Papahānaumokuākea Marine National Monument

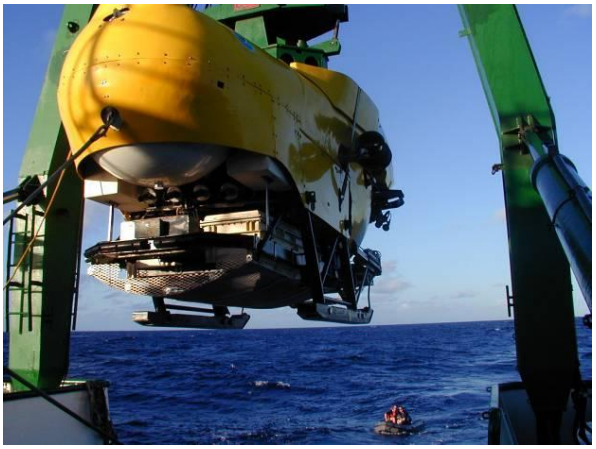
Deep-Water Research

Management Issue

The vast majority of the Papahānaumokuākea Marine National Monument (PMNM or Monument) encompasses habitats beyond depths accessible through conventional SCUBA diving (>130 feet). Relatively little is known about such deep-water habitats or the organisms that inhabit them, despite the large area of the Monument that they represent. More information is necessary to establish baselines on the deep-water resources of the Monument in order to effectively manage and protect them.

Description

The Census of Marine Life (2006) and annual Northwestern Hawaiian Islands (NWHI) Reef Assessment and Monitoring Program expeditions (2000-present) have revealed many previously unreported and undescribed species of reef invertebrates and corals in the NWHI. This work was conducted entirely within shallow areas of the Monument. While these areas have now been relatively well-explored, they still have not been sufficiently surveyed. It is therefore certain that explorations in deep-water habitats, where relatively little work has been undertaken to date, will reveal numerous new discoveries.



Advances in technology, such as this manned submersible, allow for the exploration of the deep coral reefs. Recent expeditions have found many new species, indicating that we are just beginning to understand this vast unexplored habitat. Photo credit PMNM

For instance, deep-water submersible dives in PMNM in 2003, found eight new species of bamboo corals in six new genera, six new species of sponges in one new genus, four new species of black corals, three new species of stylasterid corals and one new species of zoanthid. Similarly, the first research expedition to implement technical SCUBA diving surveys in PMNM in 2009 revealed 17 new records of reef fish for the NWHI and resulted in the collection of one undescribed species. Clearly additional explorations and analyses are needed to adequately characterize and document these deep-water habitats.

Questions and Information Needs

1) What are the different deep-water habitat types in the Monument?
2) What is the range and extent of those deep-water habitat types?
3) Do human activities or climate change impact deep-water habitats?
4) Which deep-water habitat types are most critical to protect?
5) How do protected species utilize deep-water habitats?

Scientific Approach and Actions

- Conduct workshops to determine data availability, methodologies, and select sites for additional research
- Develop deep-water habitat classification schemes for the Monument
- Collect bathymetric data (including backscatter) for all deep-water habitats within the Monument
- Ground truth bathymetric data
- Analyze human use information relative to deep-water habitat to determine if any management actions are necessary to protect resources
- Conduct assessments of biodiversity and connectivity in deep-water areas of the Monument

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Potential Key Partners and Information Sources

Hawai'i Institute of Marine Biology; Hawai'i Undersea Research Lab; School of Ocean and Earth Science Technology; NOAA Office of Ocean Exploration; NOAA/NMFS/PIFSC; State of Hawaii, DLNR; Schmidt Ocean Institute; National Museum of Natural History; Bernice P. Bishop Museum.

Management Support Products

- Develop habitat map from ground-truthed bathymetric data
- Develop GIS analysis tool that can be used to determine if further protection may be warranted
- Develop species lists for deep-water habitats

Deep water primnoids, found in the Northwestern Hawaiian Islands. Photo credit: Amy Baco

Planned Use of Products and Actions

- Utilize information collected on deep-water habitats to develop education and outreach products that inform the public of the marine resources of these areas
- Utilize habitat maps to inform monk seal foraging efforts, areas of high biodiversity and areas for future research

Program References

PMNM Management Plan

- Action Plan 3.1.1 Conservation Science
  - Strategy MCS-1: Continue and expand research, characterization and monitoring of marine ecosystems for the life of the plan

- *Other Action Plans:*
  - 3.2.1 - Threatened and Endangered Species
  - 3.2.2 - Migratory Birds
  - 3.3.2 - Alien Species
  - 3.5.1 - Agency Coordination
  - 3.6.2 - Information Management
  - 3.6.3 - Coordinated Field Operations

PMNM Condition Report

- Sea habitats are still largely unexplored: Question 9.

Other Documents

- Monument Goals 1, 2, 3, 4 and 5