

Olympic Coast National Marine Sanctuary

Deep Sea Coral and Sponge Communities

Management Issue

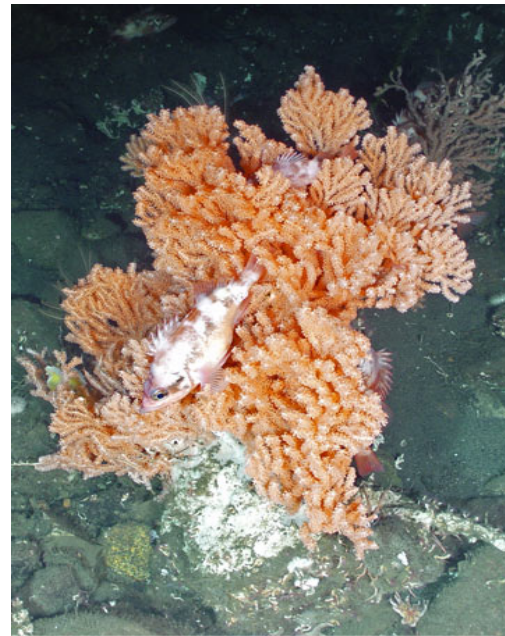
Deep-sea corals and sponges occur in the Olympic Coast National Marine Sanctuary (OCNMS or Sanctuary); however, little is known of their distribution, abundance and basic biology which are particularly important since these biogenic habitats are at risk from anthropogenic disturbance.

Description

Biodiversity within deep benthic communities of the Sanctuary is poorly characterized. Some deep corals and sponges found off the Pacific coast provide vertical structure above the seafloor and can serve as habitat for other invertebrate and fish species. Overall, there are considerable data gaps regarding the distribution, abundance and population dynamics of deep benthic species and their overall community structures. Deep coral and sponge communities are important habitats as recognized in the reauthorized Magnuson-Stevens Fishery Conservation & Management Act and the 2007 NOAA report entitled *The State of Deep Coral Ecosystems of the United States*.

Surveys and evaluation of ecological integrity of deep-sea habitats has only recently begun for coral and sponge communities due to technological advances in undersea research. Surveys conducted in offshore shelf and canyon habitats in the Sanctuary have confirmed the presence of hard-bottom substrates with soft corals (e.g., gorgonian species), stony corals (e.g., *Lophelia sp.*), giant cup corals (e.g., *Desmophyllum sp.*) and at least 40 species of sponges.

Scientific research has demonstrated that some deep coral and sponge have slow growth and recruitment rates which can increase their vulnerability to anthropogenic damage, especially by bottom contact fishing gear. The distribution of existing and historic deep coral and sponge communities in OCNMS is poorly known, as is the extent of human impact to those areas. The NOAA Fisheries Service has implemented regulations on the west coast to restore stocks of overfished species and to mitigate physical damage to groundfish Essential Fish Habitat (EFH). The Olympic-2 EFH conservation area, covering approximately 7% of OCNMS, was established in 2006 to prohibit non-tribal bottom trawl fishing gear and thereby reduce impacts on these deep benthic communities.



Red tree coral with associated rockfish. Photo Credit: OCNMS

Questions and Information Needs

- 1) What is the distribution and abundance of deep-sea corals and sponges?
- 2) Do the biogenic structures of deep corals and sponges constitute unique ecological communities? What temporal changes occur within the community structures, such as species associations?
- 3) Do these sensitive habitats warrant additional protection from anthropogenic disturbance, particularly from bottom contact fishing gear?
- 4) What is the resilience of deep corals and sponges to other anthropogenic impacts such as climate change, e.g. increased ocean temperature?
- 5) How is ocean acidification affecting aragonite and calcite saturation levels in regards to benthic invertebrate communities, particularly stony corals (, e.g., *Lophelia sp.*)?
- 6) What is the age structure of the deep coral and sponge species and what are their recruitment patterns?
- 7) How are deep coral and sponge population dynamics affected by global climate change and decadal scale cycles such as the El Niño Southern Oscillation and Pacific Decadal Oscillation?
- 8) How can stable isotope and trace element composition of deep coral skeletons provide needed data on coral stress and resilience as well as the role of intermediate and deep waters in determining climate variability?
- 9) What ecological linkages exist between deep coral and sponge biogenic assemblages and other habitats in the Sanctuary?

Current as of 9/16/2014

For More Information -- <http://www.sanctuaries.noaa.gov/science/assessment>

Scientific Approach and Actions

- Continue habitat mapping and characterization to identify potential deep coral and sponge sites based on benthic substrate
- Conduct video surveys using ROVs, AUVs, occupied submersibles, or camera sleds to quantify deep coral and sponge patterns of distribution and abundance
- Conduct deepwater coral ageing and growth with research partners
- Monitor existing deep coral and sponge sites to assess long-term trends
- Monitor areas that have suitable habitats for coral/sponge recruitment and recovery

Key Partners and Information Sources

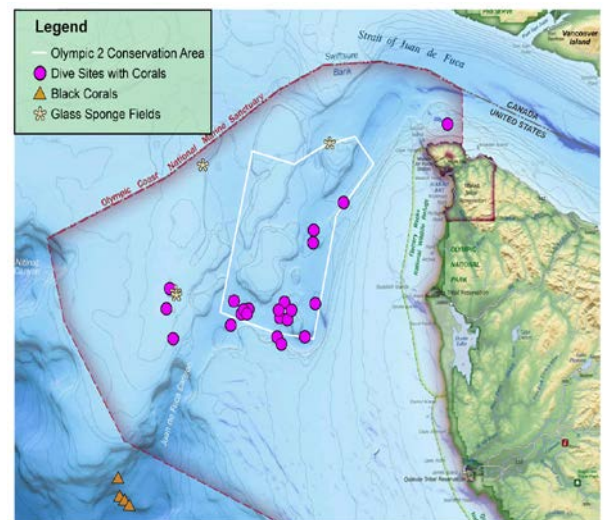
NOAA National Centers of Coastal Ocean Science, NOAA Northwest Fisheries Science Center, NOAA Fisheries Northwest Regional Office, NOAA Fisheries Office of Habitat Conservation, NOAA Coral Reef Conservation Program, Pacific Fishery Management Council, U.S. Geological Survey, Washington State Department of Fish and Wildlife, Olympic Coast Intergovernmental Policy Council, University of Washington, Washington State University, Western Washington University, Monterey Bay Aquarium Research Institute and Moss Landing Marine Laboratories.

Management Support Products

- Biological and ecological characterization of deep coral and sponge communities
- Deep coral and sponge distribution and abundance data for GIS layers

Planned Use of Products and Actions

- Monitoring data will refine management of the Olympic-2 management area and be used to assess the need for additional resource protection plans
- Increase understanding of deep corals and sponges ecological processes to refine ecosystem-based management decisions with NOAA Fisheries, Pacific Fishery Management Council, Intergovernmental Policy Council and OCNMS.
- Use data to assess the impacts of climate change
- Develop education programs and displays for the current renovation of the Olympic Coast Discovery Center and for public outreach



Boundaries of the Olympic 2 Conservation Area with locations of known coral and sponge fields in Olympic Coast National Marine Sanctuary. Map credit: OCNMS

Program References

OCNMS Management Plan

- Priority Topics C & E
- http://olympiccoast.noaa.gov/protection/mpr/mpr_prioritytopics.html

OCNMS Condition Report

- Questions 5, 6, 8,9, 10, 12, 13, 14

ONMS Performance Measures

- By 2015, 100% of the sanctuary system is adequately characterized.
- Number of sites in which select living marine resources, based on long term monitoring data, are being maintained or improved.

Other Documents

- OCNMS Science Framework, 2003 (<http://olympiccoast.noaa.gov/research/interested/welcome.html>)

Current as of 9/16/2014

For More Information -- <http://www.sanctuaries.noaa.gov/science/assessment>