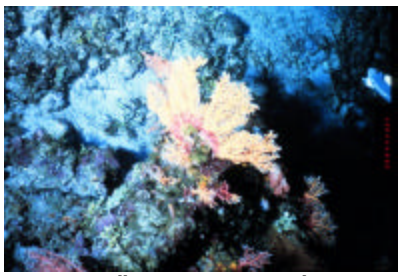
Deep Sea, Cold Water Corals

While most people are aware of tropical corals, few are aware that corals also inhabit cold waters in the deep waters off all U.S. coasts, including Alaska and Hawaii. Deep sea corals take many forms, including reefs, trees that grow over ten feet high, thimble-like cups, whips that rise straight out of the seafloor, and broad fans. Their names convey some of their diversity: bubblegum coral, bamboo coral, raspberry cup coral, sea corn coral, or gold coral to name a few. Many of these species prefer waters that are over half a mile deep on continental margins, deep sea canyons, and seamounts, and with strong currents. Just as tropical corals provide habitat for tropical fish, cold-water corals are habitat for deep sea fish, such as rockfish and Atka mackerel. Deep sea corals can live for hundreds of years and can take thousands of years to develop coral reefs that can rise hundreds of feet from the bottom. Current research indicates that these corals play an important role in the deep marine ecosystem. They host a rich diversity of life, including many species thought to only occur in shallow waters but which are now known to journey out to the deep sea corals to forage at particular times of the day or year. Yet, despite warnings from scientists that deep sea corals are disappearing faster than tropical corals, these species lack national and international protections.

Important Havens for Sea Life

The strong ocean currents that deep sea corals prefer are important for marine life because they increase water and nutrient flow, but also make survival more difficult, particularly for smaller life, such as juvenile fish. Coral outcrops and "forests" are important habitat for many fish and crustacean species, and also for other marine life such as sea anemone, starfish and sponges, because they provide protection from these currents and from predators. The clusters of biodiversity around deep sea corals are important places for fish to forage, find protection, and lay their eggs.


Hawaiian yellow gorgonian coral


Gag grouper off a NC deep sea coral reef


Coral diversity on Georges Bank

Benefits to humans from deep sea corals are just beginning to be explored. Because some species grow in concentric "rings" similar to tree-rings and are very long-lived, scientists are beginning to consider deep sea corals for information about changes in ocean temperature and nutrient levels over the past several centuries. It is thought that this data may fill in crucial gaps in our current understanding of climate change. Additionally, deep sea corals are being researched for their potential use in drugs to help combat cancer and make bone grafts more successful.

Destruction by Bottom Trawls

Deep sea corals live at depths that are largely unaffected by storms or wave action. Their threats therefore include: drastic water temperature change, oil and gas development, pollution, and damage by fishing gear, vessels and anchors. According to scientists, the largest manmade threat is from destructive fishing gear, particularly bottom trawls. Bottom trawls drag across large areas of the seafloor with each pass, crushing and

Oceana, 2501 M Street, NW, Suite 300, Washington, DC 20037
Phone: 202-833-3900 Web Site: www.oceana.org Contact: Phil Kline
Marine Conservation Biology Institute, 600 Pennsylvania Avenue, SE, Ste 210, Washington, DC 20003
Phone: 202-546-5346 Web Site: www.mcbi.org Contact: Bill Chandler or Hannah Gillelan
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flattening much of the seafloor structure in its path. Bottom trawls off Alaska destroyed nearly one million pounds of deep sea corals annually during the late 1990s. A single trawl pass can crush centuries of growth. For example, a National Marine Fisheries Service research trawl dragged up over 2200 lbs of deep sea coral with one pass over an area off Alaska. While some coral may survive a single trawl pass, recovery can take decades to centuries and repeated trawling will lessen the likelihood of any survival. Bottom trawling is not the only threat to deep sea corals, but it is capable of causing greater extent of damage in a short time than almost any other threat. According to estimates by the National Academy of Sciences, U.S. bottom trawlers affected more than 230,000 square nautical miles of seafloor in the late 1990s – an area greater in size than California!

Research in Canada and Scotland suggest that much of their deep sea coral may already have been trawled to rubble. Norway has estimated that 30-50% of their deep sea coral has already been damaged by bottom trawls. Within just weeks of becoming aware of the devastation, the Norwegian legislature acted to ban trawling in an area of high cold-water coral concentration. Australia has also acted to protect deep sea corals, designating its first deep sea marine reserve, the Tasmanian Seamounts Marine Reserve, spreading over 140 mi^2 to protect 20% of the 70 known submerged seamounts off the Australian continental margin.

Within the U.S., deep sea corals grow off every coast, from Maine to Florida, Alaska to Hawaii. A colony of the *Oculina varicosa*, or ivory tree coral, found on Oculina Banks, may take over a century to grow to just 3-5 feet. Yet extensive areas of corals, including about 90% of the Oculina corals off the east coast of Florida, have already been reduced to rubble by trawling and scallop dredging. The rubble pictured at far right depicts corals that were over 100 years old when destroyed. NMFS has shown that the ivory tree coral plays several important roles in the web of ocean life around them. The corals provide habitat for mollusks and crustaceans, which are in turn essential food for commercially and recreationally important species of fish such as red porgy, greater amberjack, and many species of snapper and of grouper. The corals are also used by groupers as spawning and nursery areas. Without the structure of the coral, the groupers seem to gather in smaller spawning groups and reproduce with less success.

The President's Ocean Action Plan of 2004 includes provisions to 'research, survey, and protect deep-sea coral communities' and 'encourages all regional fishery management councils to take action, where appropriate, to protect deep-sea corals when developing and implementing regional fishery management plans.' While NMFS and the regional fishery management councils have protected deep sea corals in some areas, they have left others to the mercy of fishing gear. Different protection approaches have been taken, including protecting discrete areas (such as the Oculina Banks off Florida) from bottom disturbing activities, restricting gear size (such as off New England and the Mid-Atlantic) to limit the ability of fishermen to tow their gear through rough terrain where many deep sea corals live, and prohibiting bottom trawling (for example, off Alaska) in all areas other than those that have been repeatedly fished by trawls in the past decade. While protections have begun to be put in place, they often only apply to specific fisheries, such as the monkfish fishery, and leave deep sea corals vulnerable to fishing by other fisheries. The longer we wait to protect deep sea corals, the less there is to protect. The ocean's redwoods need our help.

Photos courtesy of Office of Oceanic and Atmospheric Research, National Undersea Research Program, NOAA; Univ. of NC at Wilmington; and the National Undersea Research Center, Univ. of CT

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