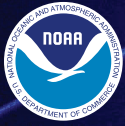


# Deep-Sea Symphony: Exploring the Musicians Seamounts

NOAA Ship *Okeanos Explorer*

August 8 - 31, 2017

September 6 - 30, 2017



Ocean Exploration  
and Research

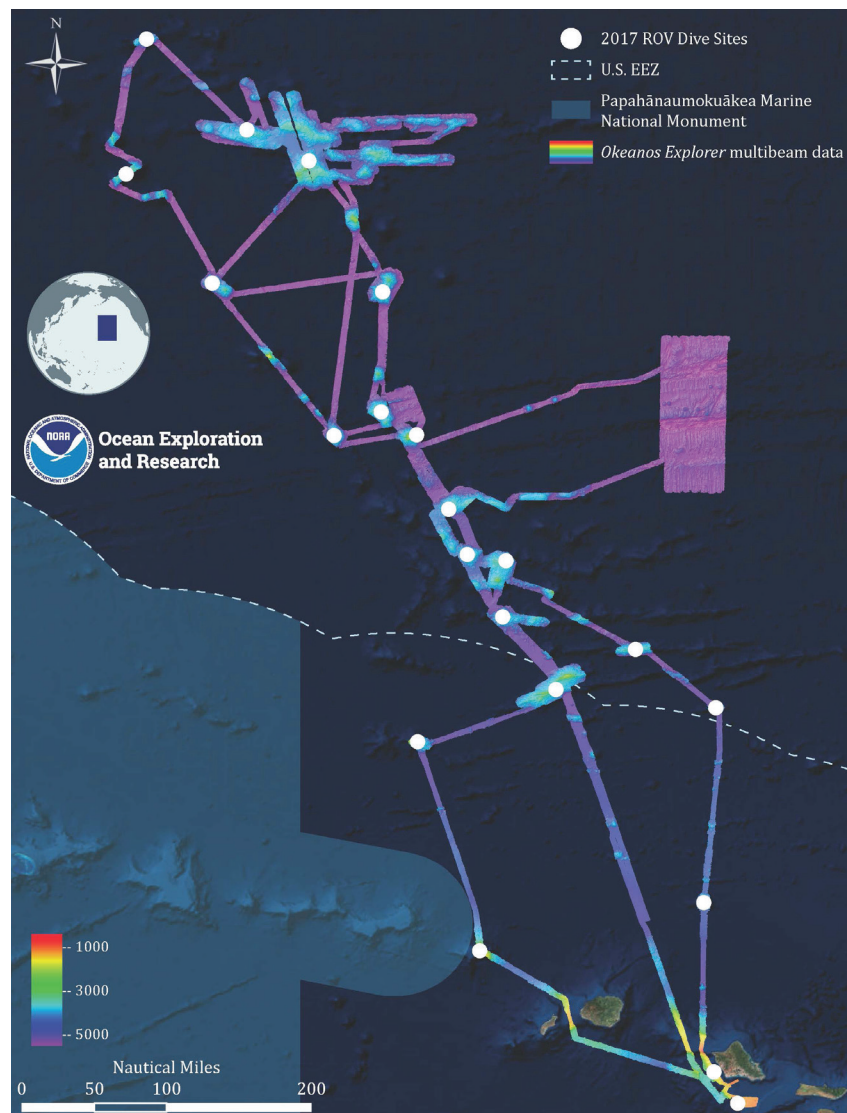
This expedition is part of the three-year Campaign to Address Pacific monument Science, Technology, and Ocean NEeds (CAPSTONE), an initiative to collect deepwater baseline information to support science and management decisions in and around U.S. marine protected areas in the central and western Pacific.

## Summary Accomplishments

The Deep-Sea Symphony: Exploring the Musicians Seamounts expedition was a 49-day telepresence-enabled, two-part expedition, to collect critical baseline information about unknown and poorly known deepwater areas of the Musicians Seamounts that lie just outside the U.S. EEZ. The goal of the expedition was to use remotely operated vehicle (ROV) dives and seafloor mapping operations to increase the understanding of the deep-sea ecosystems in these areas to support management decisions. Major accomplishments from this expedition are summarized below.

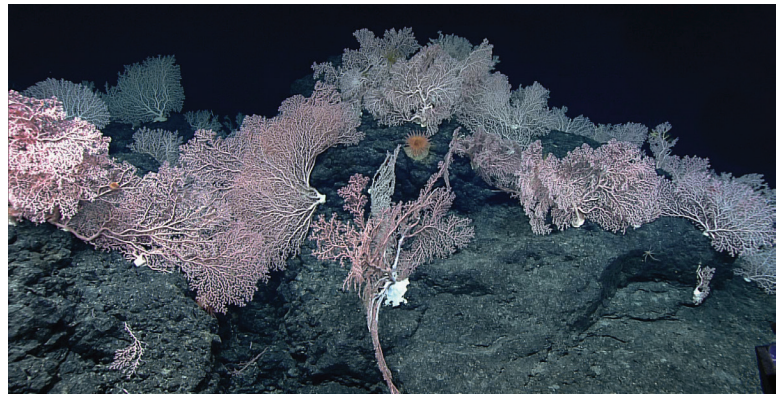
**Conducted 22 ROV dives** ranging in depth from 290 to 3,854 meters (951 to 12,644 feet) to learn more about remote areas of the Musicians Seamounts. Operations focused on characterizing the morphology and geologic history of seafloor features and surveying midwater and benthic habitats including ridges, bottomfish and precious coral habitats, and the site of the USS *Baltimore*. Highlights from the dives include:

- Documented 18 high-density deep-sea coral and sponge communities, the highest number observed during CAPSTONE, raising interesting questions for future studies.
- Documented the presence of precious corals for the first time in the Musicians Seamounts as well as an aggregation of old gold coral at Middle Bank, a site on the boundary of Papahānaumokuākea Marine National Monument.

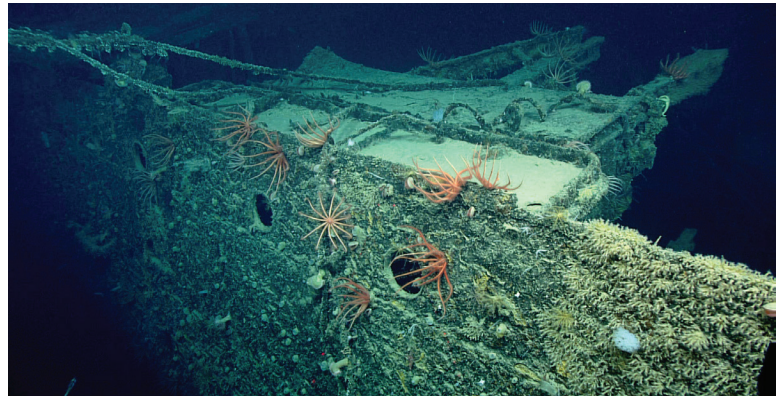


Overview map showing seafloor bathymetry and ROV dives completed during the *Deep-Sea Symphony: Exploring the Musicians Seamounts* expedition. Map courtesy of the NOAA Office of Ocean Exploration and Research.

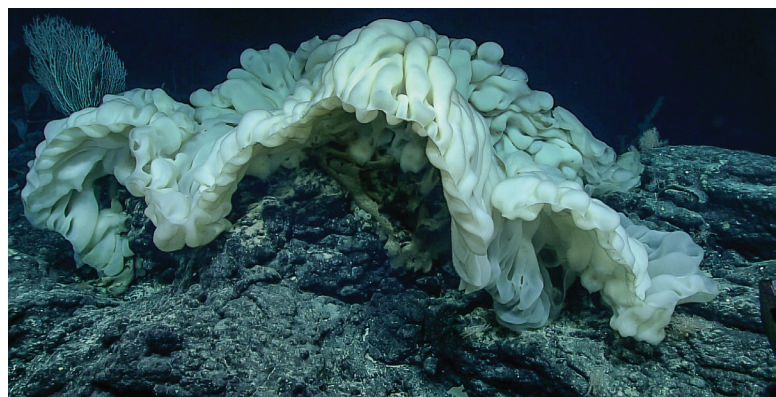
- Collected 142 biological specimens with many likely being new or undescribed species.
- Conducted a successful “Midwater Week” with unprecedented exploration of the water column, including four dives with midwater transects, to help characterize sites from the seafloor to the surface.
- The final two ROV dives of this expedition aimed to locate and better understand WWII maritime heritage sites. Archaeology highlights included:
  - Investigated seven sonar anomalies at “Caiman” site in search of a lost Japanese submarine. Though no submarine was found, data collected will help refine prospecting techniques and confirmed that these targets were not maritime heritage sites.
  - Characterized the USS *Baltimore* by thoroughly documenting the wreck, inspecting the vessel degradation, and documenting the associated biological organisms.
- Significant expedition dive observations included:
  - Third known observation of a large, yet undescribed, glass sponge (same species observed during the [2015 Hohonu Moana: Exploring Deep Waters off Hawai'i expedition](#)) at Schuman Seamount, that is only known to exist in the Northwestern Hawaiian Islands. This observation in the Musicians Seamounts suggests connectivity between the two regions, an important objective of this cruise.
  - Rare observation of a fangtooth fish (*Anoplogaster* sp.).
  - Several potential new species and novel observations of water column fauna.
  - A new species of ctenophore of a currently undescribed family.



A dense pink coral garden was found at nearly 1,800 meters (5,905 feet) on Mendellsohn Seamount. Many of the colonies were exceptionally large. *Image courtesy of the NOAA Office of Ocean Exploration and Research, Deep-Sea Symphony: Exploring the Musicians Seamounts.*



ROV *Deep Discoverer* (D2) exploring the USS *Baltimore*. *Image courtesy of the NOAA Office of Ocean Exploration and Research, Deep-Sea Symphony: Exploring the Musicians Seamounts.*



This large rippled sponge, approximately four meters (13.1 feet) in length, and may be in the hexactinellid family *Rossellidae* and subfamily *Lanuginellinae*. The sponge was found at 2,150 meters (7,054 feet). *Image courtesy of the NOAA Office of Ocean Exploration and Research, Deep-Sea Symphony: Exploring the Musicians Seamounts.*

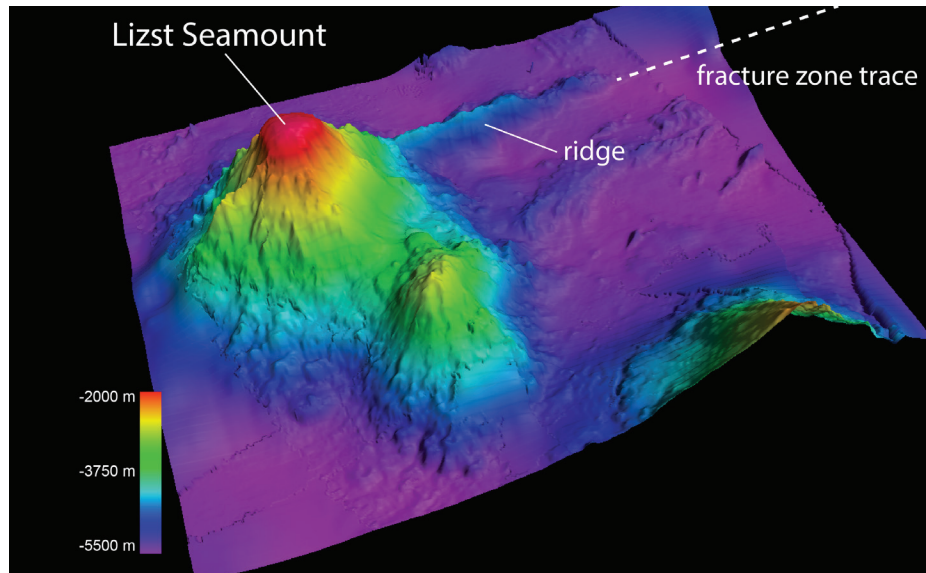
### **Mapped more than 88,600 square kilometers of seafloor during the two-part expedition.**

- Mapped over 50 seamounts and ridges (many for the first time), mapped the Murray Fracture Zone, defined a ridge feature adjacent to Liszt seamount as part of the fracture zone, and used high resolution multibeam bathymetry to reveal flat-top guyots in areas where satellite altimetry predicted conical seamounts.
- Multibeam data also revealed potential secondary volcanism on several features.

**Investigated a variety of different geological features** including seamounts and ridges.

Highlights include:

- Collected 31 rock samples for use in geochemical composition analysis and age-dating to increase the understanding of the formation of these features and hopefully provide insight into interactions of the hotspot and the Murray Fracture Zone.
- ROV dives at Mozart and Liszt Seamounts, as well as mapping of the Murray Fracture Zone, provided valuable data about the seafloor geomorphology that will help scientists understand the interaction of hotspot volcanism and fracture zones in areas where they are co-located.



Liszt Seamount sits astride one of the fractures in the Murray Fracture Zone (MFZ). A small ridge is observed extending along the trace of the MFZ, suggesting a relationship between the location of the MFZ and where melts are able to penetrate the lithosphere and erupt on the seafloor. *Figure courtesy of Thomas Morrow.*

**Collected more than 15 TB of data**, including multibeam, single beam, subbottom, ADCP, XBT, CTD and dissolved oxygen profiles, surface oceanographic and meteorological sensors, video, imagery, and associated dive and video products. All of the data from this expedition will be made publically available through national archives.

**Engaged with audiences around the world**, opening a window to the deep-sea in some of the planet's most remote locations.

- Shared the live video feeds of the expedition with the public worldwide via the Internet, receiving more than 387,000 views. Expedition content on the NOAA Office of Ocean Exploration and Research website received over 35,000 views.
- 95 scientists from the United States, Japan, Russia, New Zealand, and Canada participated as members of the science team through telepresence.
- Conducted the first shore-based Facebook Live event during “Midwater Week”—focused on answering questions about this largely unknown biome—with over 4,000 views.
- Received news and media coverage from various media sources including the Daily Mail as well as others.
- Conducted 16 live telepresence interactions with various groups engaging over 550 individuals including science and technical conferences, visitors at a science museum in Louisiana, partner agencies, and students at Exploration Command Centers (ECCs).
- Received active participation from five ECCs located in NOAA Headquarters; Harbor Branch Oceanographic Institute; University of Hawaii; Daniel K. Inouye Regional Center; and Pacific Marine Environmental Lab; which provided collaborative work environments for scientists to fully immerse in the expedition.
- At the conclusion of this expedition, the CAPSTONE team participated in the Ocean Exploration Celebration, a public event co-hosted by NOAA, the Schmidt Ocean Institute, and the University of Hawaii. Over 600 members of the public participated in tours of the NOAA Ship *Okeanos Explorer* and the R/V *Falkor*.

**For More Information**

<http://oceanexplorer.noaa.gov/okeanos/explorations/ex1708/welcome.html>



**Ocean Exploration and Research**