

A Set of Policy Recommendations to Inform, Support and Promote Better Management of Deep-sea Fisheries and Ecosystems

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Background

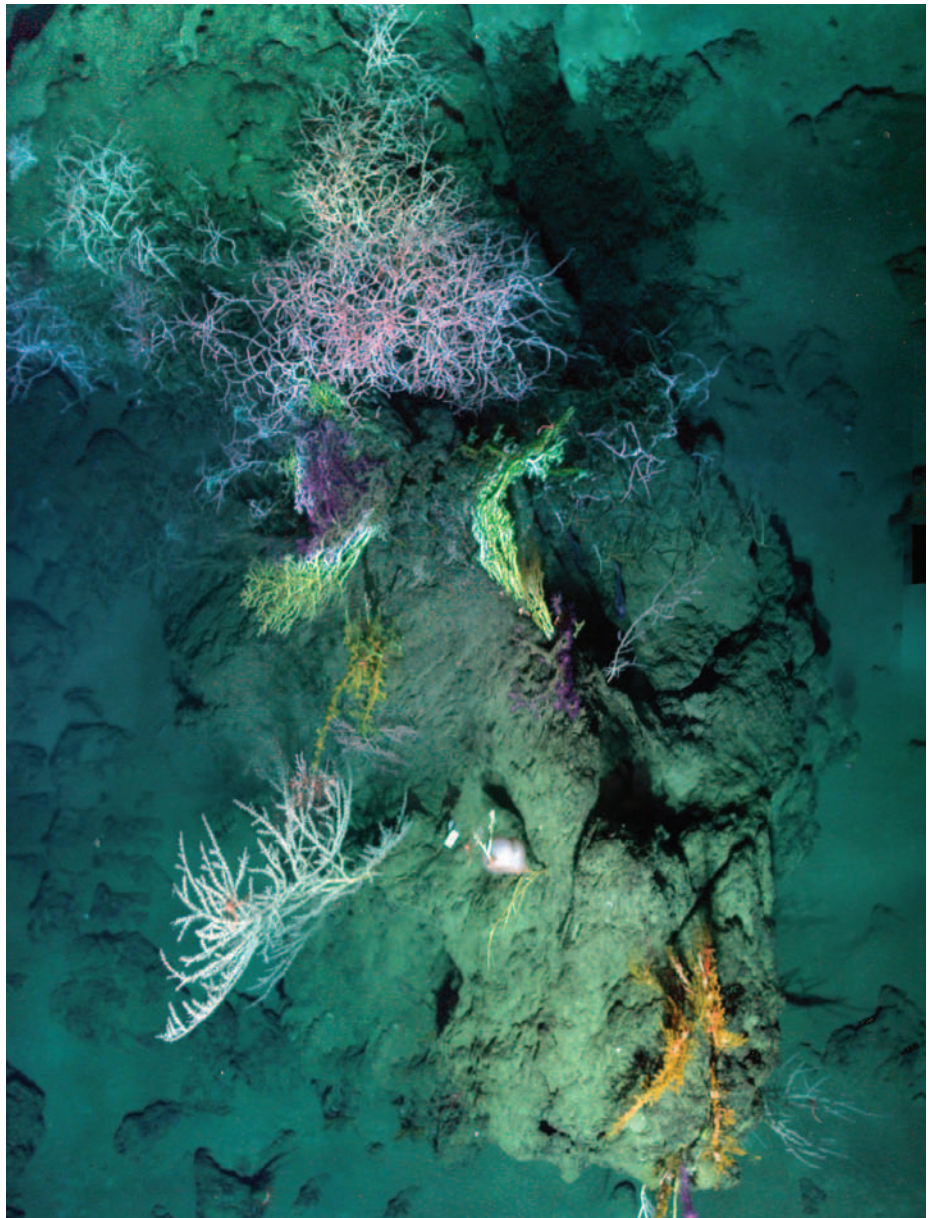
Deep-sea fisheries are generally those conducted at depths below 200 m, often on continental slopes or isolated oceanic topographic structures such as seamounts, ridge systems and banks. Deep-sea fishing, facilitated by technological changes, expanded greatly during the 1960s and 1970s as the harvest of key fish stocks in shallower waters declined because of overfishing. Targeted deep-sea fish species have proven to be extremely vulnerable to overfishing because of their lifehistory characteristics, which are markedly different from most shelf species: extreme longevity, late age of maturity, slow growth, and low fecundity. Many deep sea species also aggregate on restricted topographic features such as seamounts, and as a consequence are highly vulnerable to overfishing, and have potentially little resilience to overexploitation. Deep sea fisheries have often followed a “boom and bust” cycle. Stocks are typically fished down, often within 5–10 years, to very low levels, or even to the point of commercial extinction.

Deep-sea fishing has concentrated on biologically rich and diverse features such as seamounts, cold water coral reefs and canyon walls, with considerable impact on these vulnerable marine ecosystems, in particular from bottom trawling. In addition, Deep-sea fishing often catches a significant number of non-targeted species for which there is no market and that are discarded dead at sea. Though deep-sea fisheries discussions have tended to focus on bottom contact fishing (the capture of fish with gear that is likely to contact the seabed), the issue is broader as the removal of large



RIGHT: Black-bellied rose fish find shelter within a mass of Lophelia coral. *Photo Credit: Lophelia II 2010 Expedition, NOAA-OER/BOEMRE.*; BELOW: Associations between a hermit crab, an epibiotic anemone and a soft coral. *Photo credit: NOAA Okeanos Explorer Program, INDEX-SATAL 2010.*





ABOVE: A top-down view of a hard and soft coral community at 1400m depth. Photo credit: *Lophelia II 2009 Expedition, NOAA.*

quantities of biomass from the water column above may also affect deep sea communities and ecosystems.

Fishing now takes place to depths of 2000 m, and resources from an ecosystem about which little is known are being exploited and potentially depleted. Over the last years, there have been increasing concerns about the impacts of deep sea fisheries, particularly bottom trawling, on seamounts and other vulnerable marine ecosystems. This led to increasing international efforts and initiatives to improve regulations and management of deep sea fisheries.

The Conference on Governance and Management of Deep-sea Fisheries held in Queenstown, New Zealand in 2003 considered that the national and international track record in managing deep-sea fisheries was, in many cases, poor. Inadequacies in data, governance, implementation of management and conservation measures and

compliance with requirements for sustainable fisheries were referenced in the report. There was concern about the adverse impacts of fishing on the deep-sea environment, though there was some confidence that the application of high levels of caution would allow for the management of larger deep-sea fisheries in a sustainable manner.¹

In recent years, the United Nations General Assembly resolutions on Sustainable Fisheries, most notably 61/105 adopted on 8 December 2006 and 64/72 adopted on 4 December 2009 have included language with respect of bottom fishing.

UN General Assembly resolution 61/105 call *inter alia* on RFMOs and States to assess first whether individual bottom fishing activities would have significant adverse impacts on vulnerable marine ecosystems and to manage to prevent such impacts or not allow the activities to proceed. The resolution also called for the identification of locations where vulnerable marine ecosystems are known or likely to occur and the adoption of conservation and management measures to prevent significant adverse impacts on such ecosystems or to close them to bottom fishing. Conservation and management measures, including monitoring, control and surveillance measures are to be adopted to ensure the long-term sustainability and rebuilding where necessary of stocks. A precautionary approach should ensure that conservation and management measures are sufficient to ensure the long-term sustainability of stocks even where scientific information is uncertain, unreliable or inadequate. UN General Assembly resolution 64/72 reiterated these measures.

The FAO International Guidelines for the Management of Deep-sea Fisheries in the High Seas, adopted through a Technical Consultation in 2008 provided further guidance to enable the implementation of the UNGA resolution.

The UN General Assembly through resolution 64/72, adopted in 2009, noted that further actions were necessary in accordance with the precautionary approach, ecosystem approaches and international law to strengthen implementation of the relevant provisions of recommendation 61/105 on bottom fishing and decided to conduct a further review in 2011 of actions taken to date by States and RFMOs to implement this work and to make further recommendations where necessary. As part of this review, there will be a workshop to discuss implementation of paragraphs 80 and 83 to 87 of resolution 61/105 and paragraphs 113 to 117 and 119 to 127 of resolution 64/72 on the impacts of bottom fishing on vulnerable marine ecosystems and the long-term sustainability of deep sea fish stocks at the United Nations in September 2011.

The Nature Conservancy and the International Union for Conservation of Nature have collaborated to examine the management of deep-sea fisheries together with its effects on related ecosystems and to consider ways that such management could be improved. In support of this work, the organizations co-hosted a workshop in January 2011 at which invited experts were asked to provide information and advice. Drawing on that discussion and after further reflection, the recommendations below were developed and are available to assist those participating in the UN General Assembly review and the workshop. The recommendations, though informed by the workshop, do not necessarily reflect the views of workshop participants or of the organizations with which they are affiliated.

1. See FAO Fisheries Report 772 "DEEP SEA 2003, An International Conference on Governance and Management of Deep-Sea Fisheries"

Recommendations

Improved compliance with current measures

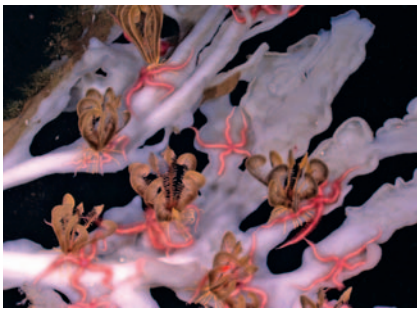
Many of the provisions of the UNGA resolutions 61/105 and 64/72 have not been implemented. In some cases, no impact assessments have been conducted for high seas bottom fisheries. In others the impact assessments produced are partial and do not fully comply with the FAO Deep-Sea Guidelines, and the mitigation measures established often do not ensure that significant adverse impacts on VMEs are prevented^{2,3}.

- **States directly and working through RFMOs should ensure that the provisions of the UNGA resolutions 61/105 and 64/72 and the FAO Guidelines are fully implemented and should not authorize deep-sea fishing by their vessels or nationals in areas for which they are not satisfied that they have been fully implemented.** In addition, as the Guidelines reflect sensible and agreed measures, **coastal States should ensure that they are implemented *mutatis mutandis* in areas subject to their national jurisdiction.**

2. DSCC. 2011. Unfinished business: a review of the implementation of the provisions of United Nations General Assembly resolutions 61/105 and 64/72, related to the management of bottom fisheries in areas beyond national jurisdiction

3. IUCN, TNC. 2011. Deep-sea Fisheries Management: Challenges and Opportunities. Report of a TNC/IUCN Workshop, 18–20 January 2011, Arlington, Virginia.

BELOW: Clockwise from top: Stunning imagery from the Indonesia-USA Deep-Sea Exploration of the Sangihe Talaud Region. *Photo credit: NOAA Okeanos Explorer Program, INDEX-SATAL 2010.*; *Photo credit: NOAA Okeanos Explorer Program, INDEX-SATAL 2010.*; Deep sea octopus from the Sangihe Talaud Region. *Photo credit: NOAA Okeanos Explorer Program, INDEX-SATAL 2010.*



- **States, individually or in cooperation, should adopt measures to enhance compliance with the UNGA resolutions. The UN General Assembly should continue to exercise a review function on a regular basis of deep sea fisheries and their impacts on environmental, economic and social development and on the implementation of its resolutions.**

Assessments:

With respect of many areas of the ocean, impact assessments have not been completed. Though many RFMOs are trying to implement the FAO Guidelines, not all have as yet undertaken necessary efforts with success to identify and make known where VMEs are or are likely to be found.

- **States should not allow their vessels or nationals to engage in bottom fishing unless and until appropriate management measures are in place, including prior assessment of the fishing activity and its likely impacts on the marine environment.**
- There is a need for a consistency in how to implement the VME criteria in the FAO Guidelines, including the appropriate level or trigger to determine a VME. Though iconic species are not the same across regions, the criteria should be applied in the same way. There has been emphasis on identifying high densities of corals and sponges in determining VMEs, but this does not take into consideration low densities or other species that may constitute VMEs. **States and RFMOs should support stronger efforts to integrate data on other species and a variety of densities into VME criteria.**
- Although the FAO Guidelines provide a good initial set of guidance for States and RFMOs to improve management of deep sea fisheries, there's still a lack of clarity on undertaking risk and impact assessments. **Existing information on risk assessments by RFMOs, States and the scientific community should be made available and shared.** In addition, further guidance is needed on a number of subjects, for example on determining levels of “significance adverse impacts”. **FAO, States and RFMOs should collaborate in the development of further guidance and procedures to facilitate risk and impact assessments.**
- The FAO International Guidelines note that “Vulnerability is related to the likelihood that a population, community, or habitat will experience substantial alteration from short-term or chronic disturbance, and the likelihood that it would recover and in what time frame”⁴. Included within an understanding of vulnerable marine ecosystems should be deep-sea fish assemblages themselves. As already noted many deep-sea fish species have low productivity and hence are slow to recover from overexploitation. In this regard, **States should increase efforts to define VMEs also with respect of target and non-target stocks and should ensure that relevant reference points as referred to in Article 7.5.3 of the FAO Code of Conduct are taken into account.**⁵ **Fishing that affects these stocks should be allowed to continue only if appropriate monitoring shows that adequate conservation and management measures are being implemented.**

4. See para 14 of the FAO International Guidelines

5. See <http://www.fao.org/docrep/005/v9878e/v9878e00.HTM#7>

- Encounter protocols and move-on rules have at times been used as the only management measure for some areas, but these protocols and rules are often of limited value and cannot substitute for prior impact assessment. Thus, **such protocols and rules should only be considered as a fail-safe back-up system for areas that have been assessed and found not to have vulnerable marine ecosystems.**
- The UN General Assembly resolutions lack guidance on what to do if the risk assessment shows uncertainty in the likely level of impact. **Efforts should be undertaken to resolve such uncertainties or adapt management measures to reduce impacts.**
- **Assessments wherever possible should consider natural variability or effects of other environmental factors, such as climate change. External impacts from other human activities such as mining, shipping or pollution also need to be considered. Assessments should be open to review by relevant science working groups, by other States and by the interested public.** Relevant comments from outside groups should be welcomed and given consideration.
- Impact assessments as described in the FAO International Guidelines are part of a risk management process. Risk management requires examination of uncertainty and evaluation of risk. **Scientific and technical experts should quantify risk, including the potential risk carried by different potential management decisions and provide this information to policymakers so that they are aware of possible consequences of a variety of options. Policymakers in turn must take into account the precautionary approach and weigh and balance the level of risk to marine ecosystems that may be acceptable to society at large with the level of economic risk that would be acceptable to the fishing industry.**

Improving management of deep sea stocks

Although the UNGA resolutions 61/105 and 64/72 addressed both the sustainability of deep sea stocks and the protection of VMEs, their implementation has largely focused on the protection of vulnerable marine ecosystems. The question on sustainability of the deep sea stocks remains largely unaddressed.

- Further efforts are needed to ensure the long-term sustainability of deep-sea fish stocks. **States and RFMOs should undertake formal stock assessments for target deep sea species and adopt precautionary and adaptive management approaches with set precautionary harvest levels and appropriate biological reference points based on scientific assessment of stocks.**
- Recognizing that in areas beyond national jurisdiction there are rarely sufficient data available for this, and simpler methods may be necessary. **FAO, States and RFMOs should cooperate to developing practical methods of stock assessments.** Ecosystem-based models need to be developed that could serve as an alternative to single species stock assessments.

Data and information:

UN General Assembly resolution 64/72 *inter alia* also called on RFMOs and States to improve scientific research and data collection and sharing and to enhance efforts to cooperate to collect and exchange scientific and technical data and information related to the implementation of measures to manage deep sea fisheries in areas

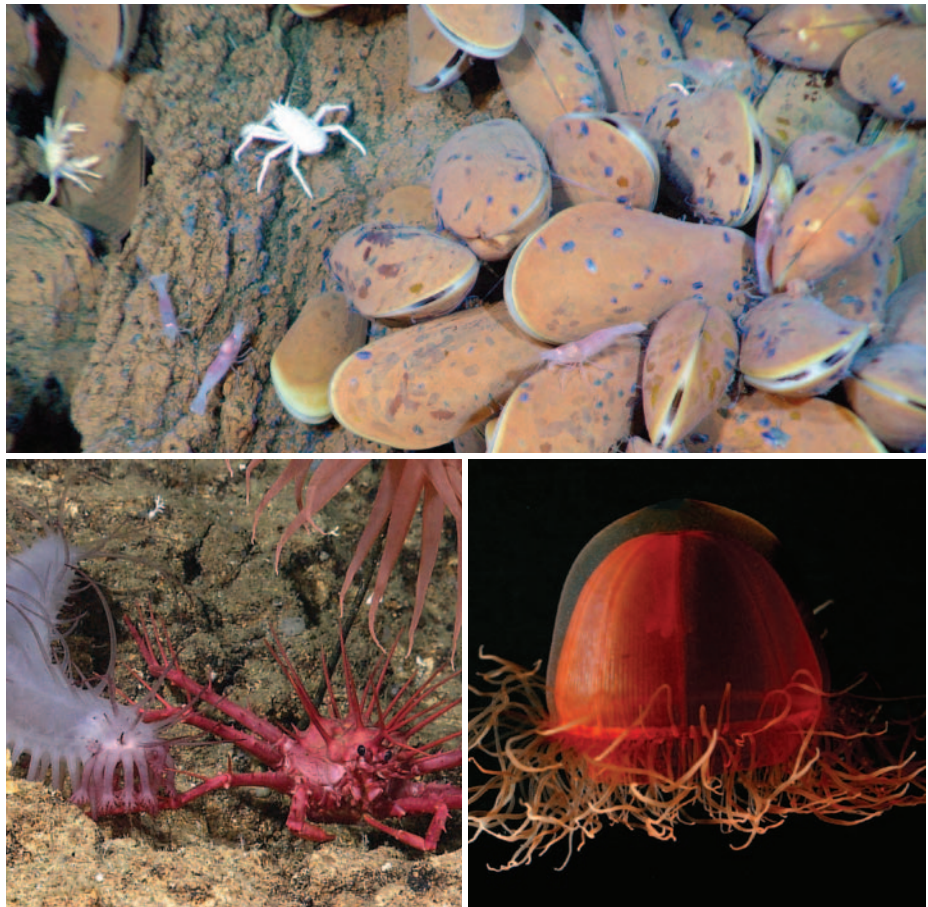


ABOVE: Assemblage of Lophelia, Candidella, and solitary cup corals with brittle stars, crinoids, and various sponges in the New England Seamount Chain. Photo credit: Mountains in the Sea 2004. NOAA Office of Ocean Exploration; Dr. Les Watling, Chief Scientist, University of Maine.

beyond national jurisdiction and to protect vulnerable marine ecosystems. Data are necessary to ensure implementation of the UN General Assembly resolutions and the collection and sharing of data are implied in the duty to cooperate as expressed in the UN Convention on the Law of the Sea.

- Data are necessary for scientists and others to understand the marine environment and anthropogenic effects. Acquisition of adequate data to enable good stock and impact assessment is an integral part of fisheries management. **Data requirements should reflect those as described in the FAO Compliance Agreement⁶ and in Annex I of the UN Fish Stocks Agreement. Fishing should not be allowed in areas where data are not collected or shared.**
- UN General Assembly resolutions call upon Flag States to submit to the FAO a list of vessels flying their flag authorized to conduct bottom fisheries in areas beyond national jurisdiction. To date not all have done so. **States that do not provide such information to the FAO should not allow their vessels to fish outside of their own jurisdiction.**
- The FAO has been asked to develop a Global Register of Fishing Vessels. **States should support this development, including through the assignment of IMO ship identification numbers also to fishing vessels.**
- **States should give consideration to the implementation of a system to limit access to specific deep sea fisheries to only those fishers who can demonstrate full compliance with the requirements of 61/105 and 64/72 and are**

6. The Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas adopted at an FAO Conference in 1993 provides *inter alia* that States Parties exercise responsibility over vessels flying their flag, that such vessels have an authorization to fish on the high seas, that States take measures to ensure that their fishing vessels do not undermine the effectiveness of international conservation and management measures, and that States establish a record of such fishing vessels and provide required information on those vessels to other States. Such information should include the name of fishing vessel, registration number, previous names (if known), and port of registry; previous flag (if any); International Radio Call Sign (if any); name and address of owner or owners; where and when built; type of vessel; and length of vessel. To the extent practicable, the following information should also be made available: and address of operator (manager) or operators (managers) (if any); type of fishing method or methods; moulded depth; beam; gross register tonnage; and power of main engine or engines.



ABOVE: Clockwise from top: A dense bed of hydrothermal mussels with shrimp and Galatheid crabs near the Champagne vent, Mariana Arc, Western Pacific. *Photo credit: Pacific Ring of Fire 2004 Expedition. NOAA Office of Ocean Exploration; Dr. Bob Embley, NOAA PMEL, Chief Scientist.*; *Crossota* sp., a deep red medusa found just off the bottom of the deep sea Arctic. *Photo credit: Kevin Raskoff, California State University, Monterey Bay.*; Spiked crab with spiked holothurian at 751 meters depth. *Photo credit: NOAA Okeanos Explorer Program, INDEX-SATAL 2010.*

otherwise in good standing. For example, States should consider an equitable method to allow persons or entities who discover new fisheries resources to make a public declaration to an appropriate national authority, which would then provide a conditional (revocable) right to fish in that area and for those fisheries resources for a limited time, and only after demonstrating compliance with requirements of UNGA resolutions and subsequent provisions.

- **Results of scientific research and related data on deep sea should be made publicly available. States should also be encouraged to release any historical fishing data that they hold to help to evaluate fisheries and information on the location of vulnerable marine ecosystems.**
- Attempts to implement FAO Guidelines have provided challenges to States, including with respect of a lack of mechanism for data exchange. A global depository of data would facilitate the work of States and RFMOs, in particular for the identification of VMEs. **States should cooperate through an international program to contribute data and information to a common database to support a fishery-related census that would also assist in the systematic identification of VMEs.** Work towards such a database should be facilitated

through assistance to developing countries to participate through, for example, the Global Environment Facility.

- Parties to the Convention on Biological Diversity have agreed to a process to identify ecologically or biologically significant areas (EBSAs) in need of protection in the world's oceans and to establish a global inventory of those areas. While VMEs are to be identified through an FAO-approved process and EBSAs through a CBD-approved process, the criteria for identification of VMEs and EBSAs share similarities and information required to identify VMEs and EBSAs is often similar or the same. However, VMEs and EBSAs themselves are not necessarily the same or co-terminus. **States should ensure coordination among their domestic interests and ministries to promote harmony between the VME and the EBSA processes.**
- The Census of Marine Life, a ten-year science-based initiative to assess the diversity, distribution, and abundance of marine life, produced the most comprehensive inventory of known marine life compiled and catalogued to date. As part of the Census initiative, the Ocean Biogeographic Information System (OBIS) database was created to provide an open access and on-line repository of information on marine life. It is now administered through the Intergovernmental Oceanographic Commission of UNESCO. **States and RFMOs should draw from all appropriate sources of information, including the OBIS database and other international, regional and national data sources, when applying the FAO International Guidelines with respect of the identification of VMEs.**
- The Regular Process of Global Reporting and Assessment of the Marine Environment, including Socio-economic Aspects, a process underway under the UN General Assembly, could assist in an effort to assimilate information from a variety of sources and make them publicly available, thus informing decision-making across a variety of sectors that use the marine environment, including fishing, mining, shipping, communications and scientific investigation. **The development of the Regular Process, including through regional workshops, should be supported.**

Capacity Building:

UN General Assembly resolutions encourage the enhancement of the ability of developing states to implement fully the resolutions. Capacity building programs should include building capacity to conduct prior assessments to promote developing country participation in deep-sea fisheries. They should include assistance to States to better regulate, manage and conserve fish stocks, both within their national jurisdiction and beyond. Capacity building should also help States to better monitor, control and survey areas subject to their national jurisdiction and the operation of their vessels and nationals in marine areas beyond their national jurisdiction.

Capacity building should assist States to develop and implement laws and agreements and to attend relevant international meetings, including of appropriate RFMOs.

- Allocation of rights to fish on the high seas should be transparent and equitable to meet the needs of all States including developing States that now have an interest in and an ability to fish though in the past they may not have the capacity to share these resources. **States should ensure equitable allocation of rights to fish based on the best available science and the conservation of healthy ecosystems.**

- **States should work together to fully implement language in UN General Assembly resolution 64/72 encouraging States to provide technical and financial support to developing countries to address their special requirements and challenges in implementing the FAO International Guidelines.**

Spatial planning:

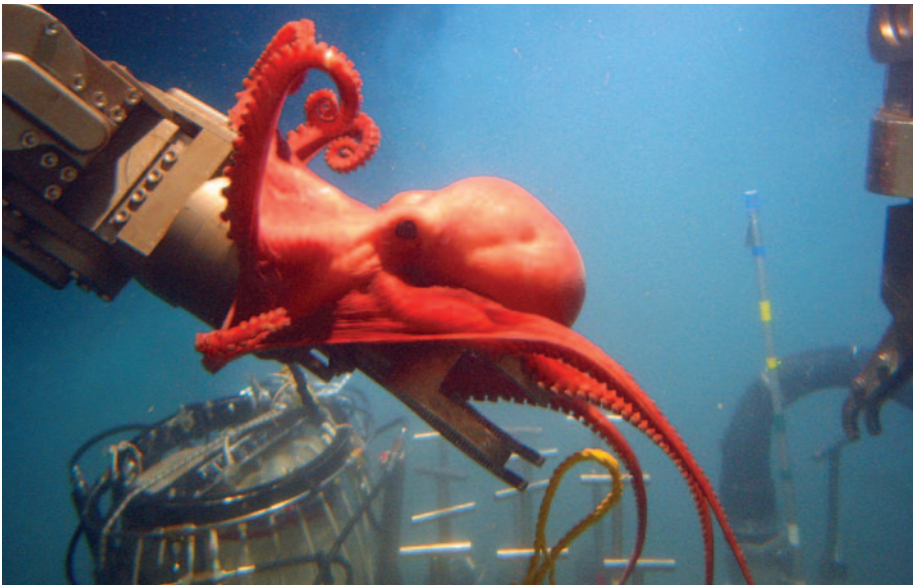
With the expansion of human activities in the high seas, and the increased interest of mining industries in deep sea mineral resources, more sectoral conflicts, for example between fishing and mining interests, can be expected in the future. Marine spatial planning for areas both within and beyond national jurisdiction, can help to avoid or minimize such conflicts, and enable consideration of cumulative impacts on the ecosystems.

- **Consideration should be given to incorporation into a future resolution language calling on States to ensure an assessment applied in a consistent way to prevent significant adverse impacts on VMEs also from non-fishing activities, such as mining, oil drilling and other potentially harmful activities.**
- **States should work through the International Seabed Authority, the International Maritime Organization, RFMO/As and regional seas organizations to assess cumulative impacts of various ocean activities on deep sea ecosystems and to avoid or mitigate the potential for conflicts among proposed activities.** The Secretariat of the International Seabed Authority should inform regional seas and fisheries organizations of all proposals for exploration and exploitation contracts for seabed minerals and seek input from these bodies before going forward with any licensing arrangements.
- **As part of a spatially planned ocean, areas should be set aside for protection and reference.** Such protected areas should be identified as vulnerable marine ecosystems using criteria developed within the FAO International Guidelines. From a fisheries perspective, consideration should be given to protect those areas that serve as important spawning and nursery areas (or other ecologically or biologically significant areas as defined under the CBD criteria). Such protected areas can provide benefits to fisheries and/or marine biodiversity. There is a need to bring together different communities, especially from the conservation and the fisheries communities, including fisheries and conservation scientists, the FAO and CBD secretariats, and within national governments from environment, fisheries, trade and other ministries.

General Recommendations:

The UN Convention on the Law of the Sea starts from the premise that the problems of ocean space are closely interrelated and need to be considered as a whole. Effectively addressing the sustainability of deep sea fisheries requires addressing some general fisheries and ocean governance issues.

- States have accepted the UN Convention on the Law of the Sea obligation to protect and preserve the marine environment as well as the obligation to ensure through proper conservation and management measures the maintenance of living marine resources. As implementation of these obligations remains at times weak, **it is urgently recommended that States move immediately to fulfil**



ABOVE: This stunning octopus, *Benthoctopus* sp., showed inquisitive behavior towards the robot's port manipulator arm. Photo credit: Bruce Strickrott, *Expedition to the Deep Slope*.

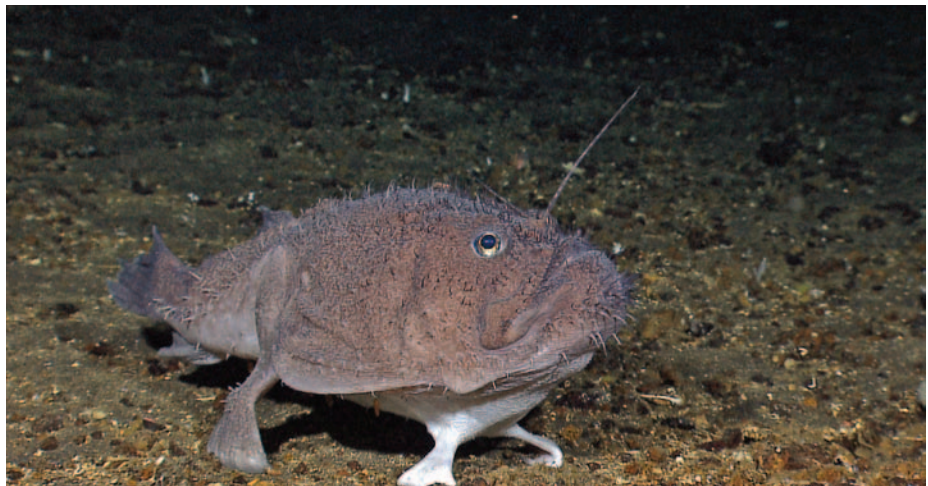
these obligations under the UN Convention on the Law of the Sea and fully implement commitments for sustainable fisheries management, whether within or beyond national jurisdiction, whether coastal, pelagic or deep-sea fisheries.

- With respect of areas subject to national jurisdiction States have a duty to protect and preserve the marine environment. Within national jurisdiction, **States are to ensure that the maintenance of the living resources is not endangered through overexploitation.** They are to take into account fishing patterns, the interdependence of stocks and any generally recommended international minimum standards. States are to contribute and exchange through competent international organizations scientific information, catch and fishing effort statistics and other relevant information or they should not allow fishing to take place.⁷ To implement these obligations, **States should ensure that fishing within national jurisdiction is subject to appropriate conservation and management measures.**
- With the increased expansion of fisheries in the last decades, there are likely no areas of exploitation of living resources on the high seas where nationals of only one State are active. States have a duty to cooperate to take necessary conservation measures. **States should agree and ensure that with respect of areas beyond national jurisdiction there should be no fishing unless appropriate management measures are already in place. Where fishing is taking place, States should ensure adequate management, monitoring, control and surveillance of those activities.**
- As fisheries cannot be managed without cooperation among interested and affected States, **fishing should not be allowed in areas where no RFMO/As exist or where interim measures meeting the UNGA resolution requirements have not been adopted.**

7. See UNCLOS, Article 61

- **RFMOs should be urgently established for areas that currently do not have them. Agreements that serve to establish RFMOs should be reviewed and amended as necessary to reflect modern practice and to ensure that the RFMO manages on the basis of precautionary and ecosystem approaches.**
- **Where they exist, RFMOs should give full consideration to all fish stocks within ecosystems under their oversight and take into consideration the effects on species associated with or dependent upon the targeted species, thus ensuring *inter alia* consideration of predator-prey relationships among species. Discrete high seas stocks should be subject to management. Arrangements should also be in place to facilitate the management of highly migratory species within the ecosystem, either directly or in cooperation with another relevant RFMO.** No stocks would fall outside of management.
- **Inappropriate subsidies have encouraged the expansion of deep sea fisheries. All States should eliminate subsidies that encourage the expansion of capacity, either within the particular fishery or more generally. States should also develop** and implement agreements to remove all incentives that result in excess capacity of fishing fleets, wasteful distortions of socio-economic systems, and economic policies that exacerbate threats to sustainability of deepwater resources
- **Conservation and management measures should include adequate monitoring, control and surveillance measures. These will often require independent on-board observers. Monitoring is important because it can indicate if target or non-target stocks are being too heavily exploited. Surveillance measures can include use of VMS (Vessel Monitoring System) and LRIT (Long Range Identification and Tracking) systems. In this regard, States should work through the IMO to bring fishing vessels into compliance with various IMO agreements and most especially to extend the IMO ship identification numbering scheme to fishing vessels.**
- **States acting individually and through RFMOs and others should consider ways to improve traceability of fish to reduce and eliminate illegal, unreported and unregulated fishing.** Options to be considered would include catch documentation and certification schemes. These also offer the opportunity to enhance the value of sustainably-caught fish products in markets.

BELOW: Sladinia fish from the Indonesia-USA Deep-Sea Exploration of the Sangihe Talaud Region.
 Photo credit: NOAA Okeanos Explorer Program, INDEX-SATAL 2010.





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