



NURP Research: Investigating Deep-Sea Corals



Deep-sea corals at Madison-Swanson, a protected area in Gulf of Mexico. Photo: Lance Horn, National Undersea Research Center, UNCW

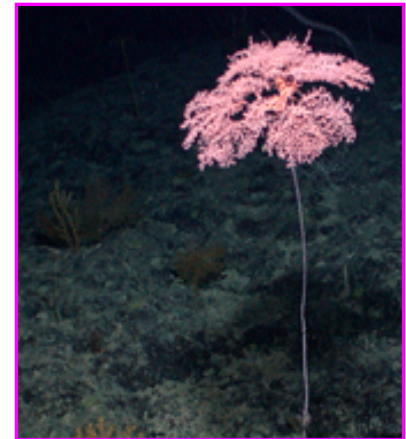
Deep-sea corals inhabit the colder deep waters of our continental shelves, submarine canyons, seamounts, and mid-ocean ridges to depths greater than 6000 m. Where ocean current and substrate conditions are suitable, these corals can form highly complex reefs, thickets, or groves, depending on species. They are similar to the ancient redwood and sequoia trees in several ways, including: 1) they are slow growing and can reach hundreds of years to over millennia in age; 2) they provide habitat for many other organisms, including deep water species of fish that are of economic importance; and 3) they contain important historical records of climate change.

Although the existence of deep-sea corals was first documented about two and a half centuries ago, most of what we know about them has come from research within the past few decades. Recent evidence suggests that fishing has had substantial impacts on these communities in both the North Atlantic and Pacific Oceans. Trawling and other fishing practices have destroyed acres of old-growth deep water corals, leaving behind rubble fields. This combined with their slow growth rates and potential role as habitat for a number of commercially and ecologically important species may produce long lasting effects on deep-sea communities. Understanding the dynamics of these corals and their related ecosystems is important to their sustainability.

NURP Research

Scientific investigation of deep-sea corals is best conducted in their natural habitat. NURP gives scientists this capability by providing access to an array of deep submergence HOVs, ROVs, and AUVs. HOVs owned by NURP centers include the *Pisces IV* and *V*, two of only 9 in the world that can dive to depths of 2,000 m (6,562 ft).

With these advanced technologies, NURP-funded scientists are furthering knowledge of the species abundance, diversity, distribution patterns, population genetics, and functional role of deep water corals. This information may be applied towards creating models that can be used to manage and conserve deep-sea coral communities.



Parasol coral (*Metallogorgia sp.*), New England Photo: Mountains in the Sea 2004



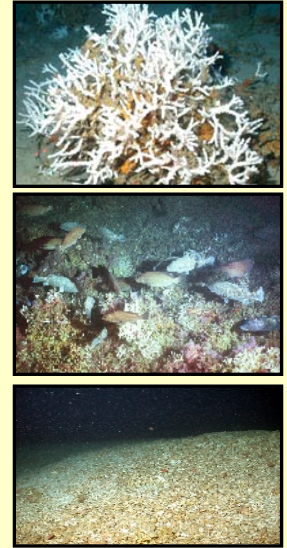
Scientists with deep-sea coral. Aleutians, Alaska. Photo: Robert Stone

Highlights from NURP-sponsored research include:

- Documented that Hawaiian monk seals, an endangered species, were diving to great depths in search of prey in beds of precious corals, indicating a possible link between monk seal and deep sea precious coral communities
- Supported the continuation of a ban on trawling and bottom fishing in a portion of Florida's Oculina Banks, to ensure protection of the world's only known deepwater stand of ivory tree coral (see box at right)
- Identified at least 17 new species of deep-sea corals in the NWHI, documented the major genetic diversity of deep water corals compared to shallow corals, proved they are key habitat for many fish and other animals
- Research findings aided the New England Fishery Management Council in developing management actions to conserve deepwater coral habitats off the North Atlantic
- Are currently funding research to characterize growth patterns of deep-sea corals in the South Pacific, to better understand climate variability at the decadal to centennial scales; (co-sponsored by Office of Exploration (OE))
- Produced the first systematic documentation to 3000 m depth of deep sea-coral distribution in the Aleutian Islands. An apparent change in density, diversity, and species composition was observed at a depth of approximately 1400 m.
- Investigated impact of bottom fishing on MPAs in the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve and determined the status of deep-sea habitat in the Stellwagen Bank National Marine Sanctuary, which is part of a Seafloor Habitat Recovery Program (both projects co-sponsored by OE)

Impact of Fishing Gear on Deep-Sea Corals

Top: Healthy ivory tree coral; Photo: Harbor Branch Oceanographic Institute; **Middle:** Grouper on *Oculina* reefs; grouper were abundant in the Oculina Banks before trawling occurred; Photo: G.Gilmore, Dynamac Corp.; **Bottom:** Legal and illegal trawling has nearly eliminated the corals and large fish in this ecosystem. Photo: Lance Horn, NIRP UNCW



Bubble gum coral (*Paragorgia sp.*), covered with brittle stars; Collected at 844 m during NURP's 2004 Aleutians Expedition. Photo: Sonya Senkowsky



Gerardia sp., a type of precious coral that may be important habitat for fish that are preyed upon by the monk seal. NWHI. Photo: Frank Parrish

