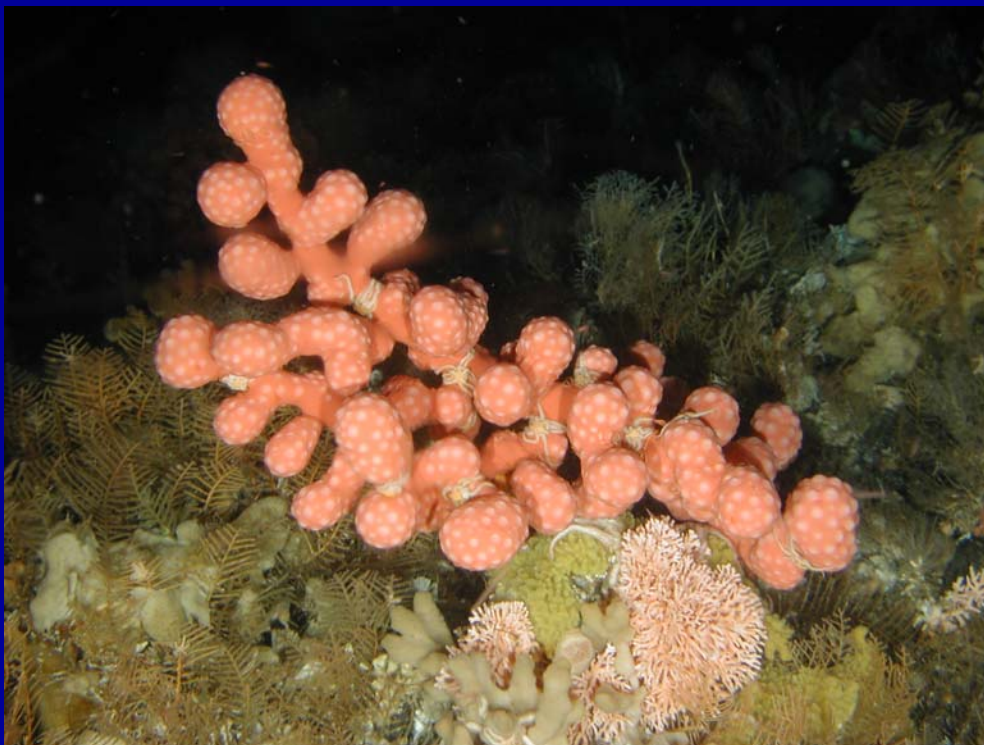


High Seas Bottom Trawl Fisheries and their Impacts on the Biodiversity of Vulnerable Deep-Sea Ecosystems: Options for International Action

EXECUTIVE SUMMARY

Matthew Gianni



Cover Photography

The author wishes to thank the following contributors for use of their photography.
Clockwise from top right:

A rare anglerfish or sea toad (Chaunacidae: *Bathychaunax coloratus*), measuring 20.5 cm in total length, on the Davidson Seamount (2461 meters). Small, globular, reddish, cirri or hairy protrusions cover the body. The lure on the forehead is used to attract prey.
Credit: NOAA/MBARI 2002

Industrial fisheries of Orange roughy. Emptying a mesh full of Orange roughy into a trawler.
© WWF / AFMA, Credit: Australian Fisheries Management Authority

White mushroom sponge (*Caulophecus* sp.) on the Davidson Seamount (1949 meters).
Credit: NOAA/MBARI 2002

Bubblegum coral (*Paragorgia* sp.) and stylasterid coral (*Stylaster* sp.) at 150 meters depth off Adak Island, Alaska.
Credit: Alberto Lindner/NOAA

Cover design: James Oliver, IUCN Global Marine Programme

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HIGH SEAS BOTTOM TRAWL FISHERIES AND THEIR IMPACTS ON THE BIODIVERSITY OF VULNERABLE DEEP-SEA ECOSYSTEMS: OPTIONS FOR INTERNATIONAL ACTION

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Matthew Gianni

IUCN – The World Conservation Union
2004

Report prepared for

IUCN - The World Conservation Union
Natural Resources Defense Council
WWF International
Conservation International



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Cover photography: Bubblegum coral courtesy of Alberto Lindner/NOAA; Sea toad/White Mushroom Sponge courtesy of NOAA/MBARI 2002; Orange Roughy fishery courtesy of WWF/AFMA.

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High Seas Bottom Trawl Fisheries and their Impacts on the Biodiversity of Vulnerable Deep-Sea Ecosystems: Options for International Action

Executive Summary

The deep ocean is increasingly recognized as a major global reservoir of the Earth's biodiversity, comparable to the biodiversity associated with tropical rainforests and shallow-water coral reefs. Though only a small fraction of the oceans' ecosystems found at depths below 200 meters have been studied, research has revealed remarkably high levels of biodiversity and endemism. Estimates of the numbers of species inhabiting the deep ocean range between 500,000 and 100 million.

The development of new fishing technologies and markets for deep-sea fish products have enabled fishing vessels to begin exploiting these diverse but poorly understood deep-sea ecosystems. By far the most widespread activity affecting the biodiversity of these areas on the high seas is bottom trawl fishing. A number of surveys have shown bottom trawl fishing to be highly destructive to the biodiversity associated with seamounts and deep-sea coral ecosystems and concluded that it is likely to pose significant risks to this biodiversity, including the risk of species extinction.

The conservation and management of fisheries and the protection of biodiversity within the 200 n.m. Exclusive Economic Zones is largely a matter of coastal state responsibility. However, the international community as a whole has a collective responsibility to ensure the conservation of fish stocks on the high seas and the protection of biodiversity beyond national jurisdiction.

The United Nations General Assembly in 2002, recognizing the vulnerability of deep-sea biodiversity, called upon the international community to urgently consider the risks to the biodiversity associated with seamounts and other deep-sea areas. The General Assembly reiterated its concern in 2003 and further called on relevant global and regional organizations *"to investigate urgently how to better address, on a scientific basis, including the application of precaution, the threats and risks to vulnerable and threatened marine ecosystems and biodiversity in areas beyond national jurisdiction..."*

This report presents findings on the current extent, location, and value of high seas bottom trawl fisheries worldwide, and the countries involved, drawing on available sources of information. It reviews the current governance of high seas bottom trawl fishing, including the standards and obligations established in several relevant instruments. It further highlights significant gaps in knowledge and oceans governance in relation to high seas bottom trawl fisheries. In light of the known vulnerability of seamounts, deepwater corals and other biodiversity hotspots to high seas bottom trawl fishing, and the lack of a management framework to protect this biodiversity or prevent the serial depletion of targeted species, this report concludes that urgent action, specifically a UN General Assembly moratorium on high seas bottom trawling, is essential to protect these biodiversity hotspots until gaps in knowledge and oceans governance are addressed.

deep sea biodiversity



Left: Rockfish in between hydroids and sponges, off Adak Island, Alaska
Credit: Alberto Lindner/NOAA

Below: Coral 'forest' off Adak Island, Alaska
Credit: Alberto Lindner/NOAA

Right: Octopus near a hydrothermal vent in Endeavour Marine Protected Area (Canada) at a depth of more than 2000m
Credit: Prof Verena Tunnicliffe



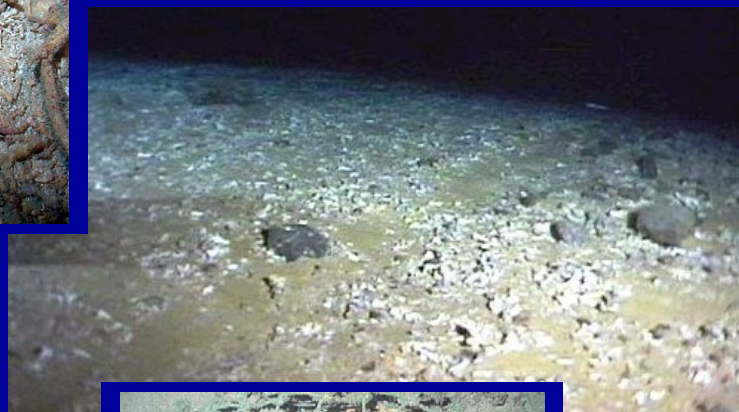
deep sea destruction



Above: Oculina rubble left by bottom trawl in Atlantic Florida
Credit: HBOI/NOAA/USGS

Right: Trawl marks left by heavy fishing gear following bottom trawl on Lophelia reef in Norway
Credit: Jan Helge Fossaa/IMR

Below right: Trawl net on Oculina Reef, Atlantic Florida
Credit: HBOI/NOAA/USGS



The key findings are as follows:

Deep-sea coral and seamount locations and vulnerability

- Deep-sea coral and seamount ecosystems are widespread throughout the world's oceans.
- Bottom trawl fishing poses a major threat to the biodiversity of vulnerable deep-sea habitats and ecosystems. Losses of up to 95-98% of the coral cover of seamounts as a result of deep-sea bottom trawl fishing have been documented.
- Given the localized species distribution and high degree of endemism associated with seamount ecosystems, bottom trawl fishing is likely to pose a serious threat to a large percentage of species inhabiting these ecosystems, including the threat of extinction.
- High seas bottom trawl fishing has often led to the serial or sequential depletion of targeted deep-sea fish stocks.

Extent of high seas bottom trawling

- Approximately 80% of the high seas catch of bottom species (groundfish, prawns etc) is taken by bottom trawl fishing vessels.
- There has been no systematic study of the geographic extent of bottom trawl fishing in relation to vulnerable deep-sea ecosystems or the extent of its impact on these ecosystems.
- Despite the lack of systematic study, we know that high seas bottom trawl fisheries take place along the continental margin where it extends beyond 200 nautical miles, and on seamounts, oceanic ridges and plateaus of the deep ocean floor in many areas of the world's oceans. This type of fishing is likely to grow in coming years as deep-sea fish stocks within national jurisdiction are depleted and/or increasing restrictions are placed on fisheries within national jurisdiction.
- Most high seas bottom trawl fishing over the past several years has taken place in the Northwest Atlantic Ocean, Northeast Atlantic Ocean, Southwest Indian Ocean and the Southwest Pacific Ocean. The majority of the high seas bottom trawl catch is taken in a relatively small area of the Northwest Atlantic (the shelf and slope area of the international waters of the Grand Banks and the Flemish Cap). However, the damage to seamount, coral and other deep-sea species and ecosystems is likely to be far higher in the other ocean areas where significant high seas bottom trawl fisheries occur because of the greater geographical scope of the fisheries in these regions.

Countries involved

- Fishing vessels flagged to only 11 countries – Spain, Russia, Portugal, Norway, Estonia, Denmark/Faros Islands, Japan, Lithuania, Iceland, New Zealand and Latvia, took approximately 95% of the reported high seas bottom trawl catch in 2001, the last year for which data on catch and value of the catch is consistently available worldwide. Of these, all except Japan (and possibly Denmark on behalf of the Faroes) have ratified, or will soon ratify, the 1995 UN Fish Stocks Agreement.
- European Union countries (including Latvia, Lithuania, and Estonia but excluding the Faroe Islands) took approximately 60% of the high seas bottom trawl catch in 2001. Spain accounted for approximately two-thirds of the European Union catch and some 40% of the overall global high seas bottom trawl catch.

Global catch information

- The reported high seas bottom trawl catch in 2001 was approximately 170,000 – 215,000 mt of fish. This figure represented only about 0.2-0.25% percent of the global marine fisheries capture production of 83.7 million tons of fish in 2001 reported by the UN Food and Agriculture Organization (FAO).
- The overall value of high seas bottom trawl fisheries is not likely to exceed \$300-\$400 million USD annually at present, a figure equivalent to approximately 0.5 percent of the estimated value of the global marine fish catch in 2001 (approximately \$75 billion USD).
- The global high seas bottom trawl catch is not likely to support more than 100-200 vessels fishing on the equivalent of a full-time, year round basis. The actual number of vessels engaged in high seas bottom trawl fishing is higher (many vessels only fish part-time on the high seas) but not likely to be more than several hundred. The UN FAO estimates that there are approximately 3.1 million fishing vessels in operation worldwide.
- The overall contribution of high seas bottom trawl fisheries to global food security is negligible as most of the catch is sold on the European Union, U.S. and Japanese markets.

Management of high seas bottom trawl fisheries

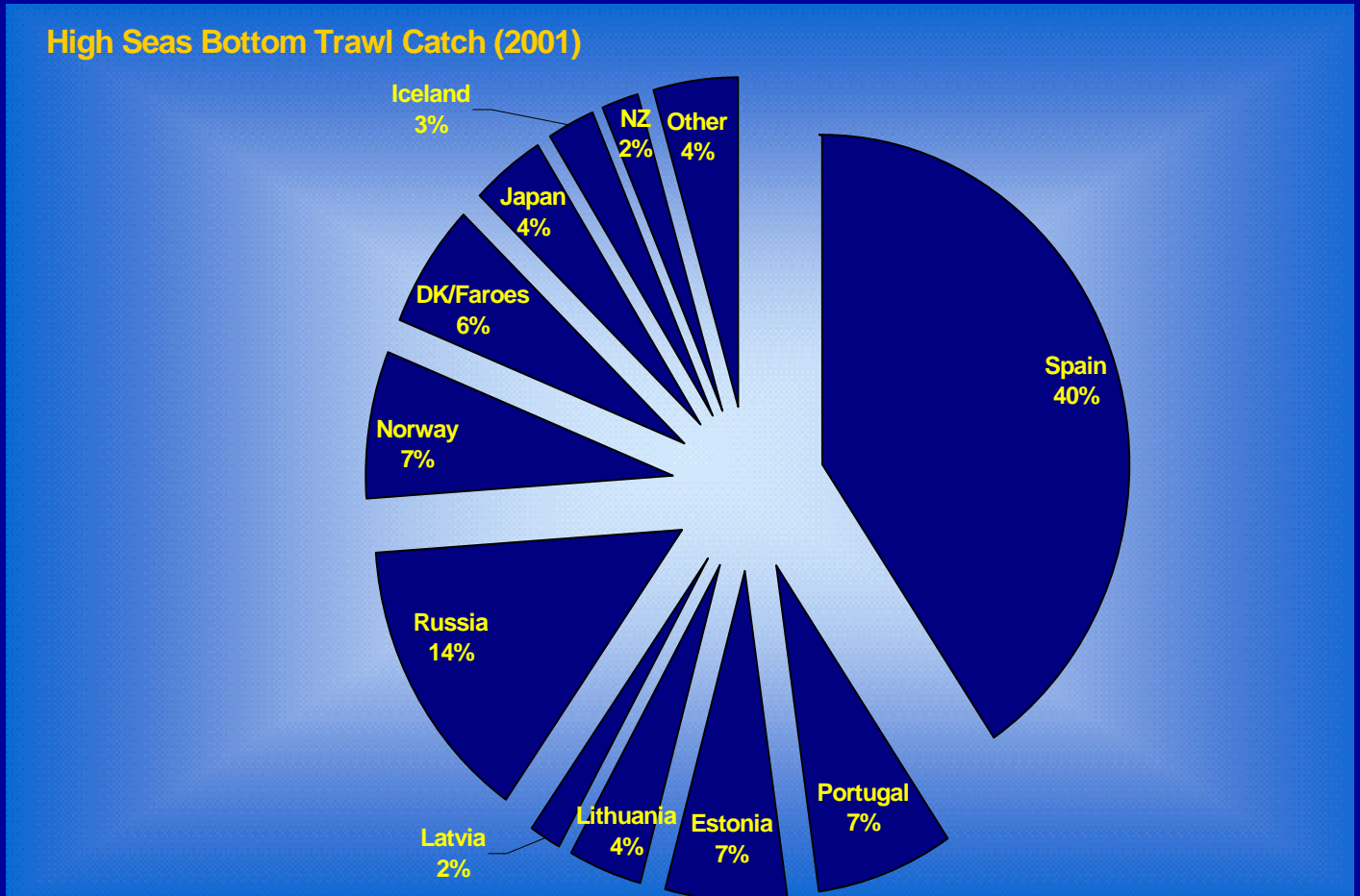
- Virtually all high seas bottom trawl fisheries are presently unregulated insofar as their impacts on deep-sea biodiversity are concerned. Most high seas areas are not covered by a regional fisheries management organization (RFMO) with competence to regulate deep-sea bottom fishing.
- There are serious problems with mis-reporting and under-reporting of high seas bottom trawl catches and accounting for catches made by illegal, unreported and unregulated (IUU) fishing.
- Virtually all high seas bottom trawl fisheries are currently conducted in a manner wholly inconsistent with the conservation and management principles and provisions of the 1995 UN Fish Stocks Agreement and the 1995 UN FAO Code of Conduct for Responsible Fisheries.

Vulnerability of continental margin biodiversity of coastal states

- On the continental margin beyond 200 n.m., coastal states have sovereign rights to explore and exploit sedentary species (UNCLOS Articles 76 and 77), yet these species are vulnerable to damage caused by bottom trawl fisheries on the high seas.
- Given current fishing areas and trends in exploratory fishing, those coastal states most vulnerable are likely to be Canada, Brazil, Uruguay, Argentina, South Africa, Namibia, Angola, Mozambique, Mauritius, Seychelles, India, Norway, Iceland, Australia, New Zealand and several EU countries.

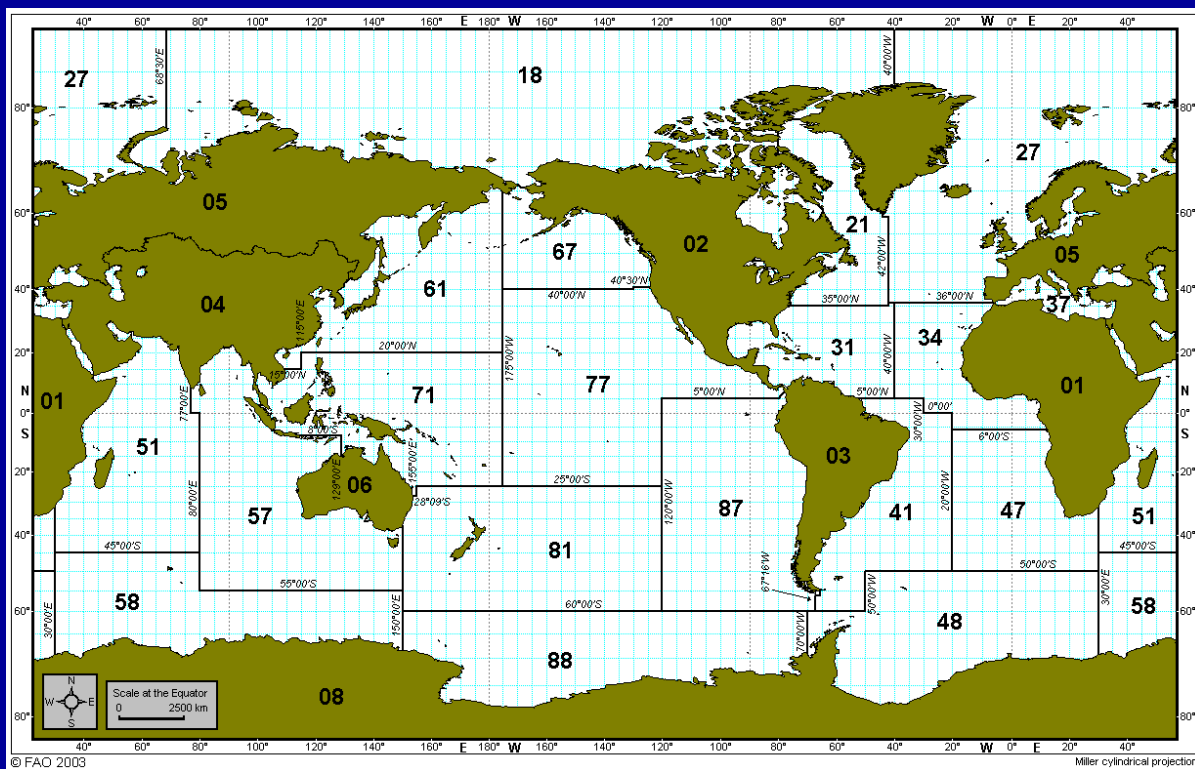
A number of important gaps in knowledge and ocean governance must be addressed before the sustainability of deep-sea fish stocks and the protection of vulnerable deep-sea habitats and biodiversity from bottom trawling on the high seas can be ensured. These include the need for:

facts and figures



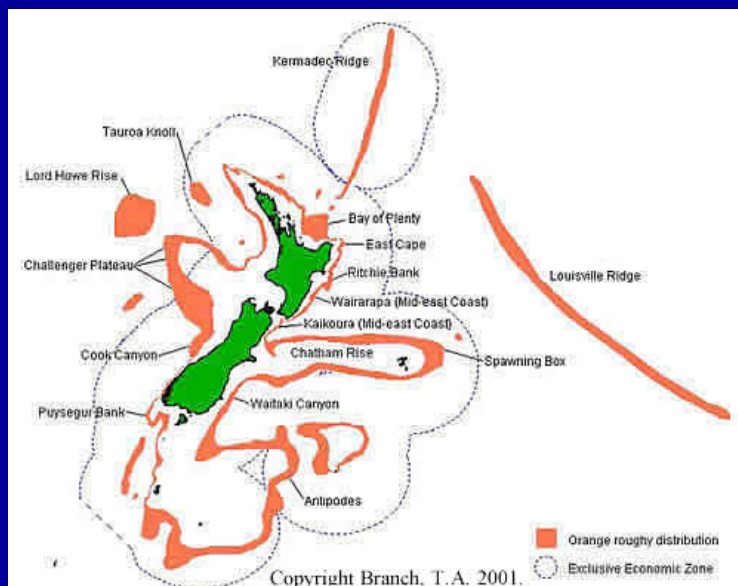
This graph illustrates the fact almost all bottom trawling activities are carried out by only eleven countries, with almost 60% attributable to EC members.

where in the world?



Above: Map of major fishing areas worldwide divided into UN FAO statistical areas (Source United Nations Food and Agricultural Organisation - see website www.fao.org/fi/statist/statist.asp).

Right: Map of principal orange roughy fishing grounds inside and outside New Zealand EEZ. Source: Branch 2001.



More Complete information

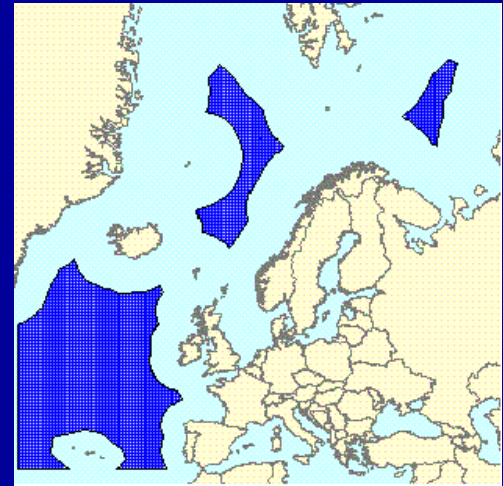
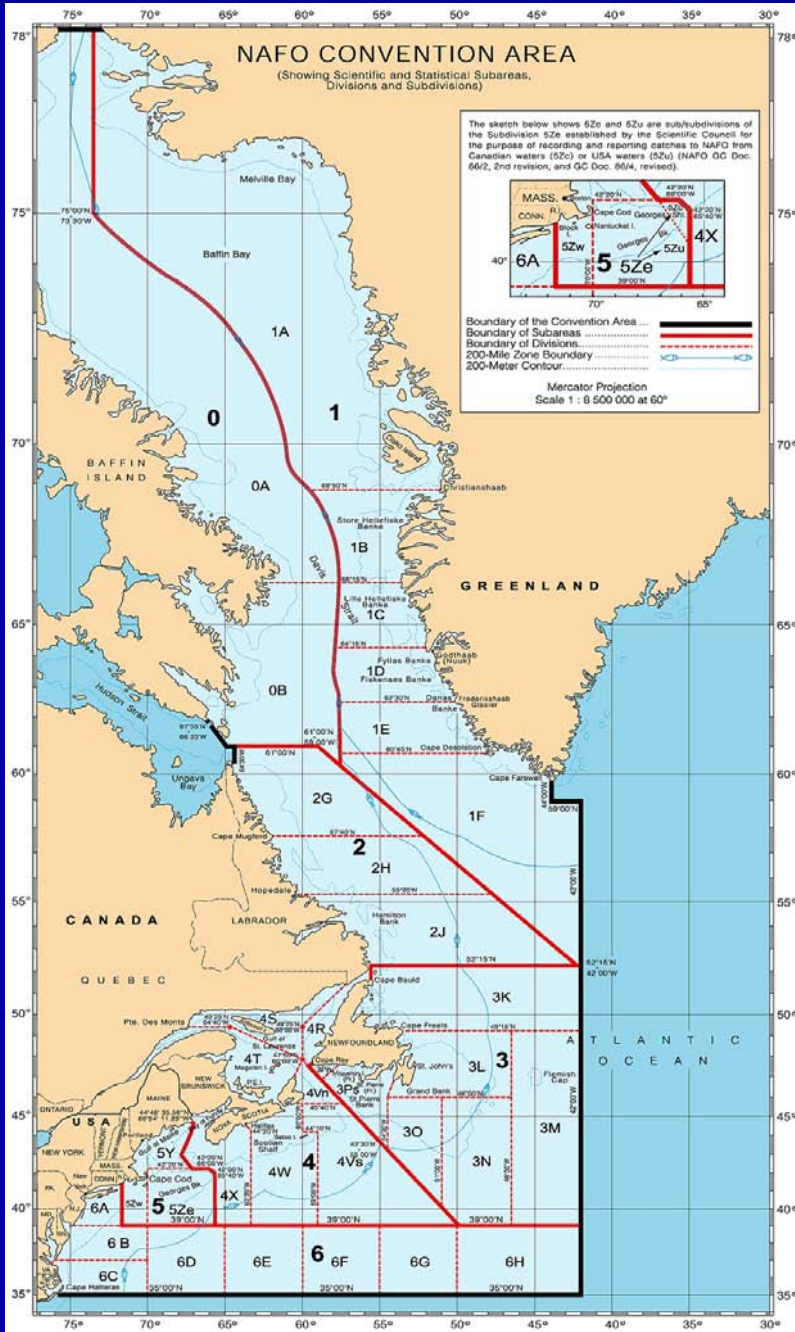
- further identification of biodiversity hotspots beyond the 200 n.m. EEZs through mapping and sampling of seamount ecosystems, cold-water corals and other vulnerable deep sea habitats along continental margins and deep ocean areas under the high seas;
- more complete information on high seas bottom fisheries including data on catch, bycatch, and areas fished, as well as basic data on the biology of targeted species and others impacted by the fisheries;
- more complete information on the number of flag states and vessels involved in high seas bottom fishing, and their reporting to the appropriate international bodies;

Precautionary and ecosystem based management and governance

- the adoption of international management measures for high seas bottom trawl fisheries in keeping with ecosystem-based fisheries management and the precautionary approach, for example through:
 - ✓ determining which deep sea bottom trawl fisheries are straddling stock fisheries and thus subject to the 1995 UN Agreement on the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UN FSA);
 - ✓ ensuring that regional fisheries management organizations (RFMOs) presently competent to regulate these fisheries do so consistent with the principles and provisions for conservation and management of the UN FSA;
 - ✓ establishing new RFMOs consistent with the principles and provisions of the UN FSA to regulate these fisheries where management regimes do not currently exist;
 - ✓ extending the competence of existing RFMOs to these fisheries, again consistent with the principles and provisions of the UN FSA, notably where target species currently regulated by the RFMO are associated with the vulnerable benthic ecosystems noted; and/or
 - ✓ establishing an international regime for deep-water fisheries on stocks and associated species found exclusively on the high seas which, at a minimum, incorporates the principles and provisions of the UN FSA; and
 - ✓ the establishment and implementation of effective mechanisms for monitoring, compliance and enforcement for high seas bottom fisheries, including the elimination of IUU fishing.

It will also be important to resolve the issue of a coastal state's authority to protect the benthic biodiversity of its legal continental shelf (continental margin) beyond its 200 n.m. EEZ from the impact of high seas bottom fishing. Further protections may be achieved through the development of long-term approaches and tools, including gear restrictions, fisheries closed areas, and marine protected areas, consistent with international law and based on scientific information, for the protection of vulnerable deep-sea ecosystems and biodiversity under the high seas.

spotlight on the North Atlantic



Above:

Map of the high seas areas regulated by the North East Atlantic Fisheries Commission - the NEAFC 'Regulatory Area'. The shaded area represents the international waters of the Northeast Atlantic. Source: NEAFC <http://www.neafc.org/about/map.htm>

Left:

Map of the area covered by the Northwest Atlantic Fisheries Organisation. Virtually all bottom trawl fishing in the area is concentrated around the shelf and slope of the portion of the Grand Banks extending into international waters (Areas 3L, 3N, and 3O) and the Flemish Cap (Area 3M). Source: NAFO

UN General Assembly moratorium on bottom trawl fishing on the high seas

In the meantime, immediate protection of seamounts, deep-water corals and other biodiversity hotspots from high seas bottom trawling is essential to prevent further depletion of deep-water fish stocks and damage to the biodiversity of these vulnerable areas. A UN General Assembly declared moratorium on high seas bottom trawl fishing is the best short-term solution as it can provide interim protection until long-term solutions can be agreed and effectively implemented. A moratorium, coupled with a process under the auspices of the UN General Assembly to resolve the issues identified above, would be the best approach to establishing more effective governance over high seas fisheries and ensuring the protection of rare and vulnerable deep-sea ecosystems from the adverse impacts of fishing on the high seas.

The opportunity exists now for the international community, individually and collectively, to take preventative action to protect a major portion of the biodiversity on the high seas – the world's global commons. Leading scientists have concluded that the threat posed by deep-sea bottom trawl fishing is real, the potential loss of marine biodiversity is significant, and have called upon the UN General Assembly to declare a moratorium on bottom trawl fishing on the high seas. Currently, the number of countries and vessels involved in high seas bottom trawl fisheries is relatively small. The economic value of these fisheries is a fraction of a percent of the overall value of marine fisheries worldwide. However, these fisheries are likely to expand in coming years.

By taking action now, the UN General Assembly and the international community can make a significant contribution toward the implementation of important international agreements, in particular the 1995 UN Fish Stocks Agreement, and the commitments made at the World Summit on Sustainable Development to reverse the loss of biodiversity on a global scale.

About the Author

Matthew Gianni (matthewgianni@netscape.net) is an independent advisor on fisheries and oceans issues as well as an advisor to the Global Marine Programme of IUCN. The views expressed in this report are those of the author and do not necessarily reflect the views of the organizations for whom the report was produced or the individuals who contributed to the production of the report.

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IUCN – The World Conservation Union brings together 79 States, 114 government agencies, and over 800 national and international non-governmental organizations. Its mission is to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable. Through its six expert commissions IUCN draws on some 10,000 scientists and other specialists from 181 countries. It has a secretariat presence in over 60 offices around the world.

WWF is one of the world's largest and most experienced independent conservation organisations with almost 5 million supporters and a global network active more than 90 countries. WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature: by conserving the world's biological diversity; ensuring that the use of renewable natural resources is sustainable; and promoting the reduction of pollution and wasteful consumption.

Conservation International is a leader and catalyst in biodiversity conservation worldwide, engaging partners in more than 40 countries on four continents to preserve species-rich, threatened ecosystems in the biodiversity hotspots, high-biodiversity wilderness areas and key marine environments.

The Natural Resources Defense Council (NRDC) is a non-profit organization based in the United States with over 1,000,000 members and online activists. With a staff of lawyers, scientists and policy analysts, NRDC is committed to preserve and restore the rich diversity of ocean life.



Before Bottom Trawling



After Bottom Trawling

DR KEITH SALISBURY / CSIRO

The deep ocean is increasingly recognised by scientists as one of the planetary reservoirs of biodiversity with up to 100 million species believed to inhabit the deep sea. However, bottom trawling, coupled with the virtual absence of protective regulations for affected areas, is by far the biggest threat to deep ocean ecosystems and species.

Further copies of this publication, as well as more information on this subject can be obtained from the following addresses:

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