

HAWAII MAPPING (NA157)

NOVEMBER 7 – 17, 2023

Geographic Focus: Geologists Seamounts, south of the Main Hawaiian Islands

Main Operations: Seafloor mapping and deployments of *Deep Autonomous Profiler (DAP) Lander*

Sponsor: NOAA and BOEM via the [Ocean Exploration Cooperative Institute](https://www.oeci.org/)

Expedition webpage: www.nautiluslive.org/cruise/NA157



- 10** days at sea
- 5,911** km² of seafloor mapped
- 7** *DAP Lander* deployments
- 166** samples collected
- 76** hours of seabird observations
- 4** students or recently alumni sailed
- 55** live ship-to-shore interactions
- 2,176** ship-to-shore participants
- 2,100** highlight video views
- 18,900** live video views
- 413,000** social media views

OVERVIEW

On November 7-17, 2023, E/V *Nautilus* conducted a telepresence-enabled expedition to map and characterize offshore environments south of the Main Hawaiian Islands. During 10 days at sea, the expedition used the deep-water [mapping capabilities of E/V *Nautilus*](#) alongside the [Deep Autonomous Profiler Lander](#) to survey unmapped or poorly mapped seafloor southwest of Hawai'i. The expedition was an interagency collaboration between the National Oceanic and Atmospheric Administration (NOAA), Bureau of Ocean Energy Management (BOEM) and US Geological Survey (USGS) that leveraged the technologies of the Ocean Exploration Cooperative Institute to address priorities of these individual agencies and the [US National Strategy for Ocean Mapping, Exploration and Characterization](#). A total of 26 scientists, engineers and educators representing 11 different institutions sailed on the expedition, including representatives from the three federal government agencies.

MAPPING SUMMARY

The original goal of the expedition was to fill seafloor mapping gaps located near the edge of the US Exclusive Economic Zone south of Hawai'i. However, severe weather conditions did not allow for operations to occur in this area. As a result, the expedition shifted its focus to areas around the Geologists Seamounts, where 5,911 square kilometers of seafloor were mapped over the course of the expedition. Mapping focused on filling gaps in bathymetry and backscatter data mostly at abyssal depths inside the Geologist Seamounts basin, as well as around Perret, Cook, Jaggar and Indianapolis Seamounts.

DEEP AUTONOMOUS PROFILER SUMMARY

The expedition included seven [deployments of the Deep Autonomous Profiler Lander](#) down to depths of 4,600 meters for a combined time of over 23 hours. Continuous video, CTD environmental and passive acoustic data was collected on the seafloor and throughout the water column during each deployment, in addition to a total of 166 water samples for the study of eDNA, nutrients and particulate organic matter.

WATER SAMPLING SUMMARY

Water collected during deployments of the *Deep Autonomous Profiler Lander* was filtered onboard E/V *Nautilus*, which resulted in a total of 166 eDNA, 140 nutrient and 14 particulate organic samples. Samples were collected at depths ranging from 1 to 4,600 meters, thereby providing a complete cross-section of the largely understudied water column environment.

SEABIRD SURVEY SUMMARY

In addition to surveying deep ocean environments, the expedition included topside surveys of seabird diversity and abundance, a first for E/V *Nautilus* operations. Seabird observations were conducted over a total time of 76 hours, during which 946 birds in 22 species were documented. These offshore observations will be added to a growing seabird database for the region, and thereby help improve our understanding on the distribution and behavior of seabirds.

EDUCATION & OUTREACH

Highlight videos from the expedition were viewed 2,100 times and live video feeds garnered another 18,900 views. Expedition content posted on OET's [TikTok](#), [Instagram](#), [Twitter](#), [Facebook](#) and [LinkedIn](#) social media accounts reached over 413,000 impressions. While at sea, the team created five new [education and outreach products](#) and hosted 55 [live ship-to-shore interactions](#) with schools, community events and professional meetings, reaching over 2,100 people in 19 US states, Guam and American Samoa. Three [Seafloor Mapping Interns](#) and one [Science Communication Fellow](#) also sailed on the expedition, gaining valuable at-sea experience.



BROADER IMPACTS

Expedition activities were conducted in unexplored areas, thus contributing directly to priorities of the [US National Strategy for Ocean Mapping, Exploration, and Characterization](#) and [Seabed 2030](#). The use of the *Deep Autonomous Profiler Lander* helped measure essential exploration variables not routinely measured from ships (i.e., seafloor imagery, sound, eDNA), as well as NOAA, BOEM and USGS priorities related to characterizing ocean biodiversity and water chemistry. In addition to providing critical baseline information in unexplored areas, this expedition also successfully demonstrated inter-institutional collaboration, with the mission being co-funded by NOAA Ocean Exploration and BOEM, with additional support from USGS. The expedition also included the at-sea participation of students and educators, thereby expanding opportunities for the next generation of ocean explorers, scientists and stewards. Finally, the data collected on this mission is an essential precursor to future explorations throughout the region, which will undoubtedly lead to many discoveries.

DATA ACCESS

Data collected on this expedition will be sent to repositories for archiving and public distribution. Links to these data repositories are provided here. These data sets are also available from OET [upon request](#).

ARCHIVE	DATA TYPES
NautilusLive.org	Background information, highlight imagery and education materials
Rolling Deck to Repository	Ship navigation, weather and mapping data
Marine Geoscience Data System	Mapping data & DAP Lander CTD data
National Centers of Environmental Information	DAP Lander video data
Open Portal to Underwater Soundscapes	DAP Lander passive acoustic data
National Center for Biotechnology Information Sequence Read Archive	eDNA genetic sequences

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