

DSCC policy paper

Mysteries and mountains of the deep

Seamounts and cold-water corals

The deep sea is one of the last frontiers on the planet – the home to breathtaking landscapes of mountains, hills, ridges and troughs that very few of us will ever see. Until a short time ago, it was assumed that there was little life in the cold and dark waters of the deep sea, which cover more than half the world’s surface. New technologies, however, have turned that belief on its head. Today, scientists and the fishing industry know that the deep sea is teeming with life, most of which remains undiscovered. Scientists, in fact, have speculated that as many as 10 million species may inhabit the deep sea – biodiversity comparable to the world’s richest tropical rainforests.

Gorgonian at the Davidson Seamount
off the coast of California, USA.



Image courtesy of NOAA and MBARI

A great deal of deep-seas biodiversity is concentrated around features known as seamounts. Seamounts are underwater mountains that rise 1,000 meters or higher from the seabed but do not break the ocean surface – silent giants sitting in the vast blue. Although they have not been comprehensively mapped, it is estimated that there may be between 30,000 and 100,000 seamounts worldwide.

In addition to being physically impressive, some seamounts are remarkably food-rich. Because of their physical characteristics and strong localized currents, seamounts accumulate enormous quantities of plankton. The plankton, in turn, attracts a vast array of marine life – providing feeding as well as spawning grounds for myriad pelagic species, including some that have migrated across wide oceanic areas. From large marine mammals, such as dolphins and whales, to an extraordinary diversity of fish species and the birds that prey on them, to exotic sponge ecosystems and microscopic bacteria, seamounts are among the world's greatest marine biological treasures.

Because many seamounts are located in remote surroundings, seamount ecosystems are home to an

unusually large number of endemic species (species not found elsewhere). With food being scarce in the cold and dark of the deep ocean, deep-sea species tend to be slow growing, late maturing and low in reproductive capacity. Many deep-water fish species live 30 years or more. Some, such as orange roughy, can live up to 150 years.

The deep sea

is also home to remarkably rich coral systems. Once thought to inhabit only the warm and shallow waters of tropical and subtropical regions, corals have apparently been thriving in deep, dark and cold waters throughout the world for millions of years. Carbon dating of living cold-water corals has revealed that the oldest may be 5,000-8,000 years old or more.

Several coral species create complex reefs and ornate three-dimensional, forest-like structures that rival tropical coral systems in their size and complexity. Indeed, the oldest and tallest reef yet observed has grown up to 35 meters in height. Although the ecological aspects of cold-water corals have only begun to be explored, it is clear that cold-water reefs are bustling with life, providing essential sanctuaries and nursing grounds for countless species. These species have dwelled in ecosystems that are rarely disturbed and that recover from disturbances at an exceedingly slow rate, if at all.



“Sadly, as we expand our understanding of the distribution, biological dynamics and rich biodiversity of cold-water ecosystems, we are also gathering evidence that shows clearly that these vulnerable ecosystems are being damaged by unregulated human activities. . . Undoubtedly, the greatest and most irreversible damage is due to the increasing intensity of deep-water trawling that relies on the deployment of heavy gear which ‘steamrollers’ over the sea floor.”

A. Frewald, J. Fossa, A. Grehan, T. Koslow, J. Roberts, *Cold Water Corals – Out of Sight, No Longer Out of Mind*, 10 (UNEP 2004)

Seamounts, and the cold-water corals they sustain, provide habitat for several commercial bottom-dwelling fish species, such as orange roughy, roundnose grenadier, blue ling, mirror dory and silver dory. Other species – for example, alfonsino, boar fish and blue-eye trevalla – are also attracted to these habitats. The concentrations of these fish around seamounts – whether for feeding or spawning – have made seamounts very attractive fishing grounds. Studies show that the long life cycles and slow sexual maturation of deep-sea fish, however, makes them particularly vulnerable to large-scale fishing activities. Whole populations can be quickly fished out and take decades to recover.

Deep-sea bottom trawling

is especially destructive of deep-sea habitats and species. Seabed trawl gear is designed to plow up the ocean floor in order to capture one or a handful of target commercial species. To protect the fish net from tearing, multi-ton plates, rollers and chains are dragged across the sea floors. The deep sea’s delicate structures and life forms are no match for the trawl gear, which pulverizes everything in its path. In the

short span of time since deep-sea trawling began, hundreds or possibly thousands of seamounts and ancient coral and sponge systems may have been

devastated. If these fragile systems recover at all, it may take centuries or millennia.

The United Nations Environment Programme recently echoed this concern (see box above).

Bottom trawling poses an enormous threat to the extraordinary, often unique biodiversity of deep-sea habitats and ecosystems. Because of the high degree of endemism on seamounts and the tendency of bottom trawl fleets to target fish populations that concentrate around seamounts and other areas of the deep sea rich in biodiversity, the extinction of countless undiscovered deep-sea species can be expected unless protective action is taken.

To protect deep-sea biodiversity

on the high seas from continued indiscriminate destruction the Deep Sea Conservation Coalition is calling on the United Nations General Assembly (UNGA) to adopt an immediate moratorium on deep-sea bottom trawl fishing on the high seas until legally-binding regimes for the effective conservation and management of fisheries and the protection of biodiversity on the high seas can be developed, implemented and enforced by the global community.

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Additional policy papers in this series include:


DSCC

- Deep-sea bottom trawling

The destructive power of deep-sea bottom trawling on the high seas

During the past several decades, it has become possible to plow up deep-sea ecosystems that have existed for millennia. If not longer. Today, as a result, well-capitalized fleets from a handful of wealthy nations are destroying some of the planet's last, most ecologically rich frontiers in search of commercial fish and crustacean species.

Until relatively recently, fishing the deep sea's rugged floors and canyons was impossible. Advances in bottom trawling technology, however, have put the unreachable within reach. More powerful engines, bigger nets, more precise mapping, more advanced navigational and fish-finding electronics have enabled fishing vessels to drag fishing gear across the ocean floor as much as two kilometers (1.2 miles) deep. Trawling is, in fact, now the preferred method for the ocean bottom on the high seas, accounting for approximately 80 percent of the total high seas fisheries catch in 2007.



Economics and equity... the deep seas parted

The global race to fish the deep seas is, in many ways, a story of horses and haves not. As coastal fisheries have grown more and more depleted, fleets from more developed nations are increasingly turning deep international waters in search of commercial fish and crustacean species. More powerful engines, more precise mapping, advanced navigational and fish-finding electronics, stronger and lighter synthetic materials – all of these developments have made it possible to fish in areas up to two kilometers (1.2 miles) deep. As a result, trawling has become the dominant high-sea bottom fishing method, accounting for approximately 80 percent of the total high seas bottom fisheries catch in 2007.



- Economics

Urgent action needed: a global moratorium on deep-sea bottom trawling on the high seas

All present, "deep-sea" bottom trawling on the high seas (the 64 percent of the ocean beyond national jurisdiction) is equally unregulated. The vast majority of the high seas is not covered by regional fisheries management organizations (RFMOs) with most countries to regulate East Atlantic Fisheries Organization (EAFO), the North Atlantic Fisheries Organization (NAFO), the South East Atlantic Fisheries Commission (SEAFCO) and the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) – only one, CCAMLR, has been able to regulate bottom trawling impacts on deep-sea biodiversity in the high seas. The FAO has been unable to regulate deep-sea bottom trawling in the high seas. The FAO has been unable to regulate deep-sea bottom trawling in the high seas. The FAO has been unable to regulate deep-sea bottom trawling in the high seas.



- RMFOs

A net with holes: the regional fisheries management system

The deep sea is one of the last frontiers on the planet – the home to breathtaking landscapes of mountains, hills, ridges and seeps that very few of us will ever see. Until a short time ago, it was assumed that there was little life in the cold and dark waters of the deep sea, which cover more than half the world's surface. Now biologists, however, have learned that belief is wrong. In fact, the deep sea is home to a vast and diverse array of life, many of which remain undiscovered. Scientists, in fact, have speculated that as many as 10 million species may inhabit the deep sea – biodiversity comparable to the world's richest tropical rainforests.

The United Nations General Assembly (UNGA) is discussing proposals to provide urgent protection for the deep-sea ecosystems. The UNGA is discussing proposals to provide urgent protection for the deep-sea ecosystems. The UNGA is discussing proposals to provide urgent protection for the deep-sea ecosystems.



- Science

United scientific community calls for: Moratorium on deep-sea bottom trawling on the high seas

In February 2008, 1,126 scientists from 89 countries released a statement, expressing profound concern over the increasing and unregulated damage to the deep-sea ecosystems and urging an immediate moratorium on deep-sea bottom trawling. The United Nations Convention on the Law of the Sea (UNCLOS) and the United Nations Convention on Biological Diversity (UNCBD) have both called on governments to agree to a moratorium on deep-sea bottom trawling on the high seas while such improvements are made.



The Deep Sea Conservation Coalition, an alliance of over 30 international organisations, representing millions of people in countries around the world, is calling for a moratorium on high seas bottom trawling. For further information about the Coalition visit www.savethehighseas.org