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THREATS TO DEEP-SEA CORALS AND THEIR CONSERVATION IN U.S. WATERS

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U.S. FISHERIES MANAGEMENT

The borders of the United States do not end at the coast. U.S. jurisdiction extends to 200 nautical miles beyond its coastlines. These vast marine holdings—about 4.4 million square miles—are divided into state waters, which extend from each state's coastline out to three nautical miles, and federal waters, which include the area from 3 to 200 nautical miles, also known as the U.S. Exclusive Economic Zone (EEZ). The Magnuson-Stevens Fishery Conservation and Management Act is the primary law dealing with U.S. fisheries management. The Act charges the National Oceanic and Atmospheric Administration (NOAA) Fisheries, an agency in the Department of Commerce, with managing the living resources within the EEZ. It also creates eight regional fishery management councils, which help manage federal fisheries by developing and implementing regional fishery management plans. The Magnuson-Stevens Act provides basic standards and guidelines for the management of fisheries, including the prevention of overfishing and the protection of essential fish habitat. Fishery-specific decisions on how to meet these standards are left to the discretion of each council.

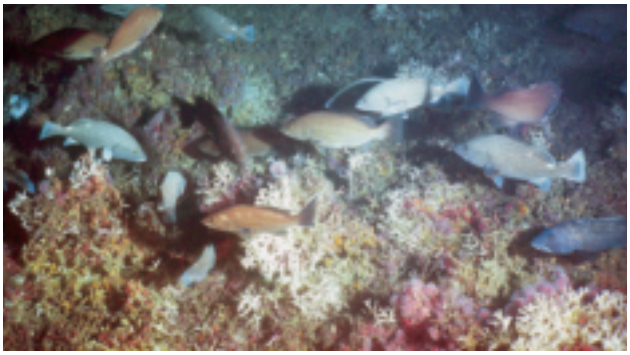
DEEP-SEA CORALS: THREATS AND MANAGEMENT STRATEGIES

Conservation of deep-sea coral species depends on carefully planned management strategies. Many deep-sea corals are slow growing and therefore take decades or even centuries to regenerate if they are damaged or destroyed. Thus, the most effective conservation tools prevent or strictly limit the initial amount of anthropogenic damage done to corals. Currently, the main threat to deep-sea corals is mechanical destruction by bottom-impacting fishing gear, particularly bottom trawls, which crush corals as gear is dragged along the ocean floor (see figures below). Oil and gas drilling operations also pose a threat, because corals can be crushed or smothered in toxic debris at drill sites. Pipelines that service drill sites may also destroy deep-sea corals.

Managers have used a variety of methods to contain or prevent damage done to deep-sea corals by fishing gear. Deep-sea corals are often associated with rough, structurally complex benthic habitats. Rockhopper and roller gears are rubber or steel discs and balls attached to the leading edge of a bottom-trawl net that allow trawlers to drag their nets over rough terrain without snagging. Larger rockhopper gear allows trawl nets to enter more complex terrain. Therefore, size restrictions on gear can prevent the expansion of bottom-trawl fisheries into some deep-sea coral habitats. The Pacific, New England, and Mid-Atlantic Fishery Management Councils have used rockhopper-size restrictions to keep bottom trawls out of habitats that include deep-sea corals. In addition, a few states have implemented roller restrictions in state waters. For example, Connecticut restricts rollers to a six-inch diameter. New Jersey and New York also have roller restrictions although they are less stringent (rollers up to 18 inches are allowed).

New trawl gear that can be used at increasingly greater depths has rapidly increased the area of seafloor accessible to trawl fleets throughout the world. As a result, deep-sea habitats that were once protected by intrinsic gear limitations have come under increased trawling pressure. Like gear-size restrictions, freezing the "footprint" of bottom-trawl fisheries is meant to prevent the continued expansion of bottom trawling into previously unfished waters. This management tool restricts damage to habitats on the seafloor that have already been repeatedly trawled. The North Pacific Fishery Management Council recently decided to use this containment strategy when it limited trawling off the Aleutian Islands to 25,000 mi^2 of ocean floor currently trawled.

Areas of known or suspected importance to deep-sea corals can also be closed to gears that are known to damage bottom



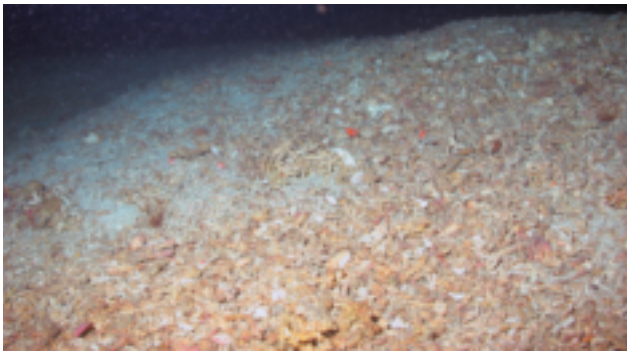


Figure 1a (left) and b (right): Groupers were abundant on deep-sea *Oculina* coral reefs off Florida's Atlantic Coast before trawling began; legal and illegal trawling has nearly eliminated the corals and large fishes in this ecosystem.

habitat. Marine protected areas (MPAs) are ocean zones designed to preserve specific habitats and marine populations. For example, Washington has protected benthic habitats in its state waters using a combination of area closures in the bottomfish trawl fishery and complete bans on other bottom-trawl fisheries. The seafloor is also protected in the Flower Garden Banks National Marine Sanctuary, located 100 miles offshore of Texas in the Gulf of Mexico. Anchoring within the sanctuary is prohibited except at designated mooring sites, and the use of trawls is also illegal.

Deep-sea coral habitats can also be protected from destructive fishing practices under Magnuson-Stevens Act protections for essential fish habitat (EFH) and habitat areas of particular concern (HAPC). A 1996 amendment to the Act defined essential fish habitat as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Under the amendment, councils must add EFH considerations to their fishery management plans by identifying and describing essential habitat for managed fish species, minimizing the fishing impact on EFH, and identifying additional steps to conserve EFH. A region within an essential fish habitat may be designated a HAPC based on its ecological importance, sensitivity to human impact, rarity, and the degree of stress that development activities put on the habitat. Several management councils have made an effort to put meaningful protections on deep-sea coral habitats designated as EFH. For example, under their monkfish fishery management plan, the New England and Mid-Atlantic Fishery Management Councils have banned monkfish bottom trawling in two deep-sea canyons known to contain corals. The South Atlantic Fishery Management Council created the 300 nm^2 *Oculina* Bank coral HAPC as part of its coral management plan and closed the area to all bottom-impacting fishing gears.

THE FUTURE

While some fishery management councils have taken steps to protect deep-sea corals from bottom-impacting gears, protections in U.S. waters remain inconsistent and are not yet comprehensive. In December 2004, the President highlighted deep-sea coral protection as an action item in his Ocean Action Plan. The issue also has reached both houses of Congress: a 2003 congressional hearing was held on coral protection measures, and the Deep Sea Coral Protection Act (DSCPA) was introduced in both the House and Senate in 2003-2004. The DSCPA aligns with the efforts of some of the regional fishery management councils' efforts to protect deep-sea corals. It declares coral ecosystem protection to be a national policy, and in many ways, would mirror action of the North Pacific Fishery Management Council. The Act freezes the footprint of bottom trawls in all fishery management regions. Trawling effort would be prevented from expanding into previously untrawled regions until deep-sea corals in those regions are surveyed and mapped, and then would be allowed, only, if potential habitat damage from proposed new bottom trawling is judged "minimal and temporary." Additionally, the Act would require implementation of a comprehensive research plan to collect information on deep-sea coral locations and life history. The DSCPA is one of a number of strategies to protect deep-sea corals and maintain their functional role in deep-sea ecosystems. A number of effective strategies are available to managers, but meaningful protections must be adopted swiftly while there are still deep-sea corals to protect.

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FOR MORE RESOURCES:

Marine Conservation Biology Institute (MCBI):
http://www.mcbi.org/destructive/Destructive.htm#deepseacorals

Magnuson Stevens Fishery Conservation and Management Act:
http://www.nmfs.noaa.gov/sfa/magact/

Flower Garden National Marine Sanctuary:
http://flowergarden.noaa.gov/

New England Fishery Management Council Monkfish Bottom-Trawl Closures:
http://www.nefmc.org/monk/planamen/amend_2/mf_amend2_proposed_rule.pdf

North Pacific Fishery Management Council Trawl Restrictions:
http://www.fakr.noaa.gov/npfmc/current_issues/HAPC/HAPCmotion205.pdf

Oculina Bank HAPC:
http://oceanexplorer.noaa.gov/explorations/islands01/background/islands/sup6_oculina.html

Washington State fishing Regulations:
http://wdfw.wa.gov/fish/regs/2004/04regs-5.pdf

Deep Sea Coral Protection Act:
http://www.mcbi.org/destructive/Justification%20of%20DSCPA.pdf

PHOTO CREDITS:

Page 46 (left): Courtesy of Dr. R. Grant Gilmore, Dynamac Corporation

Page 46 (right): Lance Horn, National Undersea Research Center/University of North Carolina at Wilmington