA Toolbox. Implementing Marine Protected Areas in the North-East Atlantic Offshore: Seamounts – A Case Study"(see Part III -Theme III). In a second step, a site-specific management plan will be drafted for Sedlo seamount, which will be presented to you as stakeholders for discussion at another workshop planned to be in Horta in the 2<sup>nd</sup> week of 2005. By the end of the project, end 2005, a revised draft shall be one of the final products of OASIS. In an attempt to apply the lessons learned from the project, it is intended to draft management recommendations for Princess Alice Bank at a final stage.

To make these efforts more concrete, before the start of the project, the Azorean government has assured us that they would be interested to designate at least one if not more seamounts in Azorean waters as a marine protected area. This is not decided yet, however, we still hope that this can be realised. The presentation of Ricardo Santos will further elaborate on this.

This workshop and round table discussion shall give you a first possibility for getting informed about the project, its aims and way of working. For us, these two days are a precious first meeting with you as stakeholders for seamounts in the northeast Atlantic. Please share your experience and knowledge with us.

- We want to listen to you!
- We would like to know what your expectations to the project are.
- What are your views on the need for conservation measures for seamounts?
- Which management techniques could you propose?
- We need your expertise to be able to fully describe the sites, ecosystems and human uses.

WWF is a partner in this project and responsible for carrying out work related to public information, education and acts as an interface between science, policy and the public. In particular, scientific results are disseminated into ongoing political processes related to marine conservation at global and regional level. All information on the project and documents produced can be found on the OASIS website. An OASIS newsletter, which is also communicated by email, summarizes the most important progress done in the project twice annually.

**Part II – Presentations given at the workshop**

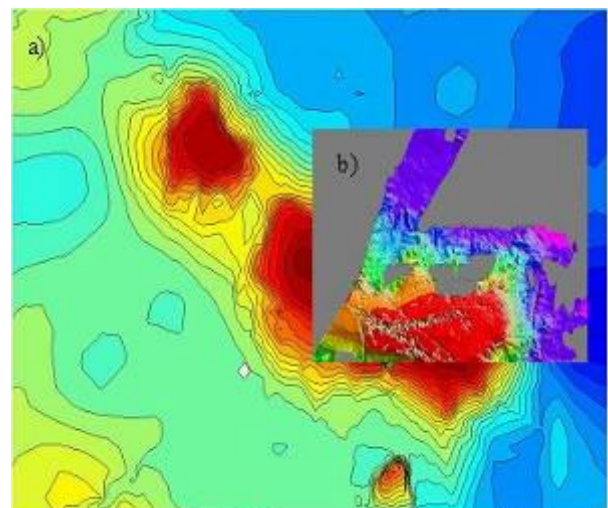
**The OASIS project: activities, goals and scientific results**

*Ana Martins, Instituto do Mar / Departamento de Oceanografia e Pescas, Universidade dos Açores, and OASIS Consortium*

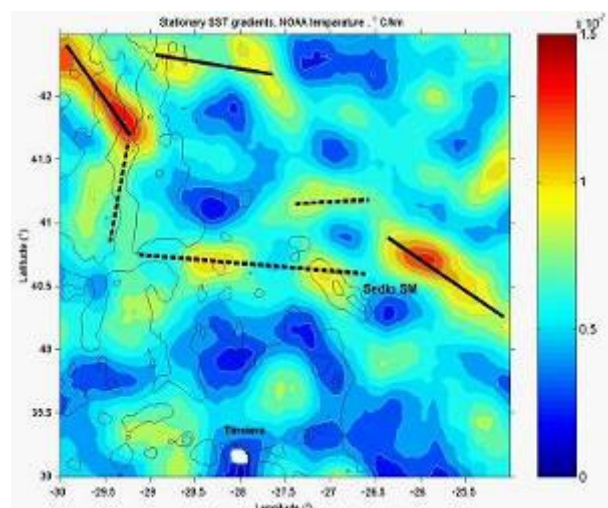
There are some ten thousand seamounts and many more abyssal hills spread throughout the world's oceans and their study dates back over a century. Still, present knowledge of the functioning of seamount ecosystems is fragmented. Little is known about the role of seamounts and abyssal hills in hydrodynamic processes and their consequent influence on biological and biogeochemical processes of the oceanic water column and underlying sediments. Seamounts are of great interest to science, industry and conservation due to their potential role as "stirring rods" of the oceans. Their shape, size and topography induce rich and complex patterns. They support distinct, often highly endemic and abundant fauna and provide lucrative fishing grounds and the potential for further exploitation of natural resources. However, they are very sensitive to disturbance from human activities, leading to a growing concern about the threats to these habitats.

There is a strong need for ecosystem-based management approaches and within the OSPAR convention, seamounts are considered to be of high priority for developing such programmes and measures. The EVK3-CT-2002-00073-OASIS project was proposed within the EC's 5<sup>th</sup> framework programme. OASIS includes 6 workpackages (WPs) and several tasks with the aim to describe the functioning characteristics of two seamount ecosystems. OASIS' holistic approach integrates hydrographic (WP1), biogeochemical (WP2) and biological (WP3) information. Based on two case studies, OASIS yields an advanced mechanistic understanding of the processes characterizing seamount ecosystems, and their influence on the surrounding ocean. The scientific results, condensed in a conceptual ecosystem model (WP4), will be applied to outline a model management plan as well as site-specific management plans for the seamounts investigated (WP5). WP6 covers the coordination and management of the project.

The two OASIS study sites (Seine and Sedlo seamounts, located in the NE Atlantic) were chosen for minimal logistic expenditure and maximum scientific outcome. The seamounts are both relatively isolated and lie within the same biogeochemical region. Both sites can be sampled during a single cruise using relatively small research vessels. Sedlo is located about 150 km north of the Azores and features three main peaks along a



Sedlo bathymetric map. a) Etopo 2, the South African exploratory fisheries; and OASIS R/V "Arquipélago" 2003 cruises; and b) from OASIS cruise M60/1, using a multibeam hydrosweep echosounder. Canions on top of SE summit are clearly seen. ©Ana Martins



Mean horizontal SST (AVHRR) gradients over the Sedlo SM, averaged over the period April 2001-Jul 2002). Solid and dashed line marks represent clear and not so clear maximum gradients, respectively. Satellite imagery was obtained at the Azores HRPT station (HAZO). ©Ana Martins



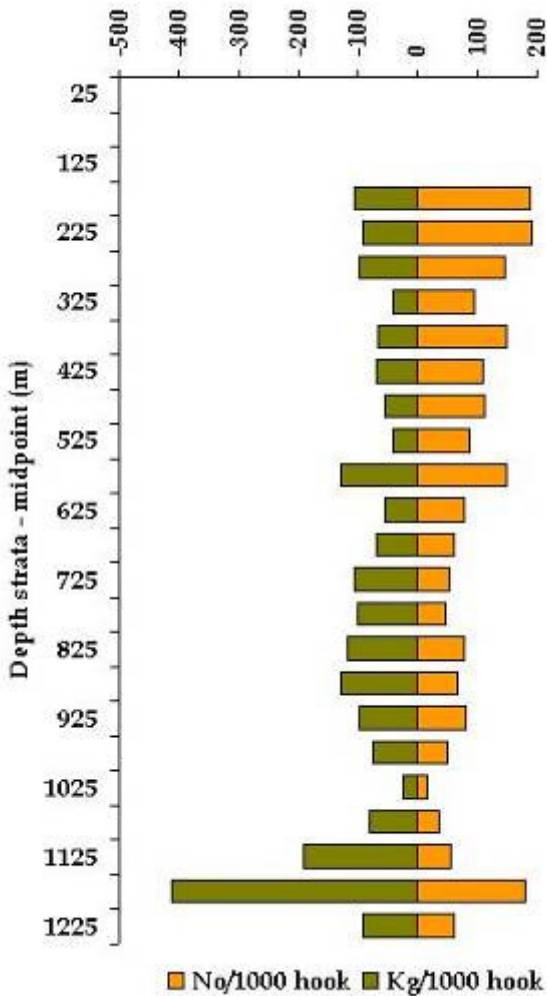


The OASIS partners © OASIS

NW/SE axis, with a maximum elevation of about 2500 m. It is surveyed, but not exploited. Seine is located northeast of Madeira, more regular in shape and has a single peak with a maximum elevation of about 4000 m, and with a basal area of about 2800 km<sup>2</sup>. It is heavily deep-sea fished.

OASIS involves nine partners from five countries, and is coordinated by the University of Hamburg, Germany. OASIS is the first integrated study of seamounts, linking physical, biogeochemical, and biological processes. It covers the seamounts from the deep-sea base up to the summit, and targets all major ecosystem components. It is also the first study addressing the role of the benthic mixed layer and its community in the mediation of water column to seabed exchanges, quantifying processes that provide nutrition to seamount communities. It uses advanced instrumentation and methods (e.g. MOCNESS, WASP, Epibenthic sledge, boxcorer, ADCP, Hydrosweep and Parasound, satellites, SAPS). The organizational innovation is reflected in the incorporation of potential end-users, with direct availability of project results to political bodies. During the first year, three cruises were made to Sedlo and four to Seine, using the research vessels Meteor and Poseidon (Germany) and Arquipélago (Portugal). During the first year, OASIS newsletters and brochures were released, and results were compiled in a scientific and technical report.

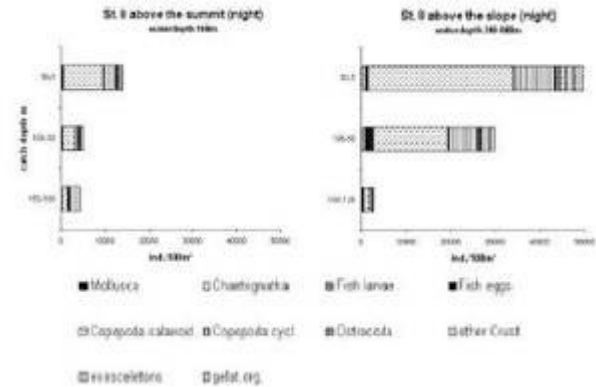
Work Package 1 included, among others, measurements of currents, temperature, conductivity, pressure, oxygen, and satellite-derived (Sea Surface Temperature (SST) and Ocean Colour) distributions. Bathymetric maps were improved for Sedlo seamount. Current meter, Acoustic Doppler Current Profiler and Conductivity-Temperature-Depth (CTD) data allowed a first characterization of the mean current profiles and the identification of typical water masses in the vicinity of the seamounts. Enhanced mean horizontal SST gradients over Sedlo together with CTD data suggest penetration of colder waters from the north further south along the Mid-Atlantic Ridge and Sedlo regions. WP2 included the sampling of particulate organic carbon (POC), dissolved organic carbon (DOC), chlorophyll a and <sup>234</sup>Thorium in the water column and in the sediments, counts of phytoplankton cells, and measurements of primary production and water column respiration (ETS). Results from gross primary production (Pg), net primary production (Pn) and respiration (R) measurements on Seine are within the range of primary production estimated given by Mourino et al. (2001) for the Great Meteor Tablemount. Phytoplankton abundances suggest a dominance of small forms over larger phytoplankton. Results from the distribution of organic carbon (OC) and remineralization rates in the water column reflect



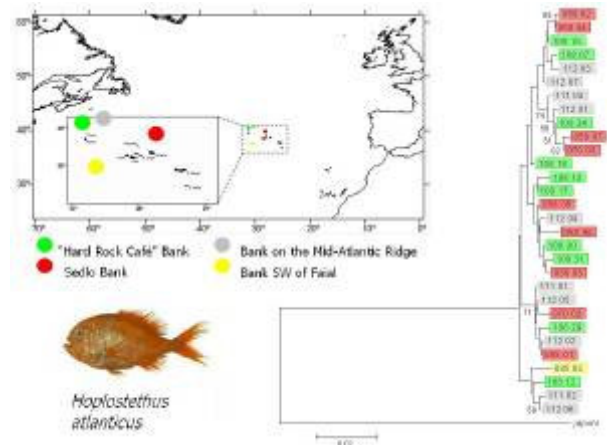
Global demersal catch rates as a function of depth strata obtained from the demersal cruise survey that took place on Seine seamount on board R/V "Arquipélago". © Gui Menezes

external inputs of organic matter advected from the African upwelling region. Observed POC and particulate organic nitrogen (PON) values agree with estimates from samples collected in other Eastern Boundary Currents, but are considerably higher than estimated from open ocean regions. Analyses of particulate carbon (PC), POC, particulate nitrogen (PN), C/N and particulate inorganic carbon (PIC) for Seine (Table 1) suggest rapid degradation of organic matter on export from the photosynthetic layer. First results on thorium for Seine reveal a  $^{234}\text{Thorium}/^{238}\text{Uranium}$  disequilibrium in the surface water column at all stations due to rapid adsorption and export of thorium on particles. A possible explanation is a (localized) resuspension loop on the slope of the seamount scavenging  $^{234}\text{Th}$  from the mid-water column. WP3 included stratified zooplankton, micronekton, and fish sampling. WP3 results for zooplankton and micronekton show that during day and night time the biomass of animals <2cm was much lower above the plateau of Seine seamount than above the slope, and lower than at the far field station during night. The taxonomic composition reveals high diversity with a rather uncommon (especially above the upper slope) relatively high abundance of cyclopoid and poecilostomatoid copepods. Preliminary results from the demersal cruise survey suggest that species and community structures in Seine are similar to what is found in other Azorean Exclusive Economic Zone areas (between 150–1200 m depth). Differences observed can probably be explained by changes in latitude and habitat/substrate sampled. In WP4, genetic studies were performed on four selected fish species to study their genetic variation between seamount stocks and to infer the degree of evolutionary isolation and external recruitment in seamount stocks. Besides Sedlo seamount, genetic samplings were performed on the “Hard Rock Café” bank, Mid-Atlantic Region, and SW of Faial. Among others, a complete sequence of the D-loop for orange roughy (870bp) and black scabbard fish (733bp) was performed, sequences were aligned and construction of the phylogenetic trees was made using appropriate software. Macrofauna biodiversity was assessed through extensive taxonomic analysis.

Based on the information gathered, an “Offshore MPA Toolbox” (see Part III – Theme III) was developed and disseminated. This is an important contribution to the development of the OSPAR and EU protected area networks. Finally, under WP5 an OASIS website was established in January 2003 and has been continuously developed since then. Several other activities were taken, e.g. press releases, international TV broadcasts, scientist interviews, stakeholder workshops, mini-campaigns, talks in public schools, and dissemination of scientific results in political bodies and in specialized conferences, contributing to decision-making processes.



Taxonomic composition of zooplankton at station 8 above Seine seamount. © Ana Martins

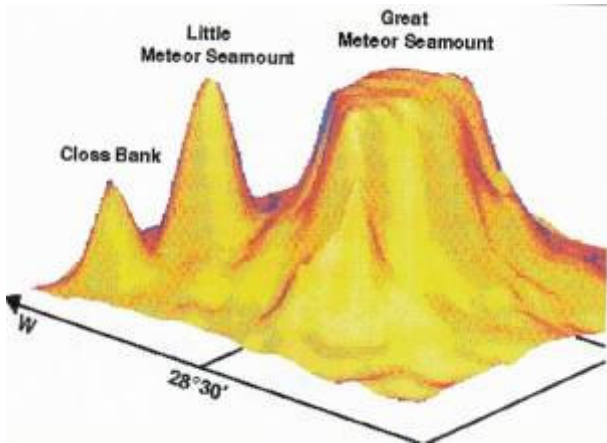


Sampling locations “Hard Rock Café” bank (in green), Sedlo seamount (in red), Mid-Atlantic Ridge (in grey) and SW of Faial island (in yellow); b) NJ tree using the parameters suggested by the output of the MODELTEST 3.06 software (Posada and Crandall, 1998). © Sergio Stéfani / ImagDOP

**Seamounts in the North-East Atlantic**

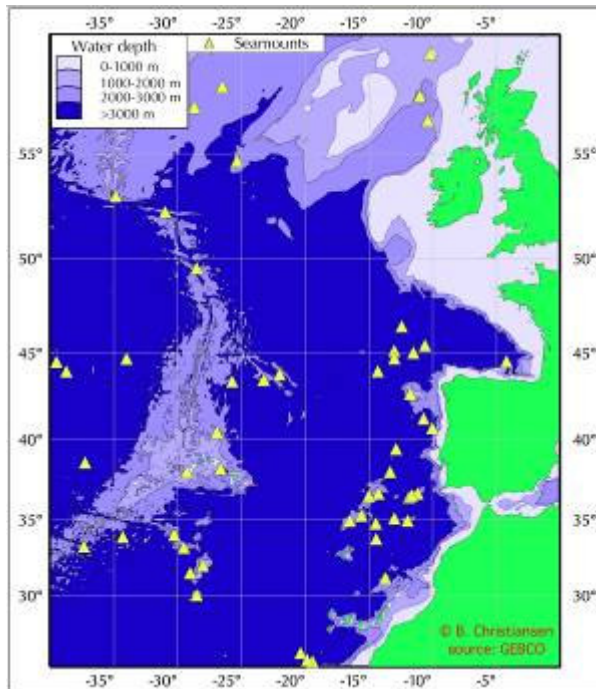
*Susan Gubbay, Consultant*

**What are seamounts?**



Topography of Great Meteor Seamount  
 © Mohn & Beckmann

**The hydrography of seamounts**



Seamounts are generally isolated, typically cone shaped undersea mountains rising relatively steeply at least several hundred meters from the surrounding deep sea floor.

There are at least some 800 major seamounts in the North Atlantic, mostly occurring associated with the Arctic Mid-Ocean Ridge, the Mid-Atlantic Ridge (MAR), and the Greenland-Iceland/Iceland-Faeroe Rise, large features which dominate the topography of the seabed. However, there are also clusters of seamounts some distance from the MAR such as those along the south west of the Rockall Bank and west of Portugal on the Madeira- Tore Rise.

Water mass circulation is characterized by the warm North Atlantic Drift setting northeastwards, seasonal upwelling off southeastern Europe and North Africa, and cold deep water formation off Greenland which then prevails in the North Atlantic deep sea. At the Mid Atlantic Ridge, and in particular around the islands of the Azores, currents, water masses and species of different biogeographic origin meet and mix - shallow seamounts often acting as stepping stones for cross-Atlantic dispersal of species, including wide-ranging migratory species. Reproductive isolation between seamount and ridge systems may also lead to elevated numbers of endemic benthic species, however this cannot yet be confirmed based on the limited data available.

Because of their volcanic origin and steep slopes amplifying the prevailing currents, hard substrata are common on seamounts and may be formed into a terrain interrupted by faults, fissures, down-dropped blocks,

canyons, caves and hummocks. Softer substrata may also be present and include biogenic sediments such as foraminiferan sands, lithogenic sediments transported from the continental margin, and authigenic sedimentation, principally from the precipitation of ferromanganese oxides.

There is a paucity of information on the benthos, illustrated by the fact that a century of study has resulted in the identification of just 596 invertebrate species from all seamounts explored up to the late 1980's. The enhanced currents that sweep around the seamounts and the exposed rock surfaces provide ideal conditions for suspension feeders, and it is these that often dominate the benthos. Cold water corals can be particularly abundant with gorgonian, scleractinian and antipatharian corals, some or all recorded from a number of seamounts at several hundred meters depth.



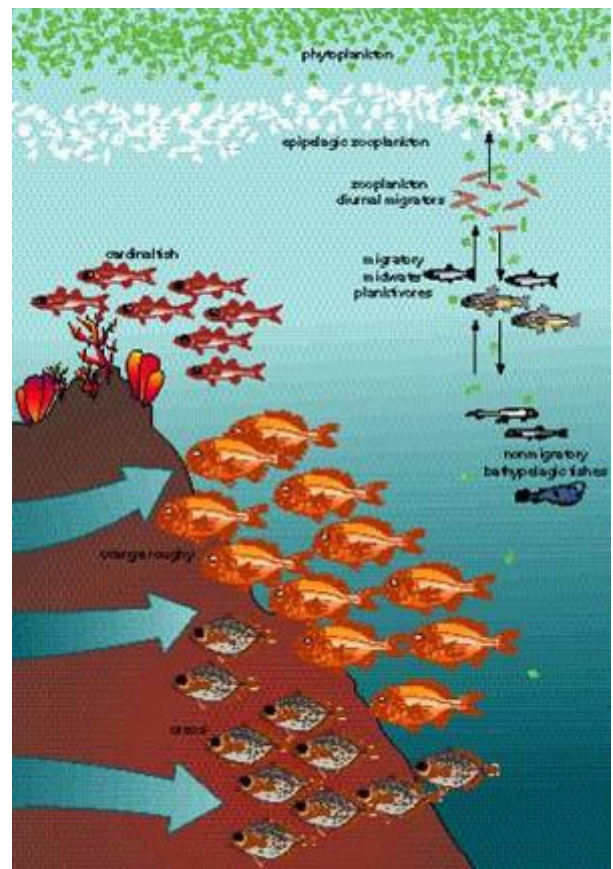
Studies of the pelagic communities above seamounts reveal qualitative and/or quantitative differences when compared to the surrounding water. The higher biomass of planktonic organisms over seamounts constitutes an important basis for the diet of fish, squid and top predators such as sharks, rays, tuna and swordfish. Small and large cetaceans, and turtles also aggregate at these biologically productive hydrographic features.

The fish communities found around seamounts have evolved a suite of morphological, ecological, life history and physiological features that enable them to successfully exploit an environment with enhanced currents and greater flux of organic matter than much of the deep sea. Many are adapted for strong swimming performance, deep-bodied and with relatively high rates of metabolism and food intake. They may also be exceptionally long-lived with a slow growth rate. Some are also subject to extremely high recruitment variability, with successful recruitment occurring on approximately decadal time scales. Such species include the teleosts like orange roughy, oreos, pelagic armour head, and *Sebastes* spp., as well as various species of sharks and skates. Deep sea fish which form spawning aggregations on North East Atlantic seamounts include the orange roughy (*Hoplostethus atlanticus*), roundnose grenadier (*Coryphaenoides rupestris*) and oreosomatids - smooth oreo and black oreo (*Pseudocyttus maculatus* and *Alloctytus niger*).

The most significant threat in terms of geographic spread and scale of impact is commercial fishing. Commercially important species known to occur on seamounts in the NE Atlantic include tusk (*Brosme brosme*), blue ling (*Molva dipterygia*), morid cod (*Mora mora*), orange roughy (*Hoplostethus atlanticus*) and the shovel nosed shark (*Deania calceus*). They have been the targets of intensive exploitation using longlines, mid-water trawls and bottom trawls that can operate at depths of more than 1500 m. The search for new locations and potentially marketable deep-water fish on seamounts is a continuous process, fuelled by the depletion of shallow water stocks and the unsustainability of exploitation of deep water stocks.

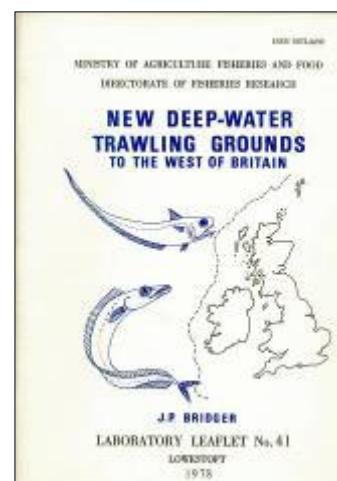
The effects of fishing on seamount fish stocks are difficult to distinguish from the effects of deep-sea fisheries in general because catch statistics are pooled for relatively large areas. There is also extensive incomplete reporting of deep water catches and landings from international waters. In most cases fishing has taken place before there is a reasonable understanding of the biology of the species targeted, and in the absence of formal stock assessments or quotas. The result has been overexploitation and major crashes in the different stocks, i.e. of orange roughy and blue ling. Another cause for concern is the high rate of discards of

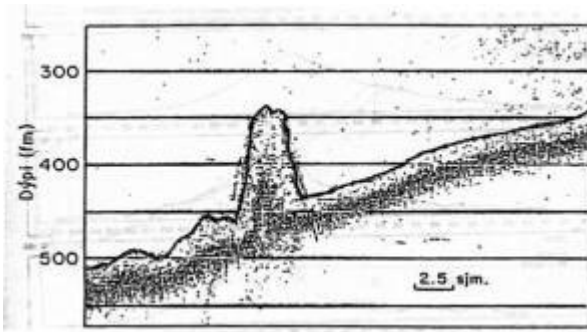
*The benthic, pelagic and fish communities*



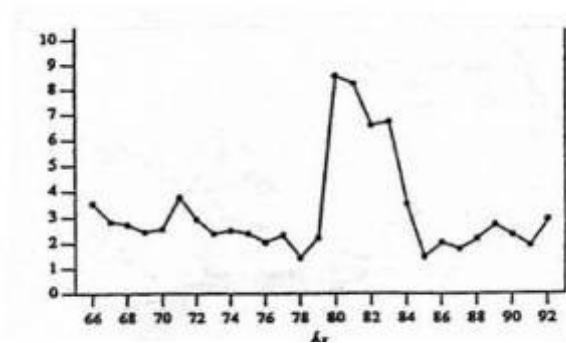
Seamount fish aggregations © T. Koslow

*Threats to seamount biodiversity*





Profile of unidentified seamount that was a spawning location for blue ling south of the Westman Islands targeted by a blue ling fishery  
 © Magnusson & Magnusson, 1995



Icelandic catch of blue ling showing peak associated with fishing the spawning aggregations on a seamount south of the Westman Islands  
 © Magnusson & Magnusson, 1995

**Threats other than fishing**

**Safeguard the biodiversity of seamounts**

ecologically vulnerable deep sea species associated with deep water fishery in general, with one ton of fish discarded for every ton of fish landed.

Fishing activity is also known to have had a massive impact on the benthos of seamounts in other areas of the world's oceans. However, for the North East Atlantic data on impacts are missing due to lack of scientific studies.

Next to demersal fisheries, which have rapidly driven some deep-sea fish stocks to commercial extinction and depleted previously abundant fishing grounds, the use of longlines, driftnets and purse seines are known to have taken many thousands of seabirds, cetaceans, and turtles between them as "incidental catch". Recreational fishing, while not as widespread in these environments, adds to pressure on the biodiversity on some of the shallower offshore banks and reefs where top predators such as sharks are targeted.

Other threats, though less imminent, are pollution associated high contamination levels of top predators, threats associated with the dumping of litter, deliberate discharge of oily and chemical wastes, accidental spills, leakage from sunken ships, noise pollution and, possibly, from the exchange of large volumes of ballast water. More localised threats include those associated with the deep-sea disposal of wastes, mineral extraction and bio-prospecting.

The habitat and associated species on seamounts have been identified as being particularly vulnerable, and there have been calls for measures, such as the establishment of Marine Protected Areas, to safeguard the biodiversity of these features and their associated wildlife, and to provide opportunities to learn more about them.



Download the 'Seamounts of the North-East Atlantic' report:  
<http://www.rz.uni-hamburg.de/OASIS/Pages/publications/Seamount%20Report.pdf>



**Fishing on seamounts: a scientific perspective - from global to local**

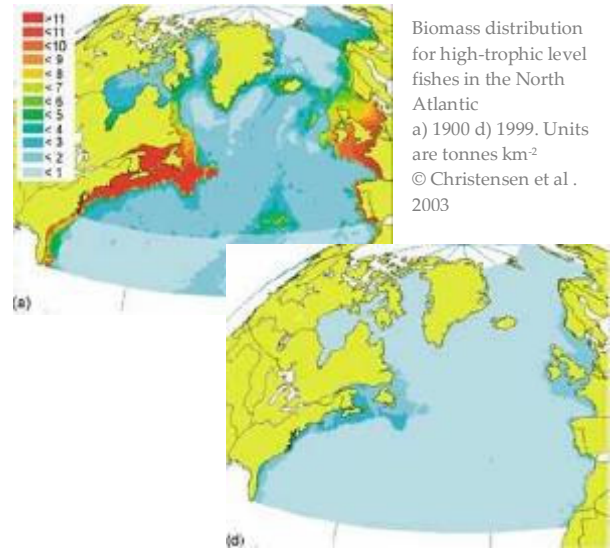
*Gui Menezes and Telmo Morato, Departamento de Oceanografia e Pescas, Universidade dos Açores*

Seamount fisheries have recently deserved much attention mainly because of their increased economical importance and the recognition of their impact on the ecosystems. However, information on seamount fisheries is very sparse and it is difficult to make a distinction between deep-water fishing activities in general and those on seamounts. Fish species living on seamounts are also known to occur in other habitats, such as continental slopes, and landings statistics are not spatially resolved. These aspects make it difficult to generate an estimate of the total seamount fisheries worldwide.

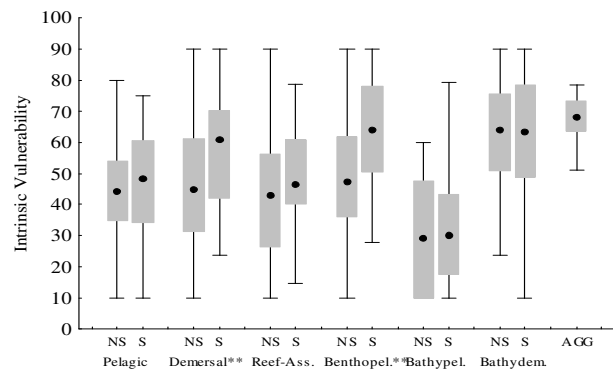
Seamount fishes, and particularly seamount aggregating fishes, have more vulnerable biological characteristics than non-seamount fishes. Seamount-aggregating fishes generally have a longer lifespan, later sexual maturation, slower growth and lower natural mortality. Because of these and some other characteristics they are the extreme end of the spectrum of vulnerability to exploitation.

Seamount fisheries are mainly conducted with highly developed deepwater trawls targeting dense fish aggregations. Due to the life history of the species targeted, deep-water fisheries in general and seamount fisheries in particular are usually characterized by a boom and bust sequence. Nevertheless, in some oceanic islands in the South Pacific or in the Azores and Madeira, there has been a long history of artisanal handline fisheries for deep-water species. Nowadays, these seamount fisheries operate with semi-industrial longline, handline and pole-and-line techniques and are believed to be sustainable. The typical boom and bust sequence has not been observed, but signs of stock decline have been determined and published.

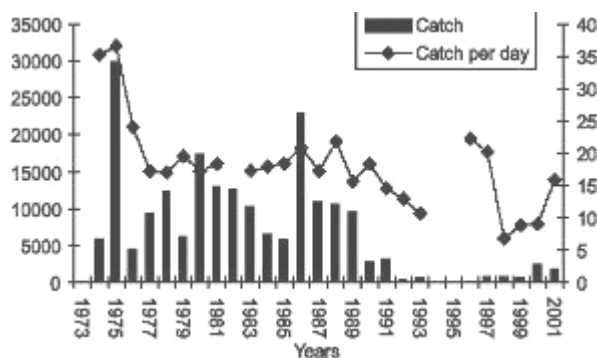
Whether seamount fisheries, and particularly deep-water trawling, can or cannot be sustainable in the long run is under discussion. Recently, several scientific studies, environmental agencies and governments have strongly highlighted the urgent need for an implementation of fishing regulations for deepwater fisheries, the establishment of marine reserves and/or a ban of deep-water trawling in what is considered a very sensitive habitat.



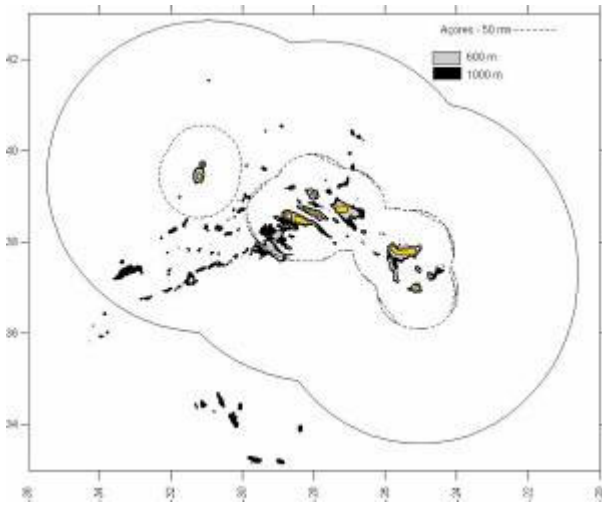
Biomass distribution for high-trophic level fishes in the North Atlantic  
 a) 1900 d) 1999. Units are tonnes km<sup>-2</sup>  
 © Christensen et al. 2003



Intrinsic vulnerability index for fish species of different habitats not occurring on seamounts (NS), occurring on seamounts (S). Vulnerability of seamount-aggregating species (AGG) also presented. © Morato et al. 2004



'Boom & Bust' development of catches (left-hand scale, tonnes) and catch per fishing day (right-hand scale, tonnes) of roundnose grenadier, *Coryphaenoides rupestris* on 34 seamounts of the Mid-Atlantic Ridge.  
 © Telmo Morato



The Azores © Ricardo Santos / ImagDOP

The Azores are geographically isolated in an area with a high topographic complexity of the Mid-Atlantic Ridge, and a high oceanographic variability strongly influenced by the Gulf Stream to the north and by a multiple flows system to the south. The waters of the Azorean sub-area under Portuguese jurisdiction (EEZ) cover about one million km<sup>2</sup>, with a medium depth of about 3.000 m.

Only 7.715 km<sup>2</sup> (0.8%) of the bottom is at less than 600m depth, while about 64.730km<sup>2</sup> (6.8%) lie between 600 and 1500m. As a result, the area actually suitable for fishery, namely for the demersal and deep sea species, is very limited. In addition to the small size of the fishing grounds available, there are other ecological and environmental factors of the oceanic waters in this depth that contribute to their low productivity when compared to the areas of the continental platform.

The Azorean fisheries can be considered as being of small scale. Between 1986 and 1998, the Azores contributed about 9% to the total Portuguese landings on average. More recently, with the tuna catch crisis, this relative importance declined even further. Only in 1998, the global landings exceeded 20.000 tons, with an average of the annual landings from 1982 to 2001 around 12.000 tons, corresponding to approximately to € 16.4 million. The total landings have decreased considerably since 1995, while its monetary value increased. The first sale values at auction places today represent about € 25 million per year.

The fishing activity in the Azores can be divided into four main categories.

- 1) a fishery targeting small pelagic fishes, blue jack mackerel and mackerel, which is made up by small vessels with open deck, usually with a length below 12m, and using small seine nets, lift nets, etc.
- 2) a seasonal pole-and-line -fishery using life bait and targeting tuna is operating with vessels of a length between 15 and 30m.
- 3) Third, a fishery for the demersal community made up by open deck vessels (<9m) or those with a cabin (+/- 14m), using several kinds of fishing methods, mainly handlines (“espinhel”) and bottom longline.
- 4) And forth, a fishery targeting swordfish (*Xiphias gladius*) has developed and is operating from vessels ranging from 14 to 30m length, using surface longline.

The Azorean licensed fisheries fleet in 2002 was mainly composed of small boats (<9m) which represent at least 74%, followed by the open deck boats larger than 9 meters with 14%, and the small longliners below 14 m with about 6%. All these vessels usually use a great variety of fishing methods, among them traditional and

*The Azorean fishery*



Azorean fishing boats © Gui Menezes / ImagDOP

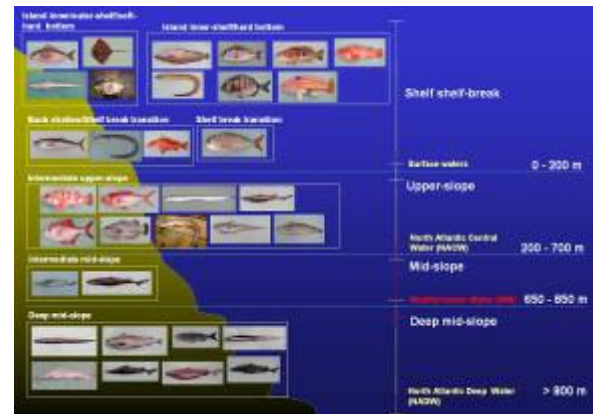
selective handlines and longlines for the demersal and deep-water fish species. About 3% of the vessels are longliners bigger than 14 m and finally, about 4% of the fleet is composed of pole-and-line tuna boats.

The multispecific nature of the demersal fishery in the Azores together with the high geographic dispersion of the fishing grounds (islands slopes, seamounts, banks, etc.), bring several challenges with them regarding their assessment and management, where the spatial structure of their populations and the spatial harvesting strategy must be taken into account. Fishing is distributed over several patches in all the Azores' EEZ and fishing intensity is heterogeneously distributed in a heterogeneous seabed ecosystem near or over submarine mounds and islands slopes.

In a recent study, Manchete *et al.* 2002, identify more than 130 seamounts (only considering those underwater features with base depths below 2000 m and peaks below 1200 m), showing a high diversity of sizes, forms, depths, degrees of isolation, etc. The spatial distribution of species and harvesting follows the seabed characteristics (islands slopes, seamounts, banks). Under these conditions it is expected that the dynamics of an entire exploited fish "metapopulation" (a group of subpopulations) is affected by many factors, including those related to the harvesting strategies. According to Sanchirico and Wilen we won't be able to understand the biological processes which drive an exploited system without knowing the harvesting system. The authors show that natural spatial dynamics of populations and the spatial harvesting dynamics can act simultaneously to homogenize abundances or to amplify differences among patches. In this scenario, a spatial fishing reporting with a fine resolution is essential for the assessment and management of fish populations.

For several demersal fish species in the Azores, there is concern that current catch rates can only be maintained by sequential depletion of each relatively isolated concentration or sub-unit of a stock. The relative abundances of the species in this region (and consequently of their sub-units) are relatively low, and even with the use of traditional and less damaging gears, the species can become locally depleted over time (as they already are in some areas), if the fishing effort on each sub-area is excessive. Moreover, the catch rates of the commercial fishing fleet could continue to be relatively high, with the total number of patches with reasonable catch rates decreasing, thus possibly masking the real total abundance of a population. When more and more sub-units or local populations are being depleted, "metapopulation" dynamics, which are influenced by environmental and density depend migration factors, can be strongly affected. The recovery in a patch or of the whole fish population exploited will

*The seamount fishery*



Fish assemblages along the Azores' slope © Gui Menezes / ImagDOP

*Sub- and meta- populations of seamount communities*



Target species of the Azorean seamount fishery  
 © Koslow et al. 2000. ICES Journal of Marine Science. 57: 548-557;  
 Vinnichenko 2002. ICES CM2002/M32: Poster;  
 Telmo Morato

**Important physical variables of spatially discrete areas**

**Important questions / knowledge gaps**

be difficult and uncertain, as it is dependent on many factors.

In a spatially discrete environment like the fishing grounds of the Azores, the subpopulations are linked by dispersal mechanisms which are poorly known. Further increasing the complexity, many species inhabit a wide depth range during their life history, and can have very different strategies, especially in the first life stages. From the general conceptual framework and basic models of species life histories and dynamics, several spatial larval replenishment models of a patchily distributed population can be envisaged. These models are usually applied when studying the fisheries effects of Marine Protected Areas. Each of these models, along with the dispersion capabilities of juveniles and adults, varies from one species to another, and all these specialities can imply the need to take different spatial management strategies for each species or similar species groups.

The abundance of any exploited fish population in a patchy environment depends on the species life strategy, on the local (subpopulation's) dynamics and on the spatial harvesting dynamics. A further necessity for the knowledge on those abundances is the understanding of important physical variables of the patches (e.g. seamounts) such as:

- Area/Size
- Distance/Degree of isolation
- Depth
- Shape
- Oceanographic dynamics

In a metapopulation context, such as the one found in the Azores, it is important to try to answer the following questions:

- Are the dynamics (mortality, birth, immigration and Martins emigration) on a patch more or less independent from other populations?
- Is small population size (of one small seamount or pinnacle for example) a problem?
- Are there environmental factors which affect more than one patch simultaneously? Correlated dynamics across subpopulations seem to be likely to occur and we have several examples in Azores with, inter alia, the species *Lepidopus caudatus* and *Pagrus pagrus*.
- Are there source populations which are more productive in terms of emigrants and more persistent in other habitats (e.g. islands, banks)?

- How far do emigrants go and where do immigrants come from and in what life stages (larvae, juveniles, adults).
- Which patches are actually connected in a network, and which are less isolated?

Many of these important questions are complex, poorly known, and data demanding, making it difficult to assess and manage fisheries in this spatially structured environment. Therefore, precautionary and specific fishing management strategies should be applied to areas like the Azores. Management must be supported by spatial control of the fishing effort and fishing methods, taking into account the spatial distribution of the resources and their biological vulnerabilities to exploitation. An ecosystem precautionary approach, if implemented by a zonation strategy of fishing and all other human activities, seems to be essential to manage the Azorean waters in an integrated way. The current fisheries management framework under the European Union (the Common Fisheries Policy), which is to a large extent based on an industrial fisheries scenario, on species by species catch limits, and applied to large statistical areas, seems to be inadequate when applied to insular areas like the Azores. Preventive and precautionary measures should be anticipated and preferred to restorative ones like species TACs or species recovery plans.

In conclusion, fisheries management should be based on a spatial/habitat level, instead of a species level management. Fishing grounds should be integrated in a rational management network based on a fishing effort control, spatially adequate, with a strict regulation and/or zonation of all the other marine activities on the islands coasts and seamount areas.

### *Spatial control of the fishing effort*

### *Conclusion*



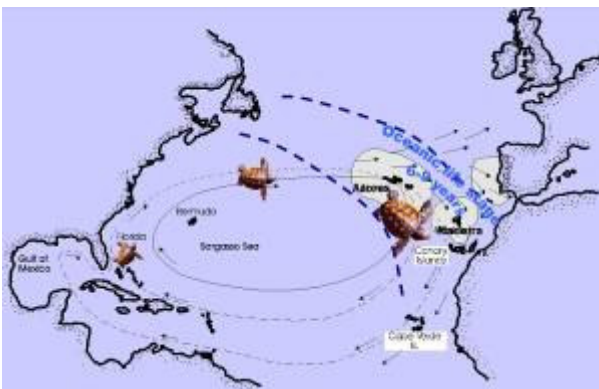
*The importance of seamounts for turtles*

*Thomas Dellinger, Universidade da Madeira*



Loggerhead turtle hatchling  
 © WWF-Canon / Michel Gunther

*Sea turtle migrations*



Brief loggerhead turtle (*Caretta caretta*) life history  
 © Thomas Dellinger

Large predators such as billfishes, tunas and sharks show highest diversities at intermediate latitudes (20-30° N and S). These oceanic diversity hotspots are often found close to prominent features like reef, shelf breaks and seamounts. Seamounts are traditionally thought of as concentration points for marine life within the pelagic domain of all major oceans. For far ranging species this has not often been documented. For example, Klimley et al. studied hammerhead sharks that used a Californian seamount as their diurnal “home” during the study period. Fonteneau studied the association of tropical tuna with east Atlantic seamounts in greater depth. Marked tuna were recaptured on the same seamount after 55 days. One individual Skipjack tuna (*Katsuwonus pelamis*) was tracked for 44 hours. The fish remained within the 6 nautical mile radius around the seamount. Fonteneau also found that species composition was not the same over the seamounts as it was offshore and for each species, seamounts harboured generally smaller fish than were captured offshore.

Sea turtles are usually not considered top predators because they feed on plants or invertebrates. Most species are neritic most of the time and thus seem unrelated to oceanic seamounts. Some turtle species however have an oceanic life stage during their life cycle. Loggerhead sea turtles *Caretta caretta*, the species we will be dealing with in this article, spend the first 6-9 years of their life in an open ocean environment. Leatherback sea turtles *Dermochelys coriacea* spend most of their life in the open ocean.

In the Northern Atlantic Ocean, loggerhead sea turtles are born in US and Mexican nesting beaches. After emergence from their nest, they swim into the open ocean, initiating their offshore life stage. Juvenile loggerhead sea turtles are found off the US coast when still very small, the post-hatchling stage. Currents transport them further north and eastward, and larger juveniles, the pelagic stage, are found in oceanic habitat off the Great Banks down to Mauritania, a huge area that crosses the North Atlantic Basin. Large concentrations of turtles are found within this area offshore the archipelagos of the Azores, Madeira, and the Canaries, as well as in their surrounding waters. There turtles are regularly seen basking in the calmer leeward areas of the islands. East Atlantic waters also harbour a number of seamounts. Furthermore they are just north of the pelagic biodiversity hotspot latitude of 20-30° N.

*Do turtles use these seamounts as they seem to do with islands?*

We here summarize empirically the results from a satellite tracking experiment involving 10 juvenile loggerhead sea turtles tagged off Madeira Island/Portugal.

Experiments were performed in 1998. We tagged two groups of 5 turtles each, the first in spring in 1998, the second in autumn of the same year. Turtle capture, type of equipment used and transmitter attachment are reported elsewhere. Tracking results have not yet been published and can be found in a preliminary form in the projects final report; and, most relevant for the topics dealt with here, in a DEA thesis.

Turtles were tracked on average for 7.4±3.4 months (Average±SD). Our maximum tracking time was 11.2 months with daily transmissions. During this time turtles covered an average of 4700±2300 km, the longest track being 8576 km. Turtle tracks differed between the spring and the autumn group. For the first group all turtles except one took north-westerly directions, eventually reaching the Azores and further. For the autumn group all except one took southerly directions to the Moroccan and Mauritanian coastal waters. Though one can speak of a general migratory direction, a smaller scale analysis showed that tracks were rather sinusoidal.

In an effort to begin to understand these smaller scale movements we superimposed tracks on the underlying seabed topography, whose outstanding features are islands and seamounts. This preliminary analysis showed that at least 4 different turtle tracks were influenced by seamounts. Turtle "Lidia" changed its northerly track near seamount "Dragon", then swam almost directly to seamount "Lion", after which she regained her northerly track again. Turtle "Samina" passed five seamounts on her clockwise course around Madeira, starting with seamount "Dragon", then "Lion", then four others. Her course looks like she was able to detect seamounts, since her track, which was not linear, sampled most seamounts on the route. The third example was from turtle "Helena" that passed seamount "Dacia" and performed anticyclonic circles around another seamount with 500m depth. These anticyclonic and cyclonic circles around seamounts were most clearly observed on turtle "Délia's" track.

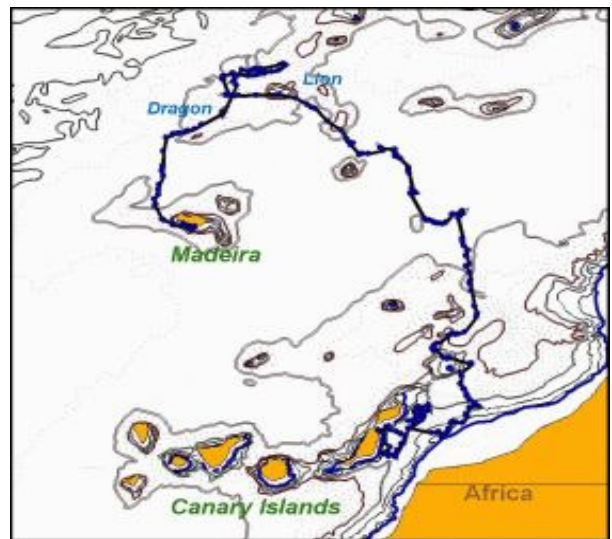
**In conclusion**, sea turtles are not resident at seamounts, they merely pass by

These seamounts are generally not the most prominent seamounts, meaning they are not the ones whose summits are closest to the surface. Track sinuosity sometimes increases close to seamounts augmenting residency time around these. This might be the

*Do turtles use these seamounts as they do with islands?*



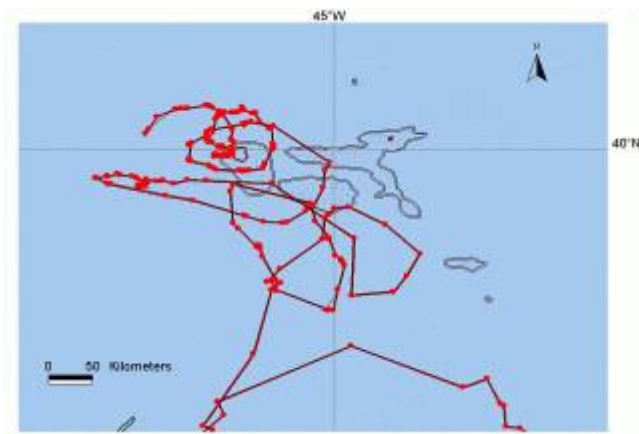
Turtle Lidia's track  
 © Thomas Dellinger



Turtle Samina's track  
 © Thomas Dellinger

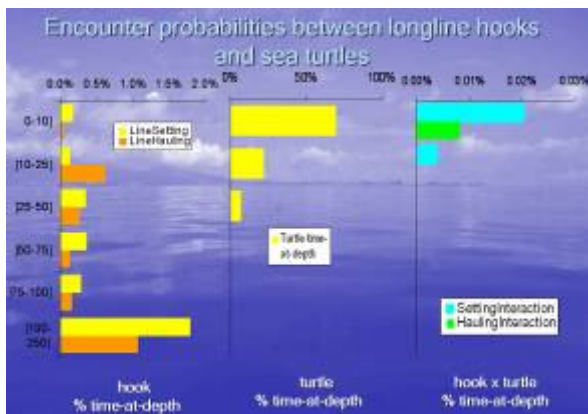


Turtle Helena's track  
 © Thomas Dellinger



Turtle Délia's track  
 © Thomas Dellinger

**Marine turtles, endangered by human activity**



© Thomas Dellinger



Entangled sea turtle that fell victim to ghost fishing by lost or abandoned fishing gear.  
 © Thomas Dellinger

mechanism for a possible concentration of sea turtles around seamounts, and indeed, for other far ranging species. A more detailed analysis is underway and will pinpoint these qualitative inferences.

Further questions remain open, the most prominent being why turtles are interested in seamounts in the first place and how they might find them. For a species whose main developmental period is spent exclusively in the open ocean, feeding seems the obvious candidate as the main reason to approach seamounts. Thus data are needed on sea turtle diet around seamounts as compared to other pelagic areas, as well as data on prey distribution. Main prey are gelatinous organisms, a group that usually is not as well sampled in pelagic collections

Marine turtles are endangered worldwide. In the Azores, 4200 turtles are estimated to be accidentally captured each year in the surface longline fishery.

Given the considerable time-depth overlap between commercial longline operations and sea turtles diving range, surface longline activities must be considered as having a higher impact on sea turtles than deep longlines, with the line setting as the most critical point. Although deep longlines are used in the black scabbardfish fishery, this fishery in a short time has a higher impact in terms of mortality and should not be neglected when regarding the issue of turtle bycatch.

For the loggerhead sea turtle, seamounts seem to play an important role within their main developmental period, the "pelagic or oceanic life stage". Thus a deeper knowledge on turtle biology around seamounts is crucial and must be paired with a protection of this habitat. This may avoid turtles falling victim to increased human activity..



**The Bowie Seamount area: a proposed Marine Protected Area**

*Kevin Conley, Department of Fisheries and Oceans Canada*

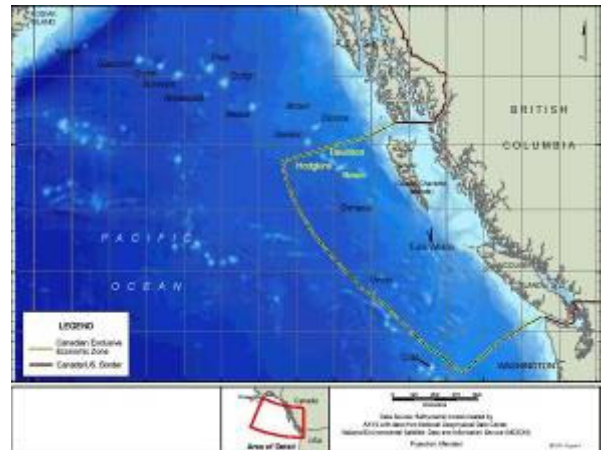
The Bowie Seamount area in Canada’s Pacific Ocean has been proposed for designation as a Marine Protected Area under Canada’s *Oceans Act* (1997). The *Oceans Act* is a three part legislation regarding oceans jurisdiction and management in Canada. Part I of the *Act* identifies Canada’s Maritime Zones, Part II calls for the development of a national Oceans Management Strategy, and Part III identifies the Powers, Duties and Functions of the Minister of Fisheries and Oceans Canada. Part II of the *Oceans Act* defines a Marine Protected Area as a coastal or oceanic area given special status in order to protect and conserve the plants, animals, and habitat within it.

Consistent with Part II of the *Act*, Canada’s Oceans Strategy was developed to define the vision, principles and policy objectives for the future management of Canada’s estuarine, coastal and marine ecosystems. Canada’s Oceans Strategy is based on knowledge from a growing body of ocean management experiences both nationally and internationally. Its further development and implementation will involve active collaboration with partners, and the development of a results-based management and accountability framework to measure progress, relevance and effectiveness.

The *National Framework for Establishing and Managing Marine Protected Areas* presents the general approach that the Fisheries and Oceans Canada (DFO) will take to establish and manage MPAs across Canada. The program will be implemented at the DFO Regional level. Regions, therefore, may develop specific guides for implementing the National Framework to suit local marine conservation and protection needs. Regional guides will be consistent with the National Framework and may provide additional details on aspects of the process. The Framework identifies a 6 step process for establishing, designating, and managing areas as Marine Protected Areas under the *Oceans Act*. This process as it is being applied to Bowie is discussed further.

In 1998, the Bowie Seamount area was identified as a Pilot Marine Protected Area, prompted by an apparent rich biological productivity; potential biological oasis supporting unique plant and animal communities; possible role as a staging area for migrating marine mammals and seabirds; and as the shallowest seamount in Canadian waters. The Bowie Seamount Area is located 180km off the northwest coast of British Columbia, Canada, rising from a depth of 3,000m to within 25m of the sea surface. This identification of the area as a Pilot MPA represents steps one and two in the national MPA process, namely Identification of an Area

**The Bowie seamount area**



Location of Bowie, Hodgkins and Davidson Seamounts in Relation to other Seamounts in the North-East Pacific  
© Excerpt from Canessa, R., K. Conley and B. Smiley. 2003. Bowie Seamount Pilot Marine Protected Area: an ecosystem overview. Can. Tech. Rep. Fish. Aquat. Sci. 2461: xi + 85 p

**The legal framework for an MPA designation**

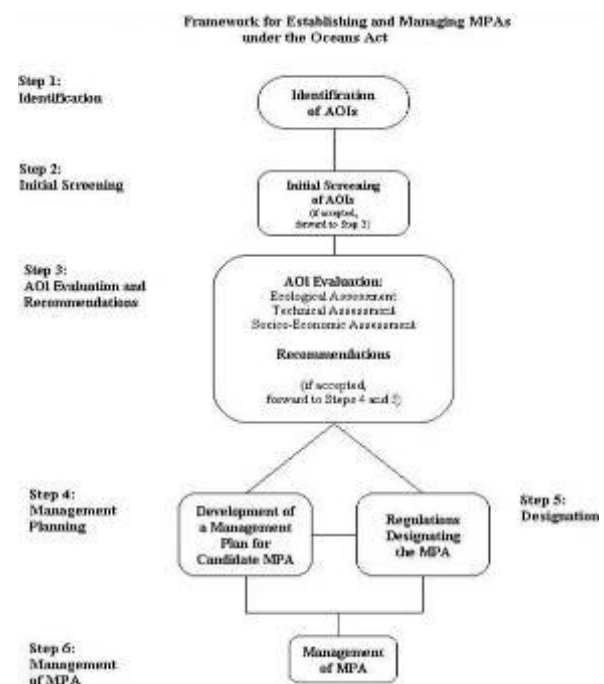


Figure excerpted from National Framework for Establishing and Managing Marine Protected Areas ([http://www.dfo-mpo.gc.ca/canwaters-eauxcan/infocentre/publications/docs/newmpa/index\\_e.asp](http://www.dfo-mpo.gc.ca/canwaters-eauxcan/infocentre/publications/docs/newmpa/index_e.asp))



A Rosethorn rockfish (*Sebastes helvomaculatus*) swimming by an area on Bowie Seamount covered in anemones, sponges and other benthic invertebrates

© Lynne Yamanaka, Fisheries and Oceans Canada

### ***Biodiversity of the Bowie seamount area***

of Interest (AOI) and subsequently the Initial Screening of that AOI.

Step three in the process then calls for the Evaluation and Recommendations of the AOI, namely the Bowie Seamount area. DFO then compiled an Ecosystem Overview to outline the important ecological, socio-economic, and cultural characteristics of the area. The Ecosystem Overview compiles information known about the physical, biological, socio-economic, and cultural characteristics of the area as well as key data gaps relevant to the MPA process. The Ecosystem Overview is intended as background to enable informed decision making in the ecological, technical and socio-economic evaluation of the AOI, which forms the basis for recommendations as to whether and how the area should proceed to designation and management as an MPA under the Oceans Act. Many ecological, socio-economic and cultural data gaps still exist in the context of a comprehensive Ecosystem Overview for the Bowie Seamount area. This will require an adaptive approach to management of the area as an MPA.

The Bowie Seamount area ecosystem has been observed to be host to over 158 plant and animal taxa, similar to those found in nearshore waters but with an unusual juxtaposition of shallow and deep water taxa. The species found in the area range from sedentary, including sponges and corals, to species with small home ranges, such as rockfish (*Sebastes* spp.), to migratory animals, including marine mammals and seabirds. Very little is known about the ecology of the deeper seamounts, Hodgkins and Davidson, though they are believed to have ecological connections with Bowie Seamount. The area is thought to be significantly influenced by oceanographic phenomena such as Haida Eddies and the possible existence of Taylor Columns. Haida eddies are eddies which have been regularly observed originating in the nearshore environment and travelling out to the offshore, and have been observed over the Bowie Seamount. Haida Eddies may be a source of larval dispersion linking the ecology of the seamounts with the coastal ecosystems. Taylor Columns, as were discussed in more detail by other presenters, are a localized eddy that is thought to entrain nutrients and larvae, enhancing local productivity on seamounts. Taylor Columns have been observed at Bowie, and although it's thought this phenomenon may exist permanently in the area, it has not been confirmed as either a long term or sporadic phenomenon.

Primary socio-economic interests in the area have included fishing, research, and to a lesser extent recreational endeavours. Fishing interest has mainly been benthic longlining for rockfish (*Sebastes* sp.) and Sablefish (Blackcod, *Anaplopoma fimbria*), though some sporadic and small scale halibut fishing has been conducted. The trawling industry has conducted test

trawls in the area, but found the seamount too rugged, resulting in extensive damage to gear. Migratory stocks are periodically fished in the Bowie seamount area, including albacore tuna, and a test fishery was conducted for neon flying squid, including sets in the Bowie area, both fisheries conducted by surface jigging. Research has been conducted in the area since the 1960s, however, biological studies have been mainly incidental to other research. Recreational interests include SCUBA diving, with 3 dive excursions to date, and future potential for submersible tours. There is currently no known interest in non-renewable resource exploration or extraction in the area. The effects of the Bowie Seamount topography on surface conditions and hazards of the shallow summit are well known to the shipping industry, thereby large vessels stay well seaward.

The Haida First Nation has expressed interest in the development of the proposed Bowie Seamount MPA as it falls within their claimed traditional territory. Sgaana Kinghlas is the Haida name for the Bowie Seamount meaning "Supernatural Being Looking Out". The Haida oral tradition describes the area as having been an island long ago. Fisheries & Oceans Canada is currently working collaboratively with the Council of the Haida Nation to protect this unique area and to explore the cultural relationship of the Haida people to Sgaana Kinghlas.

An advisory body has been formed to provide advice to Fisheries and Oceans Canada on issues concerning the consideration of MPA designation for the Bowie Seamount Area. Initially, this body was comprised of federal government agency staff (Fisheries and Oceans Canada, Natural Resources Canada, Environment Canada) and academia. Through time, this has grown to a broader set of interests today, which incorporates additional representation from environmental groups (WWF Canada and Canadian Parks and Wilderness Society), Fishing Industry (Canadian Sablefish Association and the Groundfish Hook and Line Advisory Committee), and Shipping Industry (Chamber of Shipping British Columbia).

The Council of the Haida Nation is seeking an agreement with Fisheries and Oceans Canada which would outline the relationship between DFO and the Haida to discuss issues related to the Bowie area specific to the Haida interests. The Haida have also participated in meetings of the broader advisory team.

The major conclusion of the evaluation and recommendation stage of Bowie has been that, indeed, MPA designation is warranted and feasible. For the Bowie area, it has been recommended that Bowie, Hodgkins, and Davidson seamounts be included within the boundaries for the MPA. A zoned approach is being pursued. Through the advisory process, the broad

### *The Haida First Nation's rights over the territory*



A school of Widow Rockfish, *Sebastes entomelas*, a species found schooling in the waters at the summit of Bowie seamount  
© Lynne Yamanaka, Fisheries and Oceans Canada



Sponges in the Bowie area  
© Lynne Yamanaka, Fisheries and Oceans Canada

### *The designation of the Bowie Seamount MPA*

objectives defined in the *Oceans Act* Section 35(1) pertaining to the Bowie Seamount MPA were identified for the conservation and protection of:

- the unique habitats of the area (*Oceans Act*, Section 35(1)(c));
- the area as a marine area of high biodiversity and biological productivity (consistent with *Oceans Act*, Section 35(1)(d)); and
- the commercial and non-commercial fishery resources of the area (*Oceans Act*, Section 35(1)(a)).

The support in principle for MPA designation of the Bowie Seamount area has led to the advancement into steps 5 and 6 under the national MPA process, namely drafting management plan and regulation documents, respectively, which is being pursued with input from the advisory body. The designation of an area as a Marine Protected Area then is based in regulations established under the *Oceans Act*.

In light of Fisheries and Oceans Canada resource restrictions and significant data gaps in information, partnerships will be required in managing the area as an MPA. An ecosystem research approach has been suggested, which would require partnering with researchers, industry, environmental groups and others, which would enable an adaptive management approach.

A number of individuals and organisations have already provided significant partnership benefits to Fisheries and Oceans Canada, including involvement in the advisory process, development of the Ecosystem Overview, and delivering on projects independently initiated to benefit the MPA process. By continuing relations with these organisations and seeking new partnerships, Fisheries and Oceans Canada can better achieve management and compliance within a Bowie Seamount MPA.

Beyond MPA considerations in the Bowie area, development of Integrated Management has emerged as a requirement for broader geographic, ecosystem and socio-economic considerations. Nationally, the *Policy and Operational Framework for Integrated Management of Estuarine, Coastal and Marine Environments in Canada* is intended as a working document for Canada's oceans community. It is intended to foster discussion about Integrated Management approaches by setting out policy in the legislative context, along with concepts and principles. The document also proposes an Operational Framework with governance, management by areas, design for management bodies and the type of planning processes that could be involved. Work is commencing in Canada's three oceans to implement Integrated Management, based significantly on the identification of Large Ocean Management Areas (LOMAs).



The process to consider an area for designation as an MPA, by inclusion of several interests, and considering ecosystem approaches, is generally consistent with Integrated Management. Though some might suggest the distance offshore would allow discrete management of the Bowie Seamount area as an MPA, several physical and biological features indicate a need to broaden the approach to include discussions of management at a broader geographic scale.

Evidence of ecological interactions includes Haida Eddy phenomena, rockfish genetics study results showing that seamount populations are not distinguishable from coastal stocks, observations of migratory species, etc. These ecological relations combined with the range of human activities in the area suggest a broader integrated management approach is warranted.

Other federal government organisations, including the Parks Canada Agency and the Canadian Wildlife Service of Environment Canada have interests complimentary to the Bowie area. Parks Canada is in the process of developing a National Marine Conservation Area for the Southern Haida Gwaii area, the Gwaii Haanas NMCA. The CWS has identified Bowie as an area of interest for migratory birds. The CWS is also pursuing a Marine Wildlife Area designation to protect important seabird breeding habitat in the Scott Islands at the northern tip of Vancouver Island.



A starfish, zooanthids, sponges and an anemone  
© Lynne Yamanaka, Fisheries and Oceans Canada

*For further information go to Fisheries and Oceans Canada's website on the Bowie Seamount MPA*

[http://www.pac.dfo-mpo.gc.ca/oceans/mpa/bowie\\_e.htm](http://www.pac.dfo-mpo.gc.ca/oceans/mpa/bowie_e.htm)

***Habitat protection in the Azores region: experiences from the past, prospects for the future****Ricardo Serrão Santos, Departamento de Oceanografia e Pescas, Universidade dos Açores*

Degree of threat to coastlines:  
Brown = severe, blue = medium, orange = little  
© R.S. Santos 1998

***Excessive resource exploitation is a major threat to marine biodiversity***

The oceans represent the bulk of living space on Earth, with a rich and incomparable diversity of species and ecosystems. They also play a major role on the regulation of climate and they are in many cases the ultimate geochemical sink for many of the contaminants that enter via coastal sea and the atmosphere.

The marine ecosystems that suffer the most are those situated in coastal zones. Roughly half of the shorelines of the continents are now threatened by development. In some continents, the percentage of degraded coasts is much greater. In Europe, it is considered that 86% of the coastal perimeter is at risk (moderate and high risk), which also means that the habitats and species to which they are associated are also at risk.

Among pollution and the occupation and destruction of habitats, another major threat to marine biodiversity is the excessive exploitation of resources. Sea fishing makes up an important proportion of the world's food. Marine animals (and plants) are among the few wild resources exploited on a large scale. Close to one billion people all over the world depend on fishing as their main source of protein. According to recent statistics, fish makes up 16% of the world's supply of proteins for human use.

Fishing has reduced numerous fish populations to very low levels. Those affected are to be found in various marine ecosystems: fish that live on continental platforms such as halibuts and cod, submarine seamount fish, such as some species of goldfish, including the orange roughy, and fish of vast pelagic distribution such as swordfish, albacore, and bluefin tuna. In some regions of the oceans, over-fishing has reduced stocks to half of their original maximum amount.

The establishment of exclusive economic zones was an important step to rationalise fisheries around the world, thus giving the coastal states the control of management. However, it seemed not to work well in many cases and has failed to stop increased over-exploitation. In fisheries, it is well proven that there are high degrees of uncertainty and failure of traditional management instruments.

Marine protected areas are instruments that provide protection measures that may benefit a large set of species, at least until more knowledge is available. The Azores have long since been involved in the utilisation and implementation of PA as management tools for the marine environment.

The Archipelago of the Azores consists of nine volcanic islands and several small islets, forming three groups along a tectonic zone running WNW-ESE between 37° and 40°N latitude, 25° and 32° W longitude, in the middle of the Atlantic.

The marine environment of the Azorean Archipelago and its surrounding Exclusive Economic Zone (EEZ), close to 1 million square kilometres, is of considerable conservation and marine biological interest - in large part because of its isolated position in the middle of the north-eastern Atlantic and the relatively young age of the Archipelago. There are also various seamounts including subsided islands.

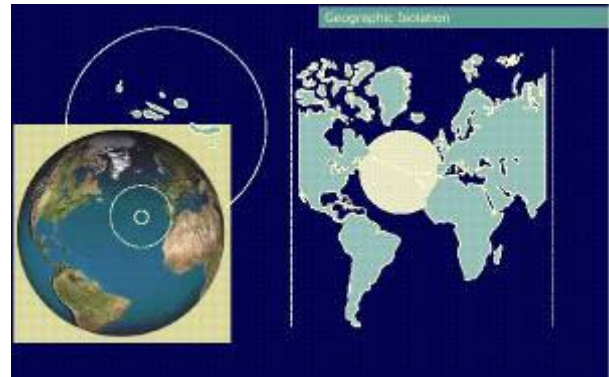
The Azores remained uninhabited until colonized by the Portuguese in the 15th Century. Since then, the population has exploited littoral, nearshore and, later on, offshore living resources. In recent years, pressures on littoral and offshore resources have grown with the switch from essentially subsistence or artisanal exploitation to more commercial operations. Meanwhile, the cessation of commercial whaling and greater environmental awareness, both on an international, national and regional level, have increased the demand to protect marine life and habitats.

Measures protecting individual species in the Azores are generally related to the management of living resources - with the exception of turtles, cetaceans and birds. The geomorphology of the Azores makes the littoral zone (both terrestrial and marine) rather narrow, as a consequence of steepness of the slope. Hence, the extent of littoral habitats is limited. Habitat conservation by creation of Marine Protected Areas is an important condition for the conservation of marine fauna and flora, and of whole ecosystems. In an archipelago with scattered islands the creation of network of protected areas must include representative littoral areas in each of the MPAs.

For several years the University of the Azores has been lobbying for the implementation of a plan for conservation of marine areas in the Azores which should essentially follow criteria of selection based on: (1) physical criteria; (2) ecological criteria; (3) cultural and educational criteria (cultural value, scientific value); (4) pragmatic criteria (value for research or monitoring, degree of threat or fragility, feasibility, redundancy, regional, national or international value, educational, recreational and economic value) and to the peculiarities of the Archipelago.

There is a pre-Natura 2000 tradition of marine protect areas in the Azores. Before 1992 (EU- Habitat Directive), nine MPAs had already been designated, distributed on four islands and one isolated group of islets: seven were designated as Marine Reserves (MR), one as a Protected landscape; and another as a Special Ecological Area. Six

*The Azores*



Geographic isolation of the Azores  
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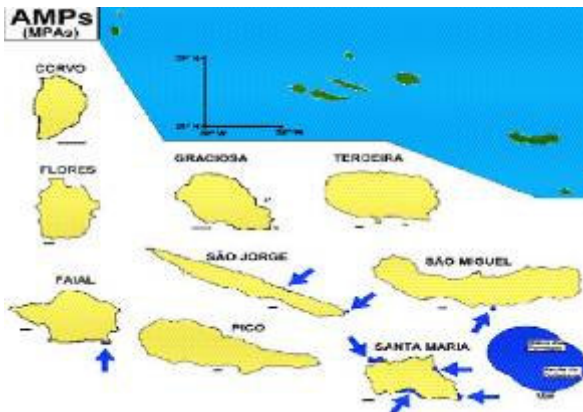
*Habitat conservation*



More information on the implementation of Natura 2000 in the Azores, including management plans, on:

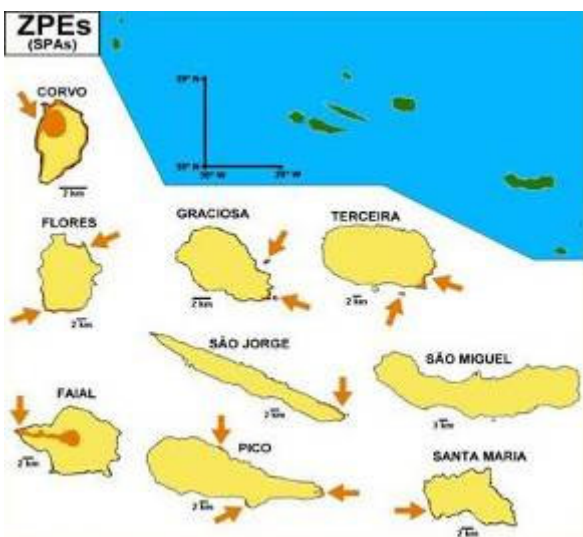
[www.macmar.info](http://www.macmar.info)

*Marine Protected Areas before Natura 2000*



Pre-Natura 2000 Protected Areas  
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*Protected Areas in the Natura 2000 network*



Special Protection Areas under the Birds Directive  
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are located in the Eastern group and three in the Central group.

These MPAs and other legislation on the regulation of individual species yet lack a management of the activities taking place in the protected areas and also deficient enforcement of the legislation. With the application of the EC “Birds” and “Habitats” Directives in the Archipelago, conservation benefited from a new strategic perspective by the designation of 18 Sites of Community Interest (SCIs) and 13 Special Protection Areas (SPAs) on coastal and marine habitats. With a view to prevent what has happened with previous scattered measures, there is a need to implement an integrated program of management planning and an enforcement of the measures taken. The success of these strategies depends on the integration, in terms of ecology and management, of the different components of the coastal environment.

In 1998, under the frame of an EU-LIFE project (NAT/P/5275: MARÉ - Integrated management of coastal and marine areas in the Azores), it was possible to initiate the elaboration and implementation of a set of management plans for a complex of areas and species that were already favoured by various legal measures. Three different levels of approach were considered for integration: littoral habitats, marine bird populations and populations of cetaceans and marine turtles.

The program followed a course of action that included (1) scientific inventory of ecological and socio-economical features, (2) elaboration of regulation plans, (3) public inquiry, (4) preparation of management plans, and (5) the implementation of specific management measures. At the same time an environmental education program for the mobilisation of the different sectors of society and their active involvement in management measures was established.

Regarding littoral habitats, 5 SCIs in different ecological and socio-economical contexts were chosen. Especially the island of Corvo represents an illustrative example for the development of the general objectives of marine conservation. Being the smallest island of the archipelago, Corvo exhibits a well preserved coastal environment and contains a small population which is very receptive to proposals on environmental conservation. Therefore, it shows all the conditions for a sustainable management plan. On the other hand, SCIs located on the coastal and marine environment at the island of Faial are subject to strong pressure from tourism, fishing and urban activities. Consequently, the necessary management was of a different type, involving a greater variety of socio-economic sectors. Finally, the islets of Formigas and the Dollabarar reef represent the setting for a third management model.



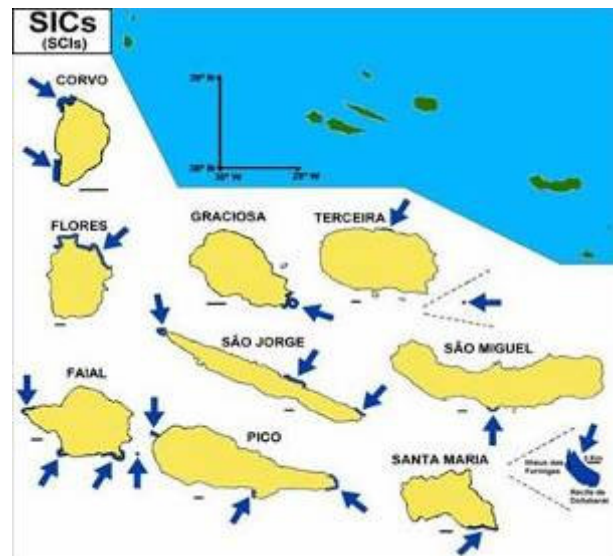
This isolated area could be made an oceanic offshore sanctuary.

The management plans for the MPAs were complemented with management plans and conservation actions in 7 SPAs, towards the recovery of population levels of *Sterna dougallii*. Besides that, genetic studies were undertaken to confirm reproductive isolation between two sympatric and temporally segregated populations of *Oceanodroma castro* occurring in the Azores. Cetaceans - 23 species occur in the Azores - were integrated in the management plans of the areas as well. Databases of the populations of the different species were compiled and the consequences for the populations of the increasing tourist pressure due to whale watching are continuously monitored. Whale watching is a rapidly growing activity in the Azores. Besides sperm whales, special attention is given to groups of *Tursiops truncatus* (species included in Annex II of the EC Habitats Directive) resident in some SCIs. The data collected were used to calculate the capacity for whale watching and for the elaboration and implementation of a set of measures to be included in management plans for the MPAs. In parallel, special emphasis was given to environmental education (EE) of local communities. EE sessions for students, teachers, stakeholders and general public are regularly held, promotion material produced, and field tours in SACs organised. This component is essential for the success of the whole program. Without the understanding, involvement and support of the public, nowhere in the world can we guarantee the continuity of the efforts to establish MPAs.

There is also a case for the designation of at least one or two seamounts as reserves. In fact, the Formigas (already an MPA and a Site of Conservation Importance), which barely breaks the surface, fulfils this need only partially. Other suitable seamounts need to be proposed as potential submarine reserves - given their commercial importance there is need of a close involvement of the fishing community. This measure could contribute to the conservation of exploited demersal species and be of primary interest for the future of the demersal fisheries in the region. Also of interest is the designation of MPAs in deep sea hydrothermal vent fields.

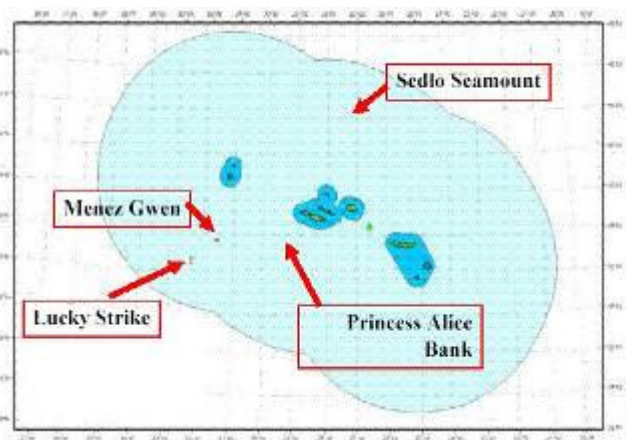
To promote the conservation of deep sea habitats and species the implementation of management plans for new MPAs in two selected deep sea hydrothermal vent sites (Lucky Strike and Menez Gwen) and one or two seamounts (Sedlo and Princess Alice) is on the way.

Lucky Strike and Menez Gwen are two offshore hydrothermal vent fields inside the Portuguese EEZ. Due to their proximity to the Azores and their relatively shallow location (in 1700m and 900m depth), numerous

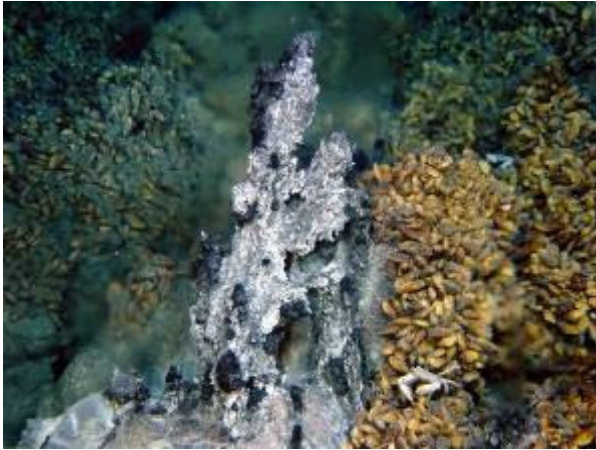


Sites of Community Importance under the Habitats Directive  
 © ImagDOP

**Protection beyond Natura 2000**



Possible further sites under protection  
 © ImagDOP



Mussels (*Bathymodiolus azoricus*) at a chimney of Menez Gwen hydrothermal vent field  
© IFREMER

### *Knowledge gaps and new projects*

scientific expeditions and programmes since 1997 investigate the temporal and spatial geological and biological variabilities. Given the small surface of the actual vent sites, a management of these activities has become particularly important. As observatory type studies expand, so will the requirement to combine both the needs of purely observational investigations and those of in situ experiments and instrumentation and the removal of specimens for collections and laboratory studies. Concern about the impact of scientific research goes beyond the resolution of conflicts between different research programs. As vent sites become the focus of intensive, long-term investigation, oversight organisations will need to introduce appropriate measures to combine preservation of habitat and scientific interference such as sampling.

The World Wide Fund for Nature (WWF) has proposed a potential MPA at Lucky Strike under OSPAR (the Convention for the Protection of the Marine Environment of the North-East Atlantic). Annex V of OSPAR contains provisions with regard to the protection and conservation of the ecosystems and biological diversity in the marine area. Due to this fact, the Regional Government of the Azores is looking forward to establish Menez Gwen and Lucky Strike as MPAs and foster at the same time the development of research activities.

At present, the amount of scientific information available on ecosystem functioning at and around seamounts is very limited. This holds true in particular for the deep-sea ecological processes associated with seamounts. We expect to gain crucial knowledge from two new projects, the CoML (Census of Marine Life) – MAR-ECO and the EU-FP6 OASIS, which will concentrate on the Mid- Atlantic Ridge and seamount studies. These new projects will become a fundamental tool in the development of appropriate boundary criteria for Marine Protected Areas (MPAs). The most important questions to tackle will concern the scale and magnitude of ecosystem changes caused by human impacts such as commercial fisheries, and in turn the determination of acceptable levels of exploitation. OASIS will focus on investigating ecological processes at two seamounts in the same bio-geographic area, which are distinguished by differences in the depths of their summits (within/below euphotic zone) and the degree of their exploitation.

Based upon this, a conceptual model of ecological functioning will be compiled with the goal of outlining management objectives, management recommendations and recommendations on boundaries and zoning (vertical and horizontal) for potential MPAs. Based on the precautionary principle, the sustainability of any present or future exploitation of seamount natural resources will be evaluated.

Based on the "OSPAR Guidelines for the Management of Marine Protected Areas in the OSPAR Maritime Area", that draws upon the outline MPA site management plan published by IUCN, the common elements of management plans for all types of offshore seamounts will be extracted and compiled. A set of possible goals and objectives, management tactics and administrative and legal requirements as well as surveillance and enforcement measures will be included in an "Offshore MPA Toolbox" (see Part III – Theme III). This document will enable users who wish to set up a protected area around a seamount (or potentially any other offshore feature) to quickly compose the basic set of management options for a particular site. Depending on the location of the site and its current human use, the details of boundaries, zoning and regulations will have to be individually designed.



Formigas Islets: Sicklefin mobulas (*Mobula tarapacana*)  
© F. Cardigos / ImagDOP

**Part III – Round table discussions & working sessions****Theme I – Fisheries at the Azores, Madeira and High Seas seamounts**

*Moderator:* Gui Menezes (*Departamento de Oceanografia e Pescas, Universidade dos Açores*)

*Rapporteur:* Filipe Porteiro (*Departamento de Oceanografia e Pescas, Universidade dos Açores*)

**Summary**

**Working session I** dealt with aspects of the fishery around the Azores, Madeira and High Seas Seamounts, and the consequences the opening of the 100-200 nm zone would have.

Most of the participants took a critical viewpoint towards the EC opening the 100-200 nm zone of the Azores. The procedure was regarded as irresponsible and in break of several of the EC's obligations, including environmental ones. Scientific advice had been neglected and the step had been decided before taking care of its consequences.

The management regime of the Azores had been regarded as exemplary with respect to an ecosystem-based management. Management would have gone far beyond the measures the EC is considering. The consequences of the changed access regime were seen as socially and economically unjust and ecologically detrimental.

The need for a precautionary protection of deep-sea fish stocks and the seamounts' communities was expressed. A sustainable deep-water fishery could only be of small scale and would need to be strictly controlled. A ban of bottom-trawling was noted to not prevent overfishing. Management aspects such as the proper geographic scale, regulatory level and problems of enforcement were discussed.

Science was considered as vital for delivering regional knowledge to the Commission and to the whole society why conservation of valuable resources was important. A need for further scientific work was expressed, current knowledge was regarded by some as sufficient for management actions, others were asking for case-by-case studies.

A **brief summary** of the process of the **Azorean waters' opening** is given at the end of this subchapter.

The **opening statements** were made by:

Helder Marques da Silva (*Secretaria Regional do Ambiente - Região Autónoma dos Açores*), Marcelo Leal Pamplona (*Direcção Regional das Pescas*), Armando Astudillo (*European Commission, DG Fisheries*), Francisco Liberato Fernandes (*Cooperativa Porto de Abrigo*), Monica Verbeek (*Seas At Risk*), Åge Høines (*Institute for Marine Research*)



The Workshop Venue © Sabine Christiansen

**Gui Menezes, Departamento de Oceanografia e Pescas**

Please let me introduce this round which will focus on the following subjects:

- seamount fisheries before and after the Western Waters Regulation came/comes into force
- the role of conservation
- the role of science – expectations to the output of the OASIS project and other scientific activities

Generally, the onset of seamount fisheries in the Azores and Madeira dates back quite some time. However, there is not much information available. Further to the fishing taking place in what is now the EEZ of the Azores, there is a group of seamounts south of the archipelago and in international waters, including



Meteor, Atlantic and Cruiser seamounts, where we know of intensive fishing activities.

The state of conservation and/or exploration rates on these seamounts is virtually unknown. Fisheries management in the Azores is based mainly on the control of fishing effort and fishing gears. This should also be the basis for developing measures for the conservation of seamount ecosystems. The department of oceanography has carried out research cruises since 1995, covering most of the seamounts and the coasts of the islands within 50-60 miles from the shore. But to complement our knowledge on the biological dynamics, we need very good data on the fleet's dynamics as well. For the management of these sites, new investigation approaches and tools like modelling should be pursued, including analyses of spatial dynamics. The OASIS project is only funded for three years and will not give all the answers we need for managing human activities near seamounts in the future.

**Helder Marques da Silva**, *Secretaria Regional do Ambiente*

Let me start by welcoming you all to the Azores as a representative of the government of the Azores. I am here in three different ways: as a Secretary of the Environment, presently, as an ex-director of Fisheries earlier and as a scientist by career and as such, I have to start by saying that I'm very sorry about the measures that were recently taken regarding the opening of the 100 to 200 nautical mile zone of the Azores through the new Western Waters Regulation: Environmentally, because these are fragile ecosystems which will be exposed to a fishing pressure of fleets which do not have the tradition of fishing here in a balanced way like the Azoreans did for centuries. As an ex-director of fisheries I regret it, because socially and economically this will have a high impact on the fisheries of the Azores and as a scientist, I probably have to be even more sorry about these measures, since the best information which is available and has been put forward and presented openly and internationally in some cases was not used to take the best decisions in this matter. Fishing in our waters is mostly happening in the vicinity of seamounts which for oceanographic, biological and other reasons represent very complex systems. I am also sorry because I have always seen in the Azores a potential for the establishment of a platform, a European platform, where an example of sustainable fisheries and the creation of marine protected areas could be developed. As the regulation is not in force yet, we may still be in a position to take these ideas forward.

*"Effort and gear control should be the basis for developing measures for the conservation of seamount ecosystems."*

*"Investigations need also to be made in fleet development and spatial dynamics."*

*"The fragile ecosystems around the Azores will be exposed to a higher fishing pressure."*

*"I have always seen the Azores as an example for the creation of sustainable fisheries and marine protected areas."*

*“We asked the Commission for more protective measures to the sea areas opened by the Western Waters Regulation.”*

*“For us it is very important that projects like OASIS can compile and transport the regional knowledge from here to the Commission.”*



Shark *Oxylotus* over *Lophelia* at Propeller Mound  
© Marum Bremen

*“The Western Waters Regulation is a sort of softening of the principle of freedom of access.”*

I should also say that I believe that science is probably not yet giving the best answers to management, globally and certainly not for an ecosystem as complex as seamounts. But I’m sure that OASIS, for the way it has been developed following the ecosystem approach, will certainly be useful for giving direction to future management.

**Marcelo Leal Pamplona, Direcção Regional das Pescas**

Before the entering into force of the new Western Waters Regulation, the 200 nm zone around the Azores and Madeira was only open to Azorean fisheries, the Madeira pole and line tuna fleet and the mainland Portuguese long-line swordfish fleet. Now this regulation liberalizes the fishery in these most sensitive sea areas being subject to the 2002 EC deep-water fishing regulations. The regulations do not differentiate between gears, e.g. trawling and gill netting as was traditionally the case in our waters. However, no decisions have yet been taken. So, in case gear restrictions will not be introduced by 1<sup>st</sup> of August, we may end up with the situation that our own fleet is subject to strict effort and gear control while at the same time the European fleet fishing for deep sea species in the 100-200 nm zone is not subject to any restrictions. We only have deep sea and pelagic species to exploit, we don’t have demersal species. So future decisions will have to be based on comprehensive and correct knowledge. Thank you.

**Armando Astudillo, European Commission, DG Fisheries**

With the entering into force of the new Western Waters Regulation of 2003 we have now what you call an opening of access to other vessels to the band between 100 and 200 mile zone, which is, I insist, a new sort of softening the conditions of the principle of freedom of access for all community vessels in all community waters. This principle is the main reason for the Common Fisheries Policy (CFP) and the derogations to this principle should be kept at a minimum. We recognized that an increased possibility for non-Portuguese vessels to fish around the Azores would mean a risk for certain deep water habitats, so we proposed a ban on the use of trawls not only between 100 and 200 miles around the islands, but in a larger square, which in my view covers all seamounts around the Azores which are until now preserved by the existing rules. This proposal is based on the precautionary approach, as we’ve thought that these seamounts were still in relatively good conservation status, but we didn’t know all of the biological features of all the seamounts. This proposal is still under discussion, and I hope that it will generate a great deal

of protection. (Update 2005: There is no permanent regulation yet.)

Then I said I would say a few words on the role of science. I think it is very important to note that the CFP is not made in Brussels. The Commission makes proposals, but decisions are taken by the ministers of Member States. Ministers respond to society, so Ministers will take a decision depending on what society has communicated to them and the society is not only fishermen, it is not only scientists, society is broader than that. So, on the one hand, if there is a concern expressed by the fishing community, this concern should be transmitted to the whole society. But if there is also a concern by the scientist community, this concern should be transmitted to society as well. This is why I feel that the whole society can influence the decisions of their Ministers. The main message that the scientists should transmit to the society is why maintaining biodiversity is good for everybody, for all the fishermen, for the whole society, and what a biodiversity that has been conserved can yield for future societies.

You mentioned that one of the objectives of the OASIS project is to design site-specific management plans for the Sedlo seamount and probably for the Princess Alice bank also. My question is whether this is the best contribution that OASIS can make. Yesterday, some of the speakers mentioned the high number of seamounts in the North Atlantic. Could you ever imagine having site-specific rules for management for each of them enforced and surveyed? I think it would be more practical to have some general rules and minimal requirements to be applied more widely, so these are easier to implement. On top of this there could be very site specific rules for well-known places as a means of improving scientific knowledge and so on. Thank you very much, muito obrigado.

**Francisco Liberato Fernandes, Cooperativa Porto de Abrigo**

First of all I would like to come back to the opening remarks of Dr. Gui Menezes and add the social dimension of fisheries in the Azores. As you know, the Azorean fishery has a predominantly artisanal character, i.e. 95 % of all fishing trips are undertaken by boats of less than 12 m length. Only 6-7 % of these boats have a cabin and are powered by larger machines. Only 6 vessels are equipped for offshore longlining fishing trips of 10-12 days at sea. 30-40 vessels can go out for less than 10 days, while the remaining 700 open deck boats can only fish close to the coast. There is no trawling equipment, net equipment is only aimed at small species, gill nets were banned for deep sea fishing (kitefin shark) and surrounding boats with divers have been banned as well. The prevailing fisherman's spirit

*"Fisheries policy is not made in Brussels, but in the Member States."*



Cephalopod from Seine Seamount  
© Tammy Horton

*"It would be more practical to have general rules and minimal requirements to be applied more widely, so these are more easily implemented."*

*"The Azorean fishery has a predominantly artisanal character."*

*"The prevailing fisherman's spirit is to hunt, but at the same time to obey the rules..."*

*“The Western Waters Regulation will increase the conflicts between local and foreign fleets and increase the socio-economic problems due to the lack of fish.”*

*“Preservation and liberalization are not compatible.”*

*“...while access to these waters is already granted, effort limits still have to be fixed.”*

*“Rather than developing integrated management, a lot of steps are being taken the wrong way around.”*

is to continue to hunt but at the same time to obey the rules set out. Until 2003, we had good management, but the present situation is dangerous: foreign fishing boats will operate within the 100-200 nm zone, targeting migratory species, namely swordfish. There are no proper controls. Floating fishing lines have a problem of space and seamount reefs are also very attractive for big fish near the surface of the water, where there are greater chances of catching them. Longlines range up to 60 miles per throw and spread lines with distances of 5-7 days between them. The space around the reefs is already occupied. The Western Waters Regulation (WWR) will increase the conflicts between local and foreign fleets and increase the socio-economic problems due to the lack of fish.

A comment to the European Commission: Agreements should be made with participation of the fishermen. They do agree with many aspects of the Common Fisheries Policy but not with the WWR. A good fisheries management cannot be based on centralized control, policy should rather be to create regional fishing councils which have decisive power. The globalization of fishing can never be considered responsible: if fishing is no longer profitable in one area they move to the next (very often to poorer states). Preservation and liberalization are not compatible.

We hope that the decisions made by the scientists of OASIS and by Non-Governmental Organisations can help.

**Monica Verbeek, *Seas At Risk***

The Azores are now in a transition period, coming from a regional management of its 200 nm zone to a situation where the outside 100 nm will be subject to the Common Fisheries Policy and its regulations. With the Western Waters Regulation being in force already since 1<sup>st</sup> of January 2004 it comes to the strange situation that while access to these waters is already granted, effort limits still have to be fixed and other conservation measures are still being proposed for implementation. This is particularly awkward as until now these waters were subject to a regional management system which we think comes quite near to an example of an eco-system based approach, where the objective is a sustainable fishery taking account of the fish’s fragile eco-systems.

This is exactly one of the objectives of the reformed Common Fisheries Policy of 2002 - one of the principles being a regional application. However, the first step taken by the Council was to implement equal access, then think about effort limits and at last, perhaps, eventually consider possible fragile eco-systems in the region. Rather than developing integrated



management, a lot of steps are being taken the wrong way around, being very un-precautious, by first opening up and then thinking about risks.

Another unfortunate effect will be the displacement of deep water fishing effort. Though according to the deep water fishing regulation effort is supposed to remain constant in the statistical rectangles, it will shift into the Azorean region, basically because in Azorean waters, seamounts seem to be much less depleted compared to other seamounts in the high seas. This tells us that management should not operate at too large a scale.

Seamounts are now widely recognized as hosting vulnerable habitats and species which afford special protection from human activities. There is an initiative to have the U.N. implement a moratorium on bottom trawling at seamounts in the high seas which I would very much appreciate. I am sure this will not happen overnight, but these are some indications of the kind of management measures one could think of for seamounts. When designing a management regime based on fishing effort and TACs, it has to be born in mind that for certain species all that effort will be concentrated along seamounts. This calls for very specific, small sized management areas.

I hope that by the time OASIS is finished, we will know some more about ecosystems of seamounts, which might help us recognize additional measures necessary specifically for seamounts. There will be a site-specific management plan and from what I have understood this site specific management plan will act as a case study which together with the models will be used to extract some general rules that could be applied for seamount management. Concerning the role of scientists to transmit the value of biodiversity to the society, indeed that is still very necessary. In a recent meeting, a representative of a fisheries organization said to me: "Do you really think our public actually cares about some corals that are so deep down that nobody will ever see them?". As long as this kind of remarks comes up, it will be hard to gain enough support for conservation measures. Yes, scientists, but also governments and environmental organisations such as mine, have an important role in making the public aware of what is down there, in explaining why we need to protect what you can't see and why it is so important to protect it. Thanks.

**Åge Høines**, *Institute for Marine Research*

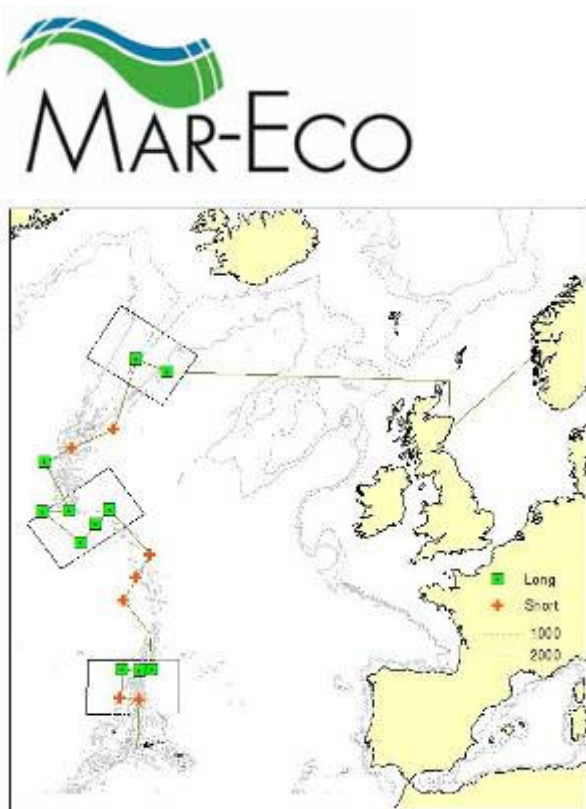
I will try to give a very short and brief introduction to the Mar-Eco Project, outlining also some of the connections to the OASIS project. The full name of Mar-Eco is "Patterns and processes of the ecosystems of the northern mid Atlantic", a pilot project of the Census of

*"Deep water fishing effort will be displaced into the Azorean region."*

*"...very specific small sized management areas are required."*

*"Scientists, but also governments and environmental organisations, have an important role in making the public aware..."*

*"Even for the mid-oceanic north Atlantic there is a need for more basic information on biodiversity and distribution of parts of the fauna."*



The Mar-Eco cruises  
 © Mar-Eco

For further information go to Mar-Eco's website  
<http://www.mar-eco.no>

*"... the two projects complement each other."*

*How do we balance the principles of precaution, sustainability and free access?*

*What is the appropriate level of management?*

Marine Life initiative. It's an international exploratory study, the main aim being to better understand the variability in the patterns of distribution and abundance and of the trophic relationships of the organisms inhabiting the northern mid Atlantic. Among the marine ecosystems that remain poorly investigated, those along the extensive global systems of mid-oceanic ridges rank amongst the most extensive and remote. Even for the mid-oceanic north Atlantic there is a need for more basic information on biodiversity and distribution of parts of the fauna. The life history strategies of many of the organisms living in the deep sea or associated to oceanic seamounts render them particularly vulnerable to human-induced disturbance and habitat deterioration. The Mar-Eco area of investigation ranges from the Azores to the Reykjanes ridge off Iceland, the ridges consisting of thousands of seamounts all the way to Iceland.

Mar-Eco has three main tasks: 1. the mapping of species composition and distribution patterns, 2. the identification of trophic interrelationships and the modelling of food patterns and 3. the analysis of life history strategies. The project started in 2001, the field phase started last year and this year (2004) we will have a two months cruise in the area between the Azores and Iceland with a Norwegian research vessel and a hired commercial longliner.

All the information Mar-Eco will collect in the area will be valuable and it will give basic information to the managers on biodiversity and also to the fisheries. Further, Mar-Eco also has a strong focus on technological innovation, and it will create a strong international scientist network. Compared to the OASIS project, Mar-Eco has a very wide approach, while OASIS is focussing on two main seamounts and will have a much higher level of details. But I feel the two projects complement each other and the input from OASIS to Mar-Eco will be highly appreciated in my project and I hope Mar-Eco can give something back to OASIS. Thank you.

**Open discussion**

**Gui Menezes, Departamento de Oceanografia e Pescas**

Introducing this discussion round, I have two comments relating to the statement of Mr. Astudillo: The Common Fisheries Policy (CFP) now embraces two very important principles, the precautionary principle and the sustainability principle. And since the very beginning the liberalization of the waters is also included in this CFP. So the question I have as a scientist is how to balance between all these principles in this case of granting access to sensitive sea areas. My

second question concerns the different levels of management discussions that are possible: In the Azores our management discussions and solutions are very detailed, small scale and in direct exchange between science, government and fisheries organisations which is completely different from what is done in other places. However, I feel that this kind of management is very beneficial for the resources and should be extended.

**Veríssimo Borges, *Quercus***

The high costs of research and also of the lack of enthusiasm for offshore research are real problems. The first thing I would like to say is that if there had been an OASIS project ten years ago, much more research could have been done before opening up the 200 nm Azorean EEZ. Now there is an urgent need for proof of impacts on the ecosystems, case-by-case and general, in order to convince the European Commission and the political and economic sea-view of some countries and Europe in general.

We should now think of a next OASIS project. It will be necessary to protect some seamounts as sanctuaries and those ones don't need to be very well studied if they are well protected. It will be more important to study seamount degradation and recovery of those that have already been destroyed by Russians or in a few years will be by Spanish fishermen. Scientific research on the recovery of seamounts is not very urgent because it will take so many years and decades and generations that we have plenty of time to study. The money needed for scientific research should be obtained from European Commission as the responsible body, following the "polluter-pays" principle.

The European Commission has done three very big mistakes. The first one was a democratic one when they decided to open the 100 to 200 nm zone of the Azores and Madeira and Canary Islands against the votes of the European Parliament. This acting of the Commission should be clarified and may be used by any non-democratic country as an argument. The second and third problems were that the Commission did not respect the two basic principles that have just been stated a few minutes ago: Neither the principle of precaution, nor the sustainability principle or the scientific principle have been applied. The opening of this zone to the European fisheries cannot be called responsible without monitoring, clarifying responsibilities, surveillance and adaptive management. Who will do all this? The well-being of the Azorean people should be at focus. I think that we should have scientific proof of impacts as soon as possible and the government, the regional government and national government, should take maybe Spain, for



German research vessel Meteor  
© Norbert Verch

*"It will be necessary to protect some seamounts as sanctuaries and those ones don't need to be very well studied if they are well protected."*

*"The opening of this zone to the European fisheries cannot be called responsible without monitoring, clarifying responsibilities, surveillance and adaptive management."*



Azorean fishing techniques  
© Sabine Christiansen

*“Fishing in deep water is essentially the same as mining...”*

*“A sustainable deep sea fishery can only be of small scale and must be strictly controlled.”*

*“To maintain profitability, sustainability is totally abandoned.”*

sure the European Commission, to the European Court of Justice because it is not acceptable in a democratic Europe to admit so much irresponsibility. The money earned with fishing in this zone must go into more research. Recovery is much more expensive and more time-consuming than destruction. Unfortunately, we heard that not many years are needed to destroy a seamount, rather just a few months. At the end, I would like to emphasize that in my view most of the times local fisheries are much more responsible and sustainable, compared to the nomad fisheries with their use-as-much-as-you-can-get philosophy. Thank you.

**Callum Roberts, University of York**

I just want to make a few comments about the sustainability of deepwater fisheries. Quite a lot of people have been talking about deepwater fisheries as if they can be sustainable. I think that throughout the world the concept of a sustainable deepwater fishery is almost an oxymoron. Fishing in deep water is essentially the same as mining: the life history characteristics of the exploited deep water species place them at the extreme end of the vulnerability spectrum. This means that pursuing them with high technology, high capacity fishing fleets is bound to cause depletion. We have seen repeated examples from around the world, and we don't need more evidence to know that deep water species are fragile and are likely to be a short term resource. Even experimental fishing on deepwater fish stocks has caused severe and long lasting declines in abundance. This means if we are to fish in the deep sea anywhere, there needs to be very strict control over fishing effort and real small scale fishery is the only kind that has a chance of being sustainable. The only places where this is possible are within the EEZs of countries.

What we see outside those exclusive economic zones is the tragedy of the commons being played out once more. People exploiting fish stocks on the high seas are using extremely expensive boats and technology in order to make a profit. The only way you can do that is to fish more than can be sustainably taken from any particular place at anytime. Derek Forester made a comment earlier in the week about a Norwegian long-liner landing € 1 million worth of fish from a six-week trip to the Mid-Atlantic ridge. If that boat was not able to land such quantities it would simply go broke. So to maintain profitability, sustainability is totally abandoned.

I think the Azores and Madeira are probably globally unique in having deep water fisheries that have been sustained over many, many years because they have had very small scale, low-technology fishing fleet, and have generally used non-damaging fishing gears. I



think the hope of achieving sustainability in deepwater with high technology fisheries really is simply wishful thinking and we should avoid that. The need for protection of seamounts from fishing is immediate. If we delay action the need for protection will simply disappear, the fish stocks will have been exhausted, biodiversity will have disappeared and nobody will be interested in fishing on seamounts any longer. And what we will end up doing is studying systems like those in shallow water that have been extensively modified by human use and are no longer anything close to being natural.

European Union management of deepwater fisheries, and I would put “management” in inverted commas, is too little, too late. The EU has been repeatedly warned since at least the mid-1990s of the extreme fragility of deepwater fish resources and the need for a highly precautionary approach to management. They’ve had a deepwater committee within high-seas for at least six to seven years now, but it was only in 2002 that they implemented first management measures for deepwater stocks, and this only by applying total allowable catches (TACs) to four species. As we know from other fisheries in Europe, TACs are a highly ineffective way of controlling fisheries and achieving sustainability and they’re also highly ineffective in preventing damage to deep or shallow water ecosystems. The measures that are being proposed alongside the expansion of access to the EEZ of the Azores are just a means of sugaring a pill that I think the islanders here should not swallow. To bring in measures like banning bottom-trawling does not secure sustainability of the deepwater fisheries for the islanders. It may help protect fragile invertebrate communities on seamounts, but it will not protect the fish resources themselves from depletion.

In my view, what we need to be talking about today is bold management measures for deepwater environments and those measures should be founded on existing knowledge rather than the hope of additional information. We already know well enough that there is a need for a global moratorium on bottom trawling in deep water and certainly there is enough information to argue for a global moratorium on bottom trawling on seamounts. Thank you.

**Veríssimo Borges, Quercus**

Well, I want to recall that some days after opening of 200 nm zone of the Azores, there was a press release from the European Commission stating that England and Spain were taken to the European Court of Justice because both countries had the bad habits of changing species, changing positions and discounted up to 85% of the quantities of what was actually caught and

*“The need for protection of seamounts from fishing is an immediate.”*



Deep sea fishing: Landing a meagre catch  
© WWF-Canon / Mike R. JACKSON

*“Banning bottom-trawling does not secure sustainability of the deepwater fisheries.”*

*“Today, management for deepwater environments should be based on existing knowledge.”*

*“It will be impossible to guarantee the protection from illegal fishing.”*



Leatherback turtle (*Dermochelys coriacea*) caught in a net  
© WWF-Canon / Michel GUNTHER

*“The pelagic fishing effort must be quantified as well.”*

*“Bycatch of seaturtles in the surface pelagic fishery is high.”*

*“First look at scientific information, then take political decisions.”*

controlled. So, in that situation, also taking account of a Vessel Monitoring System that doesn't control correctly, it will be almost impossible to guarantee that the first one hundred miles will be protected from illegal fishing from boats from outside.

**Fátima Brito, Instituto do Ambiente**

First I would like to give my opinion as a person from the mainland, and I would like to say that the people from the mainland share the concerns of people of the Azores, and that they are worried about what is happening now. As a representative of the Institute for the Environment, I think OASIS is a good project and can help to address these issues, not only the protection of marine areas but also the fisheries, not only on the Azores but also on the mainland. The results of the project and the report from this workshop and also the fisheries week should be sent also to those responsible for fisheries in the mainland, maybe through the entities of the Regional Government of the Azores. I think it is a good way to press the national authorities to these issues.

**Thomas Dellinger, Universidade da Madeira**

Most of the comments here have been related to deep sea fisheries but I think we should at least to some extent also concern ourselves with surface pelagic fisheries. We have a huge area where fishing effort is not really being quantified in a thorough way. I am concerned specifically for seaturtles because of bycatch rates of seaturtles in the swordfish fishery being rather high. As our local fishery in Madeira shows, bycatch is even high in a fishery which goes deep down with its drifting longlines, where the time that the hooks remain in the upper 100-200 m is very short. Seaturtle populations, and possibly not only those, could be impacted very strongly. The question is how well can we, can the European Union, quantify also the pelagic fishing effort for this whole area, including the international waters and recreational and other fishing vessels. We need to know if we can get total estimates of the total number of hooks and who controls that.

**Helder Marques da Silva, Secretaria Regional do Ambiente**

I would like to start by saying, following the thoughts that were expressed by Monica Verbeek, that I'm amazed by the unusual procedures that were used by the European Commission and the European Union overall.

Usually policy uses the best available scientific information to make decisions. So what is the best

available scientific information regarding the fisheries in the Azores area, and for many species outside the 200 nm zone? Swordfish is overexploited and both, tropical and temperate, tuna species are overexploited. There are concerns over turtles and other species, and on the impact of fishing on the fish community overall. When we look at sea-bream in the Azores we see it is fully exploited, there are no doubts about that. Alfonsinos, both species, *Beryx splendens* and *Beryx decadactylus*, are overexploited; the abundances of these species have been going down over the last 15 years. Catch rates for wreckfish went down strongly over the last few years. The reasons for these trends may not only lie in the fishing effort exerted by the Azoreans, but also in fishing pressure from outside the Azores as many of these species have a wider distribution than just the 200 nm.

The question is, is that scientific information available? The answer is yes. Can we get better information? Yes. And that's what we expect from the OASIS project, following a more ecosystem approach. The information which is available is the same that is used for managing fisheries all over the world. It is known that most of the exploitable fish species of the Azores area are either fully or overexploited.

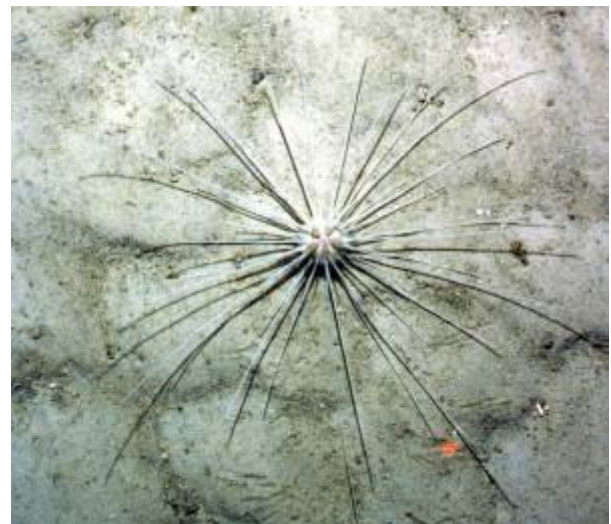
I don't understand how a decision can be made to first open a wider area to several fishing fleets and then, afterwards, start thinking of managing these fisheries as if no information had been available. This is not a matter - responding directly to Mr Armando Astudillo - this is not a matter of democracy, this is not a matter of counting votes, this is just a matter of procedure. The way policy and science normally interact in our developed societies is to first look at science and information, and then take political decisions

Secondly, I would like to come back to the idea of creating an MPA or something alike for the Princess Alice banks. It was mentioned that this was simply one of many banks we have in the area, which is true. But it is not just any bank, this bank represents something like 50% of the species richness that we have in the Azores area. So the positive impact of creating an MPA would be considerable for the whole area, even outside the 200 nm. Years ago, we measured the mobility of some of the most important fish species, like e.g. sea-bream, in a depletion experiment of a seamount. It is true that some species are very sedentary like the wreckfish, but it is also true that others are mobile, like redfish (*H. dactylopterus*) or even the alfonsinos to some extent. Thank you.



*Beryx decadactylus* hovering around a large *Lophelia* coral  
© Ken Sulek, US Geological Survey

***“Better information is what we expect from OASIS.”***



Sea urchin on Great Meteor Seamount  
© Dieter Piepenburg

*“These boats are able to devour the Atlantic.”*

*“One of the reasons why our fish stocks are more or less stable has to do with our decision to opt for the use of small and medium sized longliners...”*

*“The region’s measures go far beyond those of the EU.”*

**Jorge Gonçalves**, *Associação de Produtores de Espécies Demersais dos Açores*

I want to make note of a point of extreme concern that we have had for a while and to which Mrs. Verbeek also referred. This is of the ever increasing number of boats visiting the region, foreign boats or European Union boats. This is a serious cause for concern. Why? Because we find that these boats are machines that are able to devour the Atlantic. When I say devouring machines, I do not mean it in a negative way. Of course people want to work and make profit, but the amount of fish that is caught is incredible. When we compare notes, we discover that the boats are always full of fish and always go with the aim of spending 70 days at sea. This is only a small part of the picture; I will try to fill you in on more. One of the reasons why our fish stocks are more or less stable has to do with our decision to opt for the use of small and medium sized longliners due to the characteristics of our islands and the number of inhabitants. This kind of boats can only stay at sea for four to five days, after which they have to come back to land to unload and sell the fish. In many circumstances, sometimes due to the weather, the boats are even forced to come back to land earlier.

When the big boats are at sea, there is not a single day at which they do not operate. There is no opportunity for the fish to escape and this is causing the system to be progressively depleted. If this matter is not addressed we will probably have some problems in the future. The shipowners and the fleets belonging to the region have imposed fishing restrictions on themselves as we are concerned about our future. Some of these measures have already been referred to or recommended by Mr. Liberato Fernandes. There is, for example, a restriction on the use of longlines within a 3 mile radius of the islands, with the exception of one island where the radius is 2 miles. Boats using handheld fishing lines cannot fish within one mile of the coastline. I think this is extremely important and I believe that these measures go far beyond any of those the European Union would want to apply.

**Manuel Eleutério Serpa**, *Associação Pescadores Picoenses*

I would like to start by thanking the whole organization for this meeting for having invited so many people, many scientists who have done such a good job in preserving sealife.

Our people on the islands say they have one foot in the sea and the other foot on land. I have to say that it is unfortunate that we are part of the European Union. The EU, through our delegates, acts in order to enhance the quality of life of our people and to allow our economy to catch up. However, what happens is that



our fishermen cannot earn a decent living but just manage to survive. Now in order to survive, many of them need to find other jobs in order to feed their families.

As we belong to the EU, it is obvious that the Union's delegates that come and visit us are quite aware that poorer countries very often cannot protect or defend themselves. Fortunately, this is not our case and we have a procedure before the court in Brussels to defend our rights. We do not need to ask for charity. What we demand is that we are given the right to carry on fishing in order to show the EU and our neighbours that we do not need any moral lessons. On the contrary, they could learn a lot of things from us if they wanted to.

Nowadays we find more boats capable of fishing between 100 and 200 nm than those longliners that we have here in our region. And what will happen is that soon they are going to not only to destroy that area, but it is very possible that they will enter our 100 nm, which, as a matter of fact, they are already doing illegally. Our concern is evident in the people gathered here, namely the associations, the government, our leaders and also our scientists and people who belong to other institutions. All of us must work hand in hand and cooperate with the help of all the scientists here. The experiences that have been gained and that are still being gained through the OASIS project are very important. But what is even more important is that our delegates in the European Union, when they say something and when making legislation, should keep their word. It is a shame that more and more of the people do not believe in our politicians. Just one more thing: I hope that our representative from Brussels listens to this message: In the Azores, we are not happy with everything that our delegate in Brussels is trying to do. It is a social injustice. Thank you very much.

*"Our neighbours could learn from us."*



Azorean fishermen preparing for a fishing trip  
© J Fontes © ImagDOP

*"...it is social injustice."*

## The history of the opening of the 100-200 nautical miles zone around the Azores through the 2003 Western Waters Regulation

### 1985

- The act of **accession** to the EU of Portugal and Spain ended the free fisheries management by Portugal.
- European Community regulations became legally binding for Portugal and Spain, with among others, *Council Regulation 101 (1976)* saying that all Community **waters are free** for all Community vessels, and *Council Regulation 170 (1983)*, the first **common fisheries regulation**.
- However, the act of accession **limited these general rules** of free access to all community vessels for Spain and Portugal, including the Azores and Madeira, for a **transitional period** of ten years. Only a few vessels from Spain were allowed on conditions that existed before the act of accession. The community rules for TACs and on technical measures essentially did not apply in the Azores.

### 1995

- The **ten year transition period expired**, so there was a need of new arrangements for the community.
- Certain derogations to the principle of free access where allowed, laid down in the first Western Waters regulation (*Council Regulation (EEC) No 2847/93*), e.g. a **200 miles zone was kept exclusively** for Portuguese vessels and Spanish vessels in the case of the Canary Islands for demersal fisheries and deep water species.
- It was now allowed to fish for pelagic fish under certain conditions. However, certain new rules were applicable in the Azores, e.g. the TAC for horse mackerel. This TAC in Azores and Madeira was reserved **exclusively to Portuguese vessels** - so even if as a result of the technical measures of the Western Waters Regulation there was a

certain openness to fish for pelagic fisheries, in practice it meant that only the Portuguese could fish for this quarter.

- There was also the **first Total Allowable Catch (TAC) for certain deep-water fisheries**; the conditions by that time prevented any community vessels to fish part of this TAC in Azores.

### November 2003

- The entering into force of the new Western Waters Regulation (*Council Regulation (EC) No 1954/2003*) brings about the **opening of the zone** of 100-200 nm around the Azores, Canary and Madeira Islands.

### April 2004

- The OASIS workshop

### October 2004

- *Council Regulation (EC) No 1811/2004* amends *Council Regulation (EC) No 2287/2003* and **prohibits the use of bottom trawls** in the waters of the Azores, the Canary Islands and Madeira, immediately and for the rest of 2004.

### December 2004

- The TAC *Council Regulation (EC) No 27/2005* includes a paragraph that provides for **another trawling ban** in these waters for 2005. TACs for deep-water fisheries have been reduced, also by *Council Regulation (EC) No 2270/2004*, but not as much as advised by ICES and the European Commission.

### September 2005

- Negotiations on a permanent regulation of the prohibition of certain fishing practices in certain areas are still ongoing.

**Theme II – Collecting knowledge on Atlantic seamounts**

Moderator: Kevin Conley (Department of Fisheries and Oceans Canada)

Rapporteur: Ana Martins (Instituto do Mar / Departamento de Oceanografia e Pescas, Universidade dos Açores)

In Working Session II, knowledge on Atlantic seamounts was collected and knowledge sources as well as gaps were identified and are summarised in the table below.

Topic	Good knowledge	Ongoing research	Knowledge gaps	Problems	Source of information
Fishing fleet	<ul style="list-style-type: none"> <li>• Madeira fishery – locations, gear, target species</li> </ul>		<ul style="list-style-type: none"> <li>• Fisheries</li> <li>• Gear</li> <li>• Population biology of exploited species</li> </ul>		Fisheries Laboratory Madeira (João Delgado)
	<ul style="list-style-type: none"> <li>• Cruise surveys on the main seamounts for fishery by IPIMAR and DOP</li> </ul>	<ul style="list-style-type: none"> <li>• Compilation of all cruise survey data Azores and Madeira (historic track record)</li> <li>• Fishermen’s knowledge and logbooks</li> <li>• Observer programme POPA (tuna and experimental fishing)</li> </ul>	<ul style="list-style-type: none"> <li>• Recreational and sports fishing</li> </ul>		DOP University of the Azores (Gui Menezes)
		<ul style="list-style-type: none"> <li>• Observer programme</li> </ul>	<ul style="list-style-type: none"> <li>• Spatial resolution of fishing effort</li> </ul>	<ul style="list-style-type: none"> <li>• Discard reduction</li> </ul>	EC DG Fish
Catch statistics	<ul style="list-style-type: none"> <li>• Catch statistics since '70s</li> </ul>	<ul style="list-style-type: none"> <li>• Minimum programme to collect data since '89</li> </ul>			DOP University of the Azores
Stock assessments			<ul style="list-style-type: none"> <li>• Population structure of seamount species</li> </ul>	<ul style="list-style-type: none"> <li>• Stock assessments by VPA</li> </ul>	DOP University of the Azores
Stock structure – genetic isolation and migration		<ul style="list-style-type: none"> <li>• Tagging experiments, genetic differentiation of fish species</li> </ul>	<ul style="list-style-type: none"> <li>• Otolith micro-chemistry to complement genetic data</li> </ul>		DOP University of the Azores (Gui Menezes)
Species identity		<ul style="list-style-type: none"> <li>• Museum collection and genetic database commercial fish species – FP5 FishTrace</li> </ul>			Marine Biological Center, University of Madeira
Potential new resources		<ul style="list-style-type: none"> <li>• Potential for new deep sea resources (fish and pandalid shrimps) – InterRegIII project Azores/Madeira/ Canary Islands</li> </ul>			Marine Biological Center, University of Madeira
Ecosystem and non-target species	<ul style="list-style-type: none"> <li>• Squid</li> <li>• Fish</li> </ul>	<ul style="list-style-type: none"> <li>• Data base historic Prince Albert collections</li> <li>• Bycatch programme</li> <li>• Mar-Eco gene database</li> <li>• OASIS</li> </ul>	<ul style="list-style-type: none"> <li>• Benthos</li> <li>• Invertebrates</li> <li>• Ecosystem functioning</li> </ul>		DOP University of the Azores
Oceanography	<ul style="list-style-type: none"> <li>• Large scale</li> </ul>	<ul style="list-style-type: none"> <li>• OASIS</li> </ul>	<ul style="list-style-type: none"> <li>• Meso- and small-scale</li> </ul>		DOP University of the Azores
Policy			<ul style="list-style-type: none"> <li>• Communication Science – Public - Politics</li> </ul>		DOP University of the Azores

**Theme III – Management measures required for protecting seamounts (including MPAs)**

Moderator: Kevin Conley (*Department of Fisheries and Oceans Canada*),

Rapporteur: Ana Martins (*Instituto do Mar / Departamento de Oceanografia e Pescas, Universidade dos Açores*)

**Summary**

**Working Session III** covered questions regarding the **management of protected seamount areas**.

A general lack of data was noted, which however, would not justify suspending management initiatives. On the contrary, the lack would call for more precautionary measures as management failures would be more severe in a deep-sea environment. MPAs were regarded as tools that deliver risk reduction for species and habitats and offer integrated management of restricted resources. A representative network of MPAs could resemble an investor’s portfolio.

MPAs were also regarded as valuable for fisheries management. A variety of solutions would be required to provide for sustainable fishing, though. Positive as well as negative aspects of MPAs to exploitable fish stocks were brought up.

Management of seamount MPAs should begin with defining their purpose and the geographic

scope that could feasibly be considered. An ‘Offshore MPA Toolbox’ was introduced that provides advice on seamount MPA management. The Ecosystem Approach to fisheries management was described to still consist of traditional management tools.

Stakeholder integration into the management process was considered very important.

The adequacy of the current management regime of managing deep-sea stocks, with respect to the TAC system and the statistical areas, was discussed in view of the characteristics of seamount fisheries. Bottom-trawling on seamounts was mentioned as a serious problem for the seamounts’ biodiversity and options to tackle it were discussed. The need to include trawler associations into the process was expressed. There was a feeling of a serious gap between management measures and the risk of depletion of seamount resources.

The **opening statements** were made by:

Helder Marques da Silva (*Secretaria Regional do Ambiente - Região Autónoma dos Açores*), Armando Astudillo (*European Commission, DG Fisheries*), Jorge Gonçalves (*Associação de Produtores de Espécies Demersais dos Açores*), Gui Menezes (*Departamento de Oceanografia e Pescas*), Stefanie Schmidt (*World Wide Fund for Nature, North-East Atlantic Programme*)

*How can seamount fisheries be sustainable?*

*What can the ecosystem approach be?*

*Do we need MPAs? MPAs vs. fishery regulations*

*Which measures are effective?*

**Kevin Conley**, *Department of Fisheries and Oceans Canada*

The first topic is on how to make seamount fisheries sustainable. Which mechanisms are required for which type of fishery? This topic will hopefully generate some discussions to build upon for the OASIS project, so, secondly, the ecosystem-based approach on management: what could that be?

Third, do we need MPAs? MPAs for seamounts vs. fisheries regulations, so this gets to the point, is a general management good enough? Or do we need site-specific MPAs, or some kind of combination of both? We have talked about a variety of reasons for MPAs,



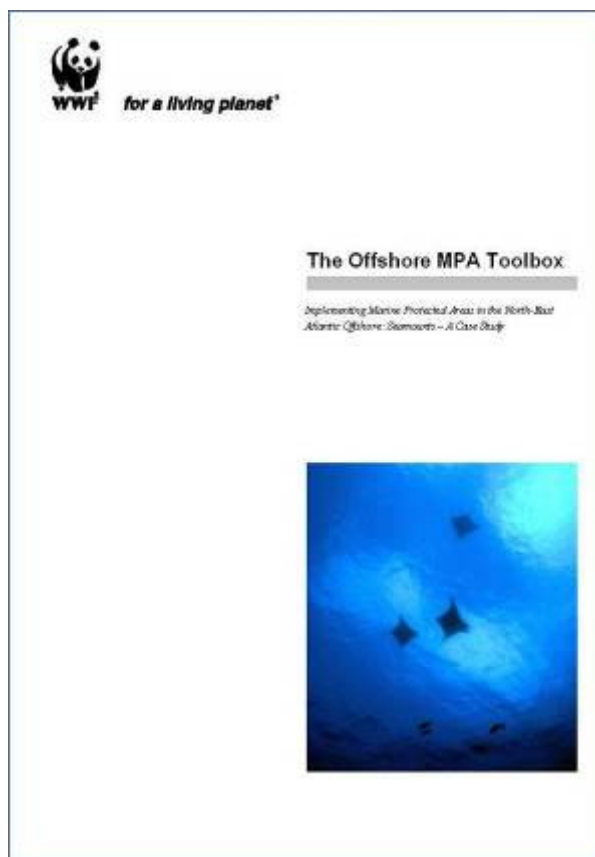
conservation of biodiversity, genetic diversity, areas of high productivity, unique habitats, areas for scientific control where activities are significantly limited, so we could manage a larger area and have something to compare that to. Or MPAs to follow the money in the bank type of approach where it provides some insurance of having fishery resources and other resources available for the future. One question that occurred to me this morning is, also with respect to topic number four: what is an appropriate partnership with fishermen, scientists, government, where does that belong? I'd like to suggest that as another question or sub-subject.

**Stefanie Schmidt**, *World Wide Fund for Nature, North-East Atlantic Programme*

I would like to take the chance to introduce to you briefly another product of OASIS, the „Offshore MPA toolbox - implementing marine protected areas in the North East Atlantic offshore: Seamounts – a case study“.

We already heard something about marine protected areas in general. According to a definition that was developed by IUCN in 1999 an MPA can be seen as: “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”. MPAs have proven to be valuable tools for the conservation or sustainable management of marine resources, but as yet, the majority of existing MPAs are coastal ones and there are only a few offshore marine protected areas worldwide so far, only a handful of them including seamounts. This means that there are only few experiences in planning, implementing and managing seamount marine protected areas or other similar offshore MPAs.

The „Offshore MPA Toolbox“ provides advice on designating and managing MPAs to protect offshore seamounts and similar habitats, with a particular focus on the North-East Atlantic Ocean and the region’s relevant legal frameworks. Based on a review of practice in already existing seamount and similar offshore MPAs, the report addresses aspects like site-selection, possible goals and objectives for the site management, options for the regulation of resource exploitation, administrative and legal requirements for making the MPA operational. Building on the „Seamounts in the North East Atlantic“-report released in 2003 (see above), this report is aimed primarily at planners and managers of offshore MPAs in the region but also elsewhere. Any comments or critique are highly appreciated.



The OASIS Offshore MPA Toolbox

**The Toolbox text version:**  
[http://www.ngo.grida.no/wwfneap/Projects/Reports/Offshore\\_Toolbox.pdf](http://www.ngo.grida.no/wwfneap/Projects/Reports/Offshore_Toolbox.pdf)

**The web version:**  
[www.ngo.grida.no/wwfneap/Toolbox/Toolbox\\_Entry.html](http://www.ngo.grida.no/wwfneap/Toolbox/Toolbox_Entry.html)

*“The majority of MPA experience comes from the coastal zones.”*

*“The Toolbox provides advice on MPA management to protect offshore seamounts.”*

*"The Azorean government regards MPAs as increasingly important tools."*



A dense population of deep sea mussels *Bathymodiolus azoricus* lives at Lucky Strike  
© Atos/IFREMER

*"We need to balance between what is desirable and what is feasible."*

*"What is really important is to define the geographical scope of management."*

**Helder Marques da Silva**, *Secretaria Regional do Ambiente*

I would like to describe our situation with respect to MPAs in the Azores. Next to other management options, the government regards MPAs as increasingly important tools. Therefore, we have made some efforts in defining and classifying as well as selecting and designating marine protected areas in our waters. In the coastal area, the Dollabarat reef is designated already, two others, the channel between Faial and Pico and also the Corvo island will hopefully be designated very soon.

Further offshore, MPAs will be instrumental to protect hydrothermal vents, of which we have at least two within our 200 nm zone. We have done some effort together with the University of the Azores and the Institute for the Environment to get international recognition of these areas as MPAs, worldwide and within OSPAR and have found that the process goes much slower than we would like. So, in parallel, we have started considering with the UNESCO the recognition of the hydrothermal vents as World Heritage Sites. The rationale for this is that the mid Atlantic ridge is very important from an ecosystem point of view, geologically and biologically reflecting the origins of life on earth. We are very keen on making progress in designating the hydrothermal vents – I am basically talking of Lucky Strike and Menez Gwen - as MPAs. However, we do need some international recognition for making progress regionally and nationally.

**Armando Astudillo**, *European Commission, DG Fisheries*

Addressing the question on how to make fisheries sustainable: the crucial point is to be able to balance the scale of management units. To manage fisheries around seamounts, it would be very difficult to individually manage each one of the seamounts in the Atlantic or each one of the seamounts we want to manage. We need more general approaches and we need to make a balance between what is desirable, which would be single management for each individual unit and what is economically feasible. Once the management units are properly defined and common management approaches defined, the mechanisms required for each type of fishery will be the traditional management tools. We presently have a set of management tools that we can use but what is really important is to define the geographical scope of management.

On question two, what an ecosystem-based approach should be, I cannot give you a final opinion of the Commission yet. However, there are two things often mixed: the ecosystem-based approach on the one side and fisheries management using fisheries management

tools, but with an ecosystem perspective, on the other side. The broader ecosystem-based approach, including the management of many other activities, will be an integral part of the „Marine Strategy“ which the Commission is developing with a view to finalising by the end of 2005. From the viewpoint of the Common Fisheries Policy we are talking about an ecosystem approach to fisheries management which is explicitly mentioned in the basic regulation as a long-term goal of the policy. In other words, we will continue to use the same or the traditional management tools for the Common Fisheries Policy but all this will be viewed from a different angle.

MPAs can range from a very small area which is protected from all activities, to a much larger area where only certain activities are prohibited or regulated in some manner. First we must define what these MPAs are, what these areas of restriction are and what they are intended for. Whenever we have decided upon this we can start asking for the main instruments to define management procedures in those areas. First we need to decide on the purpose of the MPA. Then we can start talking about research needs and how this can be dealt with when defining management requirements for the marine protected areas. Thank you.

**Jorge Gonçalves**, *Associação de Produtores de Espécies Demersais dos Açores*

I would like to express my opinion as a representative of several Azorean demersal fish shipowners. We have some difficulties with protected areas. Protected areas that are far away from the coastline could be difficult to monitor as we do not know how controls in such areas will be implemented. We also think that due to a lack of effective control, whether it be by the navy or by any other entity, the area will in fact remain unprotected.

We also think that we already have a very restricted fishing area. We do have the biggest Exclusive Economic Zone although the fishing area itself is one of the smallest in the European Union. Hence, we believe that if a marine protection zone is created, it would mean the loss of a fishing area for the fishermen themselves. On the other hand, such protected areas can be a good thing for the future as they allow the species in that area to grow and spread into surrounding fishing areas.

I would also like to point out that controlling such an area would be more feasible if it was closer to the coast as it could be controlled and monitored by staff on land or by equipment placed near land. On the other hand I am afraid of the reaction that fishermen may have to an area very near the coast in which small boats are operating. As a professional, I would like to suggest that it would be more feasible to focus on the

*“We will continue to use the traditional management tools for the CFP, but viewed from a different angle.”*

*“First we must define what these MPAs are and what they are intended for.”*

*“There will be a lack of effective control.”*

*“MPAs might reduce fishing area, but also allow for fish to grow and spill over to surrounding areas.”*

*“I would suggest to focus on fisheries management and start with reserves and closed seasons.”*

*“We might have to make changes to the fishing industry itself.”*



Azorean fishermen catching tuna  
 © Davide Martins, POPA/ImagDOP

*“A single solution is not enough; we need more than one tool for managing these ecosystems.”*

*“I don't know if we have the financial resources for a sufficient care for MPAs.”*

management of fishing and start with areas that are not marine protected areas but could eventually become reserve areas. I believe that we should think about having closed seasons that could even be referred to as biological breaks. During these times shipowners could either fish for other fish or repair their boats.

I also think that good management should consider setting the minimum sizes allowed to be caught which could also be considered in accordance with different optional reserve areas. To conclude, I would like to say this: I believe that right now we are taking more out of the ocean than it can reproduce or replace at the same rate. For this reason, as a fishing professional, as a representative of the sector, and above all as a citizen, I am extremely concerned. My concern is not only for the Exclusive Economic Zone of Azores but for the whole of the North Atlantic.

We should consider the possibility that we will have to make a lot of changes to the fishing industry itself because if we go on as we do now, then we are on the slow road to extinction. I believe that this is not beneficial for either the European Union, for us, or even for the future of humanity. Thank you very much.

**Gui Menezes, Departamento de Oceanografia e Pescas**

I want to point out that in my experience, these are very complex problems, as next to biodiversity, stock dynamics etc. we must always take into account issues related to the economics and the social dependence of the fisheries. I think in the Azores we have the possibility to develop an ecosystem-based approach to fisheries. We have talked to the fishermen. We need to learn many things, and we need more science, and to do this, we need more money. I agree in part with Armando, in that we need to define very well first what we want from the marine protected areas. For example, we will need no-take zones to preserve pristine places, we will need a zonation of human activities, we will need places where fishing can be allowed under certain circumstances, etc. We will need several tools at the same time because the uncertainty is quite high. I don't believe that a single solution is enough; we need more than one tool to manage these ecosystems.

The other thing I would like to stress is the need for monitoring the sites before and after implementing any management measures. To do that we will need money, we will need staff, people to work on these reserves or marine parks, we will need to create an administrative structure to manage these places. We need to evaluate the costs of all this and in regions like the Azores, I don't know if we have financial resources to guarantee that this will be sufficiently monitored, studied and accompanied.



I think one important possibility is a small-scale fishery like we have in the Azores now. As Jorge Gonçalves already put it I also think that rotational schemes of fishing could become important also for scientific progress because we still have to learn a lot about the ecosystems. It would be useful to design scientific experiments to accompany the development of these rotational schemes.

**Kevin Conley, Department of Fisheries and Oceans Canada**

Summing up the opening remarks, it is a complex situation and a long way to go. A lot of the issues that have been brought up, about what are MPAs for, the challenges of enforcement, the challenges of resources, are certainly shared by our department (DFO Canada, responsible for Bowie Seamount Pilot MPA) in terms of going down the path of marine protected areas, and broader ecosystem management.

**Callum Roberts, University of York**

So how do you go about protecting a resource where information is less than adequate and the need for action is very swift? We know that seamount resources and seamount fish stocks are in steep decline and are being damaged around the whole world and we need to act now. But how can we make rational choices about which places we should protect?

Management advice for shallow water fish stocks is often very unreliable and uncertainties in stock assessment methods and stock assessment data have contributed to some of the management failures that we've seen there. In deep water, we see those problems magnified, the methodologies available for stock assessment are even less precise and the cost of acquiring data is substantially higher than for shallow water fish stocks, which means we're always going to be operating with worse information. And any mistakes that we make in managing deep water fish stocks will be even more costly as the recoverability of deep water stocks is likely to be much lower than for those in shallow water.

In addition though, as the OASIS project members are acutely aware of, we also lack basic ecological information on the dynamics of the seamount environments, and of deep sea environments in general, e.g. the patterns of connectivity among different fish stocks or among different seamounts, in order to make clear choices about which ones are inter-linked at the moment and which ones would act as sources and which ones might be sink populations.

So, under these circumstances, we need to adopt tools which explicitly recognize severe data limitations, one



A deep-sea viper fish  
 © Stefanie Hirsch

*“Deep water stock assessment is even less precise...”*

*“Practically, any mistakes will be huge and irreversible.”*

*“We lack basic ecological information...”*

*“Marine reserves are essential also for fisheries management.”*

*“50% marine reserve area would be appropriate for the deep waters of the Azores.”*



A ray (*Torpedo sp.*) from Seine Seamount at a depth of 500m  
 © Bernd Christiansen

*“Build a portfolio of areas to spread the risks.”*

of these tools being marine protected areas. I mean by marine protected areas those places that are off-limits to all fishing. Marine reserves, as this kind of protected area is often called, are an essential part of the management package not just for conservation reasons but also for fisheries management reasons. The reserves should really be at the absolute heart of fishery management approach for the deep water stocks here. But where do we put them? OASIS is studying one seamount here and one in Madeira, and information from this project alone will not suffice to answer that question. We need to apply the three principles of biogeographic and habitat representation, replication, so habitats are replicated within those different marine protected area units in the network and the third one is the application of networking principles designed to achieve connectivity between populations within different protected areas. So, the idea is create your network so that populations in different protected areas are mutually supportive and able to supply areas in between.

From modelling, we have an idea about how much of the area we would need to protect from fishing to achieve sustainability or help achieve sustainability of fisheries and assure that ecosystems are protected. I mentioned in my opening remarks at this meeting, that a 50% recommendation would be appropriate for deep-waters in the Azores. Using the existing information on bathymetry and on biogeography, on oceanography, and the fisheries data, it would be possible to devise a network configuration that would achieve biogeographic representation and would achieve ecosystem protection. The fishery data would help to inform that process and also to insure the spread of protected areas throughout the region so everybody would still be left with sufficient area in which to fish.

In the absence of data, e.g. on patterns of connectivity among different protected area units, we need to learn to deal with uncertainty, e.g. by learning from investors who build portfolios of stocks they expect to perform adequately in the future. They spread the risk of failure in individual companies or business types by investing in a wide range of different kinds of stocks. In the same way the protected areas within a network can be considered as elements of a conservation investment portfolio. They are chosen so that they can achieve connectivity under the conditions that prevail today, as well as under those that will prevail in the future with directional climate change and against a background of environmental fluctuations that exist right now. So, it's not necessary to know exactly the patterns of connectivity right now in order to devise network designs that will be robust and that will meet the needs of a wide range of species that are present. Thanks.

**Veríssimo Borges, Quercus**

I think that Armando was very clear. He talked about just the opposite of the precautionary principle. This is why, as Gui Menezes said, we need money and people to work out management options and prove impacts. We also need time. It is easy to define a general approach but practically, any mistakes will be huge and irreversible. We need to put all seamounts as restriction zones and make some of them experimental to be able to learn from some fishing experiments. Unfortunately, our big problem was that the EC did not think enough about the scientific point of view in the case of the Azores and other places of seamounts.

**Francisco Liberato Fernandes, Cooperativa Porto de Abrigo**

I remember a phrase spoken by a researcher at a meeting in Peniche which was that “the management of fishing is more than anything about the management of people!”. We need to keep this in mind to have good resource management. In the case of the Azores there are measures that cannot be applied there in a uniform way across all the islands. There are general principles for the application of precautionary measures, but ways of dealing with things for their proper functioning have to be variable. If this is the situation for such a small archipelago, it is even more relevant for a union involving 15 (and later 25) countries.

One important aspect is border control. We feel that sanctions should be the last resource for this. It is more important to have a thorough discussion amongst member countries. If the fishermen decide to discuss an issue, the situation is often resolved by reaching an understanding. Those who fail to understand can then have controls imposed, although preferably by their colleagues. In other words, members can monitor each other and the transgressor will have to surrender to the majority.

A difficult issue is the type of fish hook used. Concerning this, ICCAT has a measure which is not well-suited. A small fishing boat cannot catch a small swordfish. If it does, the fisherman will usually hide it and sell it outside of the official fish auction. However, the larger fish are also difficult to register. This is because fishermen cut off the head of the fish and the remaining fish into smaller pieces and store them in the freezer. Hence, the measures that ICCAT applies do not work and therefore it never reaches its target for swordfish as they are always sold outside of the fish auction.

I don't agree with a blanket control on reserves. If the reserves are near the coast, people that go fishing will use them. I think such reserves would be better in deep sea areas.

*“The management of fishing is more than anything the management of people!”*

*“When it comes to border violations sanctions should be the last resort.”*



Swordfish being caught off Florida  
© WWF-Canon / James W. LATOURETTE

*“People are willing to take part in discussions because the matter affects their incomes.”*

*“The shift of fishing effort through MPAs might have severe ecological consequences.”*

*“The power of MPAs lies in the integrated management of a restricted area.”*

Another important aspect concerns the associations. During the Fisheries Week, the fishermen felt intimidated by the presence of the researchers, although they did speak a lot on Wednesday afternoon. The general law governing fishing suggests that the laws be discussed. On such occasions, more than 50% of the interested parties are present even when invited at the last minute. This is because the matter affects their incomes. In fact, people are willing to take part in any topic that is raised.

**Paulo Morais, Fisheries Consultant, Porto Abrigo**

I do have difficulties in understanding the value of MPAs for fisheries, even from ecological point of view. If 50% of our EEZ became an MPA, then fishing effort on the remaining fishable areas would double, and the ecological consequences could be very severe.

**Gui Menezes, Departamento de Oceanografia e Pescas**

We would need a forum for discussing these issues among fishermen from the Azores and from other countries in EU, but how can we bring all these to talk to us?

**Monica Verbeek, Seas At Risk**

A remark on MPAs. The objective of marine protected areas is one of conserving a seamount ecosystem, not of particular fish stocks. However, as a side effect, resident fishstocks are likely to profit. The power of MPAs lies in the integrated management at one particular site, which is a kind of ecosystem approach in a nutshell. Establishing MPAs is a longterm process, involving more than just closing an area to fishing. Management could mean e.g. to just eliminate potential additional pressures from the area. An important aspect is the control on human activities that is exerted in an MPA which allows for much better monitoring of the conservation status than in the case of non-spatially explicit generic measures.

**Veríssimo Borges, Quercus**

All seamounts should be protected – not in the sense of closing them fully to all kinds of uses, including local fishing. What I think is that they need to keep fishing. But there must be a way of controlling the actual fishing pressure, the gears used etc.



**Charlotte Johnston, Joint Nature Conservation Committee**

Criteria already exist for the selection and establishment of MPAs in the EEZs of European Member States and OSPAR. The main challenge now is the appropriate management of the areas.

**Manuel Eleutério Serpa, Associação Pescadores Picoenses**

Some specific reserve areas were created by the Secretary e.g. for shellfish. There is no point in creating reserve areas when they are not enforced by controls and when people are not responsible for defending their own interests. It is necessary that all of us assume our responsibilities. Why are we defending a 100 nm area when others will come later to fish in what the Azorean fishermen have preserved?

The São Miguel Association has done an excellent job. Over the years we have only been catching sufficient fish to meet our own needs. More developed countries fish without limits. We will try to destroy the fishing equipment of the boats that come to fish illegally in the Azores. There is a parliament in Brussels, with representatives responsible within this parliament. If the people elect a deputy who later fails to defend the people, the elected person will have to pay for this. If our zone is trespassed, we will regrettably have to confiscate their fish and the right to certain fishing areas. Following this, our politicians will be responsible for solving the resultant problems.

We do not want to beg for anything. Just let us work and let the scientists do their work. Our resources, which have been preserved all these years, will eventually be depleted.

**Telmo Morato, Departamento de Oceanografia e Pescas**

I think we do need to compile as much information as possible but, in line with what Callum said before: we cannot wait much before acting. I think that in the Azores, the scientists should try to quantify more the management objectives and options that we have. Also the impact of establishing MPAs may be predictable.

I consider it very urgent to try to forget the lack of data and try to have a good discussion about what we can do.

**Susan Gubbay, Consultant**

If we close 50% of the available fishing area, then we will have a doubling of fishing effort in the remaining areas if the fishing intensity remains the same. There may well be some short-term negative effects of MPAs in relation to fisheries (just as there are with some

*“All of us need to assume their responsibility.”*

*“We will try to destroy the equipment of boats that fish illegally in the Azores.”*

*“Let us forget the lack of data and discuss what we can do.”*

*“We should also consider the effects of not doing anything.”*



Boarfish from Seine Seamount  
© Stefanie Hirsch

*“An MPA will need a large buffer zone to protect associated flora and fauna.”*



A turtle swimming in the waters of Madeira  
© Bernd Christiansen

fisheries management measures) but we should also consider the consequences of not doing anything.

Addressing the question of how to make seamount fisheries sustainable, it seems to me also a question of methodology for developing the right measures at the right time in the right place. There are two principles at hand which are not yet applied to fisheries: the reversal of the burden of proof of environmental impacts and environmental impact assessments. Environmental impact assessments, and strategic environmental assessments now required for all new plans or programmes in the EU (Directive 2001/42/EC). This approach is becoming standard in most sectors but fisheries is a major exception. These techniques should be applied to deliver a precautionary forward-looking approach rather than the usual reactive, restrictive management action. We also need action to investigate possible cumulative effects of various human activities in one place. Applying both principles could buy us some time in working towards the recovery of degraded marine ecosystems.

**Paulo Morais, Fisheries Consultant, Porto Abrigo**

Obvious to me an MPA will protect biodiversity. But this can in my view only be achieved by a responsible commitment from all the people (researchers, consumers, etc.).

**Thomas Dellinger, Universidade da Madeira**

Are seamounts the only habitat to protect by MPAs? Apart from considering all ecosystem components, thus also the water column fauna and flora, it will be important to design MPA boundaries including large buffer zones around the seamounts themselves.

**Armando Astudillo, European Commission, DG Fisheries**

The principle of the reversal of proof which Susan proposed to apply is an old one, but difficult to apply in fisheries as it could be taken to the extreme for individual fishing vessels.

**Gui Menezes, Departamento de Oceanografia e Pescas**

NEAFC and ICES proposed to change the statistical areas. Area X (includes the Azores) has been divided into two different areas. I don't know the consequences of this measure, but this is being discussed. For example, the Azorean fishing effort is being assigned to the huge area X.

**Armando Astudillo, European Commission, DG Fisheries**

Some comments on the statistical areas: there is a lack of knowledge on the population structure of deep-water fish. At the time the areas were defined it was a compromise between political needs and lack of scientific knowledge. The present stock division is totally artificial. At the same time we as the European Commission established fishing effort and catch limitation regimes for each fishing area. We recognize that TACs were established to: 1) allocate catches to country members and 2) implement a precautionary approach to each area, following the scientific awareness of stocks in decline.

The opening of part of the Azorean EEZ is an important issue for conservation, but we have the feeling that there's an over-reaction to this topic. With the abolishment of subsidies we expect to have a significant reduction on fishing effort, due to lack of economic effectiveness.

**Callum Roberts, University of York**

Setting TACs can be an ineffective measure, because of the particular behaviour of fishing fleets that will fish seamount after seamount until depletion. In this case landings could remain constant year after year until eventually the fleet runs out of fish to catch. For most species there's little evidence of population movements between seamounts which would allow replenishment of depleted populations.

**Gui Menezes, Department of Fisheries and Oceans Canada**

Deep water species are probably not as widely distributed as we expected. The Azores are isolated, thus colonization is limited (with effects on the likelihood of recovery). Recovery plans will have more uncertainty and recovery will take longer compared to continental shelves.

Will catches of deep-water species be used to allocate quotas based on historical records?

**Armando Astudillo, European Commission, DG Fisheries**

Yes. That's how things work in EC

**Callum Roberts, University of York**

Areas where deep-water trawling is operated (outside EEZs) are probably already overexploited. There is a moratorium proposed for deep-water trawling in the North Atlantic. OASIS could write a statement to support this.

*"We have the feeling that there's an over-reaction to the opening of the Azorean EEZ."*



A dolphin swimming in the waters of Madeira  
© Bernd Christiansen

*"...recovery of deep water fish stocks will take longer compared to continental shelves."*



Panel discussion at the workshop  
© Sabine Christiansen

**Download the OASIS position statement from:**  
<http://www.rrz.uni-hamburg.de/OASIS/Pages/public/OASIS%20Statement.pdf>

*“It is very important to have trawler associations in these discussions.”*

*“Proposing more diverse measures might not be realistic or feasible.”*

*“Even experimental fishing is not as surgical as we expected.”*

*“Thank you very much!  
Muito obrigado!”*

**Sabine Christiansen, World Wide Fund for Nature, North-East Atlantic Programme**

Well, if I may answer for OASIS: OASIS is a scientific project that has no scientific data supporting a ban on deep water trawling. However, early in the project we’ve written a statement about our concern of damaging fishing practices on seamounts. There’s also the problem of surveillance. It’s important to talk about this, but we should be careful about what to formulate.

**Paolo Morais, Fisheries Consultant, Porto Abrigo**

The information I have been gathering from this workshop is that these seamount are important biodiversity spots, but very limited areas. I imagine that trawling might have the highest impact in these areas. My question is: have trawler associations been contacted to be part of this discussion? We have limited time to act, the risk is high, we must go on working with other stakeholders, but it would be very important to have trawlers involved in the process.

**Monica Verbeek, Seas At Risk**

Clearly on the high seas there’s a real gap between risk of depletion and management measures. Even implementing TACs or fishing effort regulations has been very difficult. Proposing more diverse measures would probably not be realistic and feasible. I think seamounts are in real trouble. I’m very pessimistic.

**Ricardo Serrão Santos, Departamento Oceanografia e Pescas**

We had lots of pressure from a deep-water trawler to come here and do some experiments. We started with control on bycatch, etc. After 3 months the company asked to increase the bycatch allowed. We noted that these operations are not as “surgical” as we expected. During the Fisheries Week, we discussed the topic and decided not to allow more trawling in the area. For the next stakeholder meeting we should invite trawlers to participate.

Thank you for the good discussion.

I want to thank everybody, especially the fisheries’ representatives. They are willing to keep involved in this discussion.

**Sabine Christiansen, World Wide Fund for Nature, North-East Atlantic Programme**

We have to think about an advisory board of a limited group of people.

Thank you very much for being here, I hope we will have at least one more workshop.



*Part IV – Appendix*

*Workshop agenda*

<i>Thursday, 1<sup>st</sup> April</i>		<i>Friday 2<sup>nd</sup> April</i>
<i>09:15</i>	Ana Martins, Bernd Christiansen & the OASIS consortium – Project activities, goals and scientific results.	Round table Fisheries at Atlantic seamounts: past, present and future
<i>10:00</i>	Gui Menezes & Telmo Morato - The ecosystem at/around seamounts – a scientific perspective	
<i>10:45</i>	<b>Break</b>	<b>Break</b>
<i>11:00</i>	Susan Gubbay -Seamounts in the Northeast Atlantic	Working Group Fisheries at Atlantic seamounts: past, present and future
<i>11:45</i>	Kevin Conley – Bowie seamount: a MPA proposal	
<i>12:30</i>	<b>Lunch</b>	<b>Lunch</b>
<i>14:15</i>	Thomas Dellinger – The importance of seamounts for turtles and marine mammals.	
<i>15:00</i>	<b>Break</b>	<b>Break</b>
<i>15:30</i>	RS Santos – Habitat protection in the Azores Region: experience from the past, prospects for the future.	Round table Management measures required for protecting seamounts (including MPAs)
<i>15:45</i>	Speech by the President of the Regional Parliament	
<i>16:15</i>	Meeting of the Chairs and rapporteurs for the Round Tables and Working Groups	Working Group Management measures required for protecting seamounts (including MPAs)
<i>19:30</i>	<b>Conference Dinner</b>	

*List of participants*

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