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MANAGEMENT OF RISKS TO THE BIODIVERSITY OF SEAMOUNTS AND COLD-WATER CORAL COMMUNITIES BEYOND NATIONAL JURISDICTION

Note by the Executive Secretary

I. BACKGROUND

1. The present document is the result of collaboration between the Executive Secretary and the IUCN Global Marine Programme and has been prepared in the context of recommendations VIII/3 A-D of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) as they relate to biological diversity in areas outside the limits of national jurisdiction. Its is intended to provide the Conference of the Parties with further background information for its deliberations under agenda items 18.2, on the review, further elaboration and refinement of the programme of work on marine and coastal biological diversity, and 26, with regard to the development of outcome-oriented targets for the programme of work on marine and coastal biological diversity.

2. In paragraph 18 of recommendation VIII/3 B, SBSTTA recommended to the Conference of the Parties that there is a need to protect biological diversity in areas outside of national jurisdiction, but also stated that more information about the status and trends of, and threats to, biodiversity in these areas is needed (recommendation VIII/3 D, para. (a)). Specifically, SBSTTA recommended that the Conference of the Parties note that there are increasing risks to biodiversity in areas beyond national jurisdiction and that marine and coastal protected areas are extremely deficient in purpose, numbers and coverage in these areas. In addition, SBSTTA recommended that the Conference of the Parties agree that there is an urgent need to establish in areas beyond national jurisdiction further marine and coastal protected areas consistent with international law, and based on scientific information, including in relation to areas of seamounts, hydrothermal vents, cold water corals and open ocean. Furthermore, in recommendation IX/4 paragraph 6 (x), SBSTTA recommended that the Conference of the Parties call for the exploration of options for cooperation for the establishment of protected areas on areas beyond national jurisdiction, consistent with international law including the United Nations Convention on the Law of the Sea.

3. In the past few years, scientists have found that seamounts and cold-water coral reefs are home to an astonishing diversity of species. These biodiversity 'hotspots' support complex communities of life providing shelter and food for a large variety of deep-sea and open-ocean species as well as fish stocks of commercial value. However, technological advances over the past few decades have enabled the increasing exploitation of fish populations and the biodiversity of deep

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ocean areas associated with seamounts, cold-water coral reefs and other deep-sea habitats, and at the present time, numerous species of deep-sea fish have been and continue to be significantly depleted by fishing. The impacts of deep-sea fishing extend well beyond the depletion of individual stocks of fish. The most common method of deep-sea fishing – bottom trawling – has been found to severely damage deep-sea corals, sponges and other vulnerable benthic habitats and communities, and may result in hundreds or possibly thousands of deep sea species as yet unknown to science disappearing before they can be identified or studied.

4. In addition, there is extreme scientific uncertainty concerning: (i) the biology and life histories of deep sea fish targeted for exploitation as well as those taken as unwanted by-catch; (ii) the impacts of the overexploitation of these species on the broader marine ecosystems of the deep sea; and (iii) the ecosystem impacts of the physical damage caused by fishing to corals, sponges and other vulnerable benthic species and habitats in the deep sea. In addition to scientific uncertainty, most deep-sea fisheries on the high seas take place in the absence of a regulatory regime or precautionary measures to ensure sustainable use, protect habitats, or conserve biological diversity. This has important implications for the conservation and sustainable use of the biodiversity of the deep sea.

5. The concerns regarding risks to biodiversity in areas outside of national jurisdiction expressed by SBSTTA echo similar concerns raised in other international forums. At the time this note was prepared, the General Assembly of the United Nations had before it a draft resolution in which it would reiterate its 2002 call for "urgent consideration of ways to integrate and improve, on a scientific basis, the management of risks to marine biodiversity of seamounts, cold water coral reefs and certain other underwater features" within the framework of the United Nations Convention on the Law of the Sea (A/58/L.19, para. 51). The Secretary General would be requested to provide a special addendum to his annual report on oceans and the law of the sea concerning the risks to the biodiversity of the deep-sea beyond areas of national jurisdiction. That draft resolution was taken up by the Assembly in November 2003 but action on it was deferred pending consideration by the Fifth Committee of its programme budgetary implications.

6. Furthermore, in its resolution 58/14, on sustainable fisheries, adopted in November 2003, the General Assembly called upon the Secretary-General, in close consultation with the Food and Agriculture Organization of the United Nations (FAO), States and other relevant organizations, to study and report on current risks to the marine biodiversity of vulnerable marine ecosystems, including seamounts and cold water coral reefs from fishing activities.

7. The immediate and urgent needs and options for managing risks to high-seas biodiversity (such as the elimination of destructive fishing practices and the establishment of marine protected areas) have been highlighted in a number of other international gatherings, including the fourth meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea, the World Parks Congress (see UNEP/CBD/SBSTTA/9/INF/21/Add.4), the Cairns Workshop on the Governance of High Seas Biodiversity Conservation, the 2003 Defying Ocean's End Conference, the Tenth Deep–Sea Biology Symposium, and the Second International Symposium on Deep Sea Corals. The Deep Sea Conference convened by New Zealand, Australia and the FAO in December 2003 highlighted that the absence of an adequate governance and management framework for deep sea fishing activities on the high seas was impeding the conservation and sustainable use of deep sea resources and the protection of biodiversity.

8. It is clear that the international community recognizes the urgent need to protect seamounts and cold water coral reefs before their biodiversity is lost or destroyed. Failure to take strong and immediate action may cause the extinction of unique and rare species, the destruction of vulnerable habitats, prolong unsustainable fisheries, and impair the functioning of deep-sea ecosystems. The Convention on Biological Diversity has a critical role to play in the conservation and sustainable use of the biodiversity of deep sea ecosystems, such as seamounts and cold water coral reefs. Articles 3 and 5 collectively give Parties to the Convention the mandate to take action to regulate activities within their national jurisdiction or under their control to ensure that such activities do not cause damage to the environment of areas beyond the limits of national jurisdiction and to identify mechanisms to cooperate for the conservation and sustainable use of high seas biological diversity, consistent with the United Nations Convention on the Law of the Sea.

9. The present note provides information on the status of and threats to two identified priority deep-sea ecosystems: seamounts and cold-water coral reefs. Section II of this document discusses the biodiversity of seamounts and cold water corals; section III discusses the impacts of bottom fisheries on vulnerable deep-sea ecosystems; section IV provides an analysis of current governance of deep-sea fisheries and bottom trawling on the high seas; and section V identifies key gaps in knowledge and governance that should be addressed to ensure the sustainability of deep-sea fisheries and the protection of vulnerable deep-sea habitats and biodiversity.

II. THE BIODIVERSITY OF SEAMOUNT AND COLD WATER CORAL COMMUNITIES

A. Introduction

10. Biologists generally agree that the deep sea constitutes a major reservoir of the Earth's biodiversity. Estimates of the numbers of species inhabiting this area range between 500,000 species of macrofauna and 100 million species altogether, including sediment dwelling species such as nematodes[1]. The 'deep sea' is generally considered to be that part of the ocean bottom which extends beyond the continental shelf and includes the slope and rise of the continental margin, the abyssal plain as well as mid-ocean ridges, seamounts and plateaus rising from the deep ocean floor. Much, if not most, of this habitat lies beyond 200 nautical miles from shore[2].

B. Biodiversity of seamounts

11. One of the most exciting developments in deep sea ecology in recent years has been the discovery of highly endemic fauna and many new species on seamounts. Seamounts are isolated islands or island chains beneath the surface of the sea. More than 30,000 seamounts over 1000 meters high are estimated to exist in the world's oceans[3]. As deep currents sweep past seamounts they accelerate, serving to concentrate plankton and carry nutrients up from the ocean floor. This upwelling turns these features into important feeding, breeding and spawning sites for a wide variety of bottom-dwelling and pelagic species. Many seamounts support dense assemblages of suspension feeding species such as corals (gorgonian, scleratinian and antipatharian), crinoids, hydroids, ophiuroids, and sponges[4]. Orange roughy, pelagic armourhead, and oreos are some of the commercially important deep water fish species known to aggregate at seamounts to feed and spawn. Frequent pelagic guests to seamounts include swordfish, tuna, sharks, turtles and whales.

12. Although relatively few seamounts have been comprehensively sampled, research has shown that seamounts are hot spots for the evolution of new species, refuges for ancient species, and stepping-stones for species to spread across ocean basins[5]. Rates of endemism are considered very high, ranging from 35% on seamounts off Tasmania, 36% for seamounts on the Norfolk Ridge; 31% on the Lord Howe Island seamounts, and 44% for fishes and 52% for invertebrates on the Nasca and Sala-y-Gomez chain off Chile[6]. Research suggests that these high rates are not just an artifact due to limited sampling, for adjacent seamounts in New Caledonia have been found to share an average of just 21% of their species, and seamounts on separate ridges approximately 1000 km apart in the Tasman and Coral Seas have only 4% of their species in common[7].

C. Biodiversity of cold-water coral communities

13. Another exciting discovery in recent years has been the number and variety of coral species living in the deep-sea: there may be more species of cold water corals than tropical corals. These corals can form extensive reefs, such as the *Lophelia* reef off Rost Island, in Lofoten, Norway. This reef, which was discovered only in June 2002, is 35 kilometers long and 3 kilometers wide[8]. Like their tropical cousins, they support rich and diverse assemblages of marine life. For example, *Lophelia* coral reefs in cold waters of the Northeast Atlantic provide habitat for over 1,300 species of invertebrates. Marine scientists have observed large numbers of commercially important but increasingly uncommon groupers and redfish among the sheltering structures of deep-sea coral reefs, indicating their importance as habitat.

14. It is now known that deep-sea coral reefs, like their shallow water counterparts, may be found along the continental slope throughout the world's oceans. In recent years scientists have discovered deep-sea corals and/or coral reefs in Japan, Tasmania, New Zealand, Alaska, California, Nova Scotia,

Maine, North Carolina, Florida, Colombia, Brazil, Norway, Sweden, United Kingdom, Ireland, Mauritania as well as on the high seas.

15. The biological characteristics of most deep-sea species render them particularly sensitive to human disturbance and exploitation; deep-sea corals and sponges typically are slow-growing and long-lived. Deep coral reef structures found in the North-east Atlantic may be up to 10,000 years old. Concerns over the impact of fishing and the potential loss of this biodiversity are amplified by the limited information about the taxonomy, biology and ecology of most of the species found in deep ocean areas. The slow growth, longevity, late sexual maturity, and restricted distribution of many of the species associated with seamount ecosystems make them particularly vulnerable to human impacts and the risk of extinction.

III. IMPACTS OF BOTTOM FISHERIES ON VULNERABLE DEEP-SEA ECOSYSTEMS

16. Large-scale commercial fishing for bottom dwelling species in deep-sea areas began in the 1960s for pelagic armourhead and other seamount-associated species. Over the course of subsequent decades, many deep-sea bottom fisheries, particularly those on seamounts, came to be characterized as 'serial depletion' fisheries as one population after another of commercially exploited deep-water species were depleted or collapsed. By 2002, most shallow seamounts (<800m below the water's surface) had already experienced some degree of fishing pressure9. Larger vessels, more powerful winches, stronger cables and rochkhopper trawls have greatly expanded the reach of bottom trawl fishing, which can now reach depths of 2000 metres.

17. Aside from the depletion of targeted species of fish, the environmental or ecosystem impacts of bottom fishing in the deep-sea are threefold. One is the impact of the extensive 'bycatch' of non-target or unwanted species. The second is the removal of large quantities of biomass (fish populations) from the food web of food-poor or low energy environments characteristic of the deep-sea. There is concern that loss of large quantities of fish biomass (and their wastes) could significantly disrupt food web and trophic level interactions amongst bottom dwelling communities[10]. The third is the physical impact of fishing on ocean bottom habitats and ecosystems; primarily coral, sponge and other filter feeding species that often provide the basic structure of seamount and other deep-sea ecosystems.

18. The three major gear types used in deep-sea bottom fishing—gill nets, longlines, and bottom trawls—are all believed to have some degree of impact on corals and other bottom dwelling organisms. Bottom trawling, however, is considered to be by far the most damaging and is the most common gear used in deep-sea bottom fishing throughout the world. Bottom trawling often involves taking high quantities of bycatch of numerous non-target species, and while fishing, bottom trawl ships drag the ocean floor with a heavily weighted net designed to scoop up large schools of fish. Deeper trawling and rougher seabeds require heavier trawl doors, cables and/or ropes to keep the nets open and on the bottom. The trawl doors alone, for example, can weigh up to five tons each[11].

19. Studies have shown that bottom trawling has turned heavily fished seamounts into rubble. This destructive impact has been clearly documented in a number of areas of the Northeast Atlantic and Southwest Pacific Oceans and elsewhere[12]. Photographic transects conducted south of Tasmania in the Southwest Pacific showed that 95% of the bottom was bare rock on a heavily fished seamount compared with about 10% bare rock on the most comparable unfished seamount[13]. Video and photographic surveys have revealed deep parallel grooves of pulverized coral ploughed by trawl doors. Norwegian scientists estimate that up to half of their continental shelf cold-water reefs have already been damaged or destroyed by fishing[14]. The by-catch of coral in the first two years of bottom trawl fishing in the South Tasman Rise orange roughy fisheries reached 1,762 tonnes (1997-1998) but was quickly reduced to only 181 tonnes in 1999-2000[15], as repeated trawls in the same area had already brought up or destroyed most of the living coral.

20. There are also significant questions about the sustainability of deep sea fisheries themselves[16]. Exploited deepwater species generally exhibit life history characteristics markedly different from most shallow water species: extreme longevity, late age of maturity, slow growth, and low fecundity. This, coupled with the intense exploitation of seamounts' valuable resources has led to depletion and collapse of a variety of fish stocks. The populations of the rock lobster, *Jasus tristani* on the Vema

seamount crashed due to a combination of overfishing and unpredictable larval recruitment; fisheries of the pelagic armourhead *Pseudopentaceros wheeleri* over the southern Emperor seamounts and seamounts in the northern Hawaiian Ridge came to commercial extinction within 10 years of their discovery; and the orange roughy *Hoplostethus atlanticus* fisheries on seamounts off the coasts of New Zealand and Australia where new discoveries of stocks are typically fished down to 15-30 per cent of their initial biomass, and sometimes lower, within 5-10 years[15]. A mixed species deepsea shark trawl fishery off the coast of New South Wales caused the rapid depletion of some of the most biologically-vulnerable species targeted. For example, an endemic species of deepwater gulper shark (Centrophorus harrissoni) is now Critically Endangered (www.redlist.org) following 98% depletion in this fishery, with several other regional populations of deepwater sharks similarly affected[17].

21. Orange roughy live up to 150 years, reach reproductive maturity around 25 to 30 years of age, and undergo extended periods of very low recruitment (in the order of a decade or more)[18]. These characteristics added to the fact that the species form large spawning aggregations-which most fishing operation target- near banks, pinnacles and canyons make the species very vulnerable to over-exploitation.

22. Deep-ater sharks caught as both targets and bycatch may be even more vulnerable. Scientists now realize that over 35% of all shark species live only in the deep sea, with many species endemic to relatively small areas and very restricted depth ranges. The conclusions of a recent workshop indicated that deep water sharks may be more vulnerable to overexploitation than perhaps any other species[19].

23. Deep-sea corals are another group of species that have been targeted for exploitation since their discovery in the mid-60s in the North Pacific Ocean following their depletion in the Mediterranean Sea. Red, pink, gold, black and bamboo corals have all been collected from these areas in substantial quantities. Corals present the same life history attributes as other deep water species and therefore they are highly vulnerable to overexploitation.[20]

24. The past thirty years of exploitation have repeated a boom and bust pattern of exploration, discovery, exploitation, and depletion. A recent example is the fishery, which developed on seamounts in the international waters of the south-wst Indian Ocean. In 1999, orange roughy stocks were discovered in the area by several vessels. By 2000, 40 large-scale deep-sea trawlers from over a dozen countries were fishing in the region and together caught almost 40,000 tons of deep-sea fish, primarily orange roughy and alfonsinos. The catch dropped to some 8,000 tonnes in 2001 and by 2002 only a few vessels remained in the fishery. In response to the rapid development of fishing in the region, a number of countries attempted to establish a regional fisheries management organization to regulate the deep-sea fisheries on the high seas. To date, negotiations are still under ay; in the meantime, the fisheries have largely collapsed and the fleets have moved on[21].

25. Thus, the primary concern at this point in time is not only the direct exploitation of deep sea species, but the physical damage caused by bottom trawl fishing to rare and vulnerable deep-sea species and ecosystems, including cold water coral systems. It is this type of impact, and the fact that deep-sea bottom trawl fishing, despite its low sustainable yields, is likely to continue to expand in coming years in response to the depletion of shallow water fish species and growing market demand for fish products, that has generated the concern expressed by the General Assembly.

IV. GOVERNANCE OF DEEP SEAS FISHERIES AND BOTTOM TRAWLING ON THE HIGH SEAS

26. Within national exclusive economic zones (EEZs), the Convention on Biological Diversity applies with regard to the duty to conserve and sustainably use biodiversity, apply the ecosystem-based approach to management, adopt precautionary measures, and establish a system of protected areas or areas where special measures are taken to conserve biological diversity.

27. Some countries have already recognized the need to take action within domestic waters[22]. Several have declared at least some seamount and cold water coral areas within their national waters off limits to bottom trawling through marine protected areas, marine reserves or restrictions on fishing gears[23]. Most recently, in June 2003, the 16 Contracting Parties, including the European Union, to the Oslo and Paris Convention for the Protection of the Marine Environment of the Northeast Atlantic expressed their concern about the status of vulnerable cold-water coral reefs. In a Ministerial

Statement, they made an important commitment to protect cold-water coral reefs: "We are particularly concerned about the status of vulnerable cold-water coral reefs, many of which are threatened with destruction. Bearing in mind the ecological importance of these reefs and the practical irreversibility of their damage, we shall take immediate measures to protect coral reefs from further damage due to use of active fishing gear on the reefs"[24].

28. Beyond national jurisdiction, the protection and preservation of the marine environment and the conservation and sustainable use of biodiversity are the collective responsibility of all nations. The Convention on Biological Diversity and the United Nations Convention on the Law of the Sea recognize this and the need for further cooperation to achieve these ends.

29. At present, however, management of oceans and ocean resources is scattered among a complex network of regional and international actors and mandates. High seas fisheries management is generally accomplished on a regional basis (often based on the geographic range of specific stocks or species) through a series of regional fisheries management organizations. There are seventeen regional organizations that establish management measures for straddling, highly migratory and other high seas fish stocks (e.g. those in the Southern Ocean). An additional twenty-seven regional organizations provide scientific information or management advice to their member governments but do not exercise regulatory authority[25]. While many of these regional fishery management organizations exercise competence over fish stocks such as tuna that aggregate at seamounts in areas beyond national jurisdiction, only four regional fishery management organizations have direct competence to regulate *bottom* fisheries on the high seas:

- Northwest Atlantic Fisheries Organization (NAFO);
- Northeast Atlantic Fisheries Commission (NEAFC);
- Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR);
- The Southeast Atlantic Fisheries Organization (SEAFO).

30. None of these organizations has yet regulated bottom trawling on the high seas for purposes of protecting vulnerable marine ecosystems or biodiversity with the exception of CCAMLR, which is reported to have recently closed an area around Prydz Bay in international waters to trawling to protect bottom habitat[26]. As a result, most high seas areas have no effective regime for the management of bottom fisheries and their impacts on the biodiversity of the deep sea. [27].

31. At the global level, there are clear mandates for conservation found in United Nations Convention on the Law of the Sea and the Convention on Biological Diversity. A number of non-binding instruments, including the Plan of Implementation of the World Summit on Sustainable Development, chapter 17 of Agenda 21, the FAO Code of Conduct for Responsible Fishing, and several FAO species- and issue-based plans of action are also relevant to determining the rights and duties of States and establishing guiding principles and standards of behavior with respect to high seas fishing activities. The three General Assembly resolutions calling for a moratorium beginning in 1992 on large-scale driftnet fishing on the high seas are also relevant as a clear application of the precautionary approach to fisheries management. This moratorium was driven by concerns about the wasteful by-catch of non-target species. The driftnet moratorium is not legally binding on any nation, though it did spur the major high seas driftnet nations to curtail the practice in the last decade.[28]

32. Most relevant to these issues, however, is the 1995 United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (the "1995 United Nations Fish Stocks Agreement"), which elaborates upon the rights and obligations of States for the conservation and management of straddling fish stocks and highly migratory fish stocks on both the high seas and within areas of national jurisdiction. Parties must assess the impact of fishing on non-target species and species belonging to the same ecosystem, minimize the impact of fishing on non-target species, protect habitats of special concern, protect biodiversity in the marine environment, and apply the precautionary approach. Given that some bottom trawl fisheries may target straddling fish stocks associated with vulnerable ecosystems, it has been suggested that to ensure consistency and provide a framework where management is otherwise

lacking, these principles and provisions should be applied to all high seas/ deep seas fishing activities[29].

V. CRITICAL GAPS

33. The above suggests that a number of important gaps in knowledge and ocean governance needs to be addressed before the sustainability of deep-sea fisheries and the protection of vulnerable deep-sea habitats and biodiversity can be ensured. These include the need for:

(a) Short-term and long-term approaches and tools, including the prohibition of destructive fishing practices and the establishment of 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;

(b) Clarification of a coastal state's authority and responsibility to protect the benthic biodiversity of its legal continental shelf (continental margin) from the impact of high seas bottom fishing[30];

(c) Further identification of important biodiversity areas beyond the 200 mile exclusive economic zone through mapping and sampling of vital seamount ecosystems and cold-water corals along continental margins and deep ocean areas under the high seas;

(d) More complete and systematic data collection on high seas bottom fisheries including data on catch, bycatch, and areas fished, as well as basic data on the biology of targeted species;

(e) 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;

(f) The adoption of international measures for the management of high seas bottom trawl fisheries in keeping with ecosystem-based fisheries management and the precautionary approach, for example through:

(i) Determining which of these fisheries are subject to the 1995 United Nations Fish Stocks Agreement;

(ii) Ensuring that regional fisheries management organizations currently competent to regulate these fisheries do so consistent with the principles and provisions of the 1995 United Nations Fish Stocks Agreement;

(iii) Establishing new regional fisheries management organizations consistent with the principles and provisions of the 1995 United Nations Fish Stocks Agreement to regulate these fisheries where management regimes do not currently exist;

(iv) Extending the competence of existing regional fisheries management organizations to these fisheries, consistent with the principles and provisions of the 1995 United Nations Fish Stocks Agreement, notably where target species currently regulated by the regional fisheries management organizations are associated with the vulnerable benthic ecosystems noted; and/or

(v) 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 1995 United Nations Fish Stocks Agreement; and

(vi) Establishing and implementing effective mechanisms for monitoring, compliance and enforcement for high seas bottom fisheries, including the elimination of illegal, unregulated and unreported fishing.

34. In light of the absence of management for many other human activities that may impact on high seas biodiversity, it has also been suggested that a more cost-effective albeit long-term approach might be the development of a global framework to address the full range of uses, building on the

United Nations Convention for the Law of the Sea, the 1995 United Nations Fish Stocks Agreement, the Convention on Biological Diversity and other relevant instruments[31].

VI. CONCLUSIONS

35. The United Nations General Assembly has called upon the international community to 'urgently consider' the risks to the biodiversity of the deep sea. The greatest current risk to the biodiversity of the deep sea comes from bottom trawl fisheries.

36. The conservation and management of fisheries within areas of national jurisdiction is the responsibility of each coastal state under the United Nations Convention on the Law of the Sea. However, the international community as a whole has the responsibility to take appropriate action at the global level in relation to the high seas—the world's global commons.

37. It should be recognized that long-term solutions to the problems associated with deep-sea bottom fishing on the high seas and the impact on biodiversity are necessary but will take time, whether through the negotiation of new instruments, the extension of coverage by regional fisheries management organizations consistent with the 1995 United Nations Fish Stocks Agreement and/or other measures to address the gaps identified in section V above. In the meantime, interim measures may be necessary to address the immediate threat posed by bottom trawl fishing in deep-sea areas on the high seas.

38. In light of the relevance of the Convention on Biological Diversity, it is important that the Conference of the Parties considers the request of the General Assembly for "urgent consideration of ways to integrate and improve, on a scientific basis, the management of risks to marine biodiversity of seamounts, cold water coral reefs and certain other features" within the framework of the United Nations Convention on the Law of the Sea, should draft resolution A/58/L.19 referred to in paragraph 5 above be adopted. The General Assembly will take up this issue again in 2004 as it further deliberates upon actions to be taken at the global level, and will, at that time, also consider any decision taken by the seventh meeting of the Conference of the Parties on this matter.

ENDNOTES

[1] Butler AJ, JA Koslow, PVR Snelgrove, SK Juniper (2001). *A Review of the Biodiversity of the Deep Sea*. Environment Australia, Canberra. Commonwealth of Australia,.

[2] Where the continental margin (submerged prolongation of the land mass of the coastal state) extends beyond 200 n.m. from the baseline of the territorial sea, this forms part of the coastal state's *legal* continental shelf, whose outer limits are defined in art. 76 of the UN Convention on the Law of the Sea. The coastal state exercises sovereign rights for the purpose of exploiting the natural resources of its legal continental shelf. For living resources, these consist of organisms belonging to sedentary species, as defined in art. 77.4, which may include varieties of coral, crab, mollusks and sponges.

[3] Many additional features of several hundred meters or more are believed to exist along continental margins and oceanic ridge systems. These are sometimes referred to as seamounts or variously as hills, knolls, and mounds. While the location of the 1000-meter-plus seamounts is generally known, much less is known about the location of these smaller features, though they are thought to contain similarly high levels of endemism.

[4] Rogers, AD, (1994). The biology of seamounts. *Advances in Marine Biology* 30: 305-354.

[5] For a comprehensive overview, see Stone, G, L Madin, K Stocks, G Hovermale, P Hoagland, M Schumacher, C Steve-Sotka, and H Tausig (in press). "*Seamount Biodiversity, Exploitation and Conservation: Case Study prepared* for *Defying Oceans End Conference*, Los Cabos, Mexico, May 30-June 3, 2003. Sponsored by Conservation International and the Gordon and Betty Moore Foundation. See also Roberts, CM. (2002) Deep impact: the rising toll of fishing in the deep sea. *Trends in Science and Ecology;* Koslow, JA, K Gowlett-Holmes, JK Lowry, T O'Hara, GCB Poore and A Williams (2001). Seamount benthic macrofauna off southern Tasmania: community structure and impacts of trawling *Mar Ecol Prog Ser* 213:111-125; Richer de Forges, B, JA Koslow, GCB Poore (2000), Diversity and endemism of the benthic seamount macrofauna in the Southwestern Pacific. *Nature* 405:944-947.

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[8] Gubbay, S (2003)."Protecting the Natural Resources of the High Seas: Scientific Background Paper" in *Towards a Strategy for High Seas Marine Protected Areas: Proceedings of the IUCN, WCPA and WWF Experts Workshop on High Seas Marine Protected Areas,* 15-17 January 2003, Malaga, Spain, (Annex 3) (Gjerde, KM and C Breide, editors) available at http://www.iucn.org/themes/marine/pdf/GjerdeBreideHSMPA.pdf

[9] Stone, G, L Madin, K Stocks, G Hovermale, P Hoagland, M Schumacher, C Steve-Sotka, and H Tausig (in press). *Seamount Biodiversity, Exploitation and Conservation: Case Study prepared* for *Defying Oceans End Conference*, Los Cabos, Mexico, May 30-June 3, 2003. Sponsored by Conservation International and the Gordon and Betty Moore Foundation.

[10] Koslow, JA, GW Boerhlert, JSM Gordon, RL Haedrich, P Lorance and N Parin (2000). Continental slope and deep-sea fisheries, implications for a fragile ecosystem, *ICES Journal of Marine Science*, 57: 548-557

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[13] Koslow, JA, K Gowlett-Holmes, JK Lowry, T O'Hara, GCB Poore and A Williams (2001) "Seamount benthic macrofauna off southern Tasmania: community structure and impacts of trawling". *Mar Ecol Prog Ser* 213:111-125

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[17] Cavanagh, RD, PM Kyne, SL Fowler, JA Musick, and MB Bennett (editors, 2003) Conservation Status of Australian Chondrichthyans: Report of the IUCN Shark Specialist Group Australia and Oceania Regional Red List Workshop. The University of Queensland, School of Biomedical Sciences, Brisbane, Australia. x + 170pp..

[18] Koslow, JA, GW Boerhlert, JSM Gordon, RL Haedrich, P Lorance and N Parin (2000). Continental slope and deep-sea fisheries, implications for a fragile ecosystem, *ICES Journal of Marine Science*, 57: 548-557

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[20] Gubbay, S. (2002), *The Offshore Directory: Review of a selection of habitats, communities and species of the north-east Atlantic.* A report for WWF, with contributions from Maria Baker, Brian Bett and Gerd Konnecker.

[21] UN FAO, Report of the Second Ad Hoc Meeting on Management of Deepwater Fisheries Resources of the Southern Indian Ocean - Fremantle, Western Australia, 20-22 May 2002, FAO Fisheries Report No. 677, Rome, 2002. www.fao.org/DOCREP/005/Y3992E/y3992e00.htm#Contents; Fishing News International 41/7, August 2002, p17.

[22] The information is the next two sections is drawn in large part from Gianni, M (2003) *High Seas Bottom Fisheries and their Impact on the Biodiversity of Vulnerable Deep Sea Ecosystems: Preliminary Findings*, Report prepared for IUCN, NRDC, WWF and Conservation International, October 2003. A more detailed and comprehensive report will be available in early 2004.

[23] These include Australia, Canada New Zealand, Norway, and the United States Gubbay, S (2003). *Seamounts of the North-East Atlantic*, OASIS research project supported by the European Commission, WWF Germany.

[24] Bremen Statement, Ministerial Meeting of the OSPAR Commission, Bremen, Germany, 25 June 2003.

[25] Stone, G, L Madin, K Stocks, G Hovermale, P Hoagland, M Schumacher, C Steve-Sotka, and H Tausig (in press). *Seamount Biodiversity, Exploitation and Conservation: Case Study prepared* for *Defying Oceans End Conference*, Los Cabos, Mexico, May 30-June 3, 2003. Sponsored by Conservation International and the Gordon and Betty Moore Foundation

[26] SEAFO has only just entered into force, and NEAFC has only begun to attempt to regulate deep-water bottom fisheries on the high seas in the North Atlantic. Their primary focus has been to regulate high seas bottom trawl fisheries to reduce their impacts on target species. Various nations regulate bottom trawl fisheries within the EEZ, in some cases to protect habitat and/or other species.

[27] It does not appear that other RFMOs have competence to regulate high seas bottom fishing, although further research may reveal that this is not the case.

[28] Stone, G, L Madin, K Stocks, G Hovermale, P Hoagland, M Schumacher, C Steve-Sotka, and H Tausig (in press). *Seamount Biodiversity, Exploitation and Conservation:* Case Study prepared for *Defying Oceans End* Conference, Los Cabos, Mexico, May 30-June 3, 2003. Sponsored by Conservation International and the Gordon and Betty Moore Foundation

[29] E.g., Lodge, M. Summary wrap-up presentation at Deepsea 2003 Conference, Queenstown, New Zealand, 1-5 December 2003. In some regions, notably the North Atlantic, it appears that many of the deep-sea stocks fished by bottom trawlers on the high seas are straddling fish stocks. Similarly, in other regions further research may indicate that high seas bottom trawl fisheries target straddling stocks, or that target species subject to the UN FSA and governed by RFMOs and are associated with vulnerable benthic ecosystems.

[30] A concern for coastal states whose continental margin extends beyond 200 n.m. is that high seas bottom trawling may adversely impact the biodiversity of these underwater areas and the 'sedentary' species, such as corals, over which it exercises sovereign rights. The ambiguities regarding coastal state rights and duties vis-à-vis high seas bottom fishing in this area need to be addressed.

[31] See e.g. Report of the High Seas Biodiversity Conservation Governance Workshop organized by Environment Australia, 16-20 June, 2003, Cairns, Australia; World Parks Congress Recommendation 5.23, Durban, South Africa, 8-17 September 2003.
