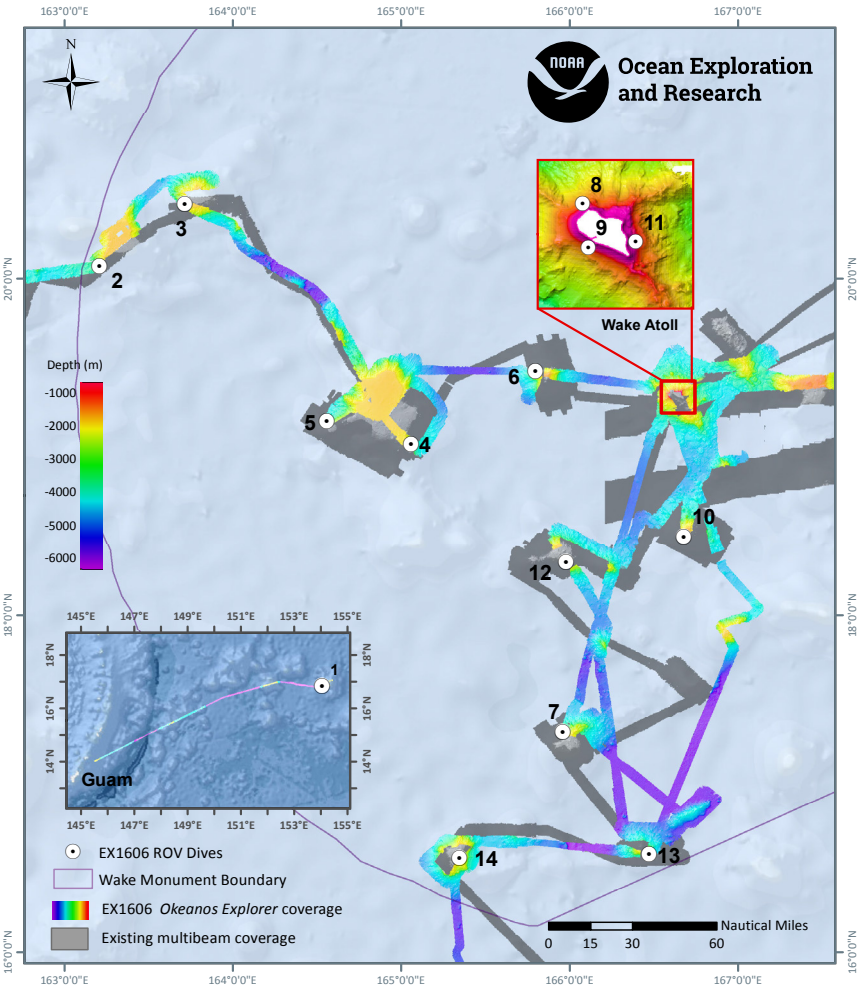
Deepwater Wonders of Wake: Exploring the Pacific Remote Islands Marine National Monument

NOAA Ship *Okeanos Explorer*, July 27 – August 19, 2016

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 24-day Deepwater Wonders of Wake: Exploring the Pacific Remote Islands Marine National Monument expedition addressed science themes, priority areas, and exploration targets put forward by scientists and managers across the broad ocean science community. Throughout the expedition, scientists conducted 24-hour operations consisting of remotely operated vehicle (ROV) dives and mapping. Expedition priorities included a combination of science, education, outreach, and open data objectives that will support management decisions at multiple levels. Major accomplishments from the expedition are summarized below.



Overview map showing seafloor bathymetry collected and ROV dives conducted during the Deepwater Wonders of Wake expedition.

Conducted 14 ROV dives, ranging from 350 to 3,140 meters depth, to survey the diversity and distribution of bottom fish habitats and deep-sea and precious coral communities; characterize manganese-encrusted habitats on seamounts; and collect rock samples that could potentially change our understanding of the geologic history of the region as well as the tectonics of the Pacific Plate around 100 million years ago.

- Conducted the first-ever deep submergence dives in the Wake Atoll Unit of the Monument. Prior to this expedition, only a small number of rock dredges had been conducted in the deep waters inside the Wake Atoll Unit of the Monument, and there had been no systematic exploration below SCUBA diving depths. Thus, this expedition represented exploration in its truest form, as scientists and members of the public from around the world tuned in to visit some of the least-explored parts of the planet for the first time in history.
- Discovered high-density biological communities at four dive sites. Knowledge about the conditions favorable for these communities will help researchers and managers predict other areas that are most likely to host similar communities and take steps to protect them.

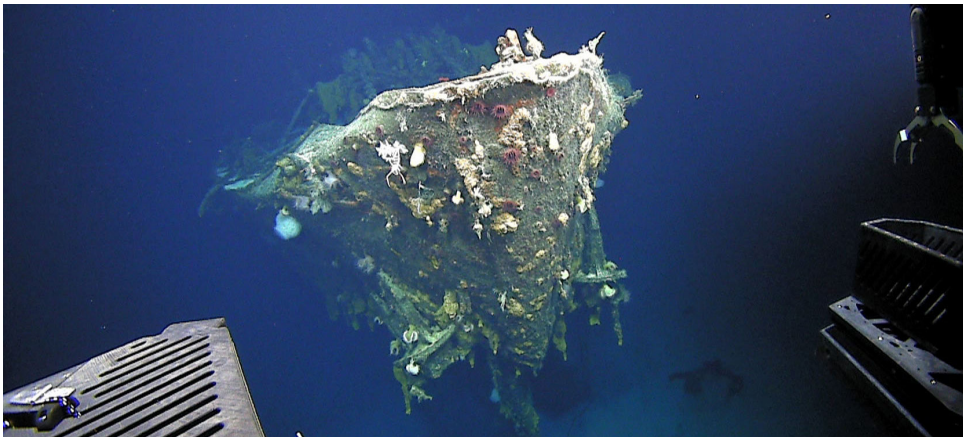
- Collected a total of 61 specimens. This includes 41 biological samples that all likely represent either new species or new records for the region and 20 geological samples that will be analyzed to determine age and geochemical composition, leading to a greater understanding of the area's geologic history.
- Observed hundreds of different species of animals. Preliminary identification indicates that more than 300 different taxa were imaged during video surveys.
- Located and identified the wreck of the *Amakasu Maru No. 1*, a Japanese water tanker that was sunk by a U.S. submarine in 1942. The target for this shipwreck was identified from data collected during an earlier *Okeanos Explorer* mapping expedition and was hypothesized to be the Japanese Imperial Naval Destroyer, *Hayate*, which was sunk during the World War II Battle of Wake Island.

More than two dozen ophiacanthid brittle stars cling to the branches of a primnoid octocoral colony on "Lafayette Guyot." These brittle stars are thought to be suspension feeding—grabbing their food from the water column rather than feeding directly on the coral.

An urchin climbs up the dead skeleton of a bamboo coral.

Expanded mapping coverage by more than 36,000 square kilometers along the ship's transit line and within the Pacific Remote Islands Marine National Monument.

- Completed mapping of seamounts that were dive targets during the expedition. Altogether, high-resolution bathymetric data from the expedition revealed the flat-topped morphology of 13 seamounts for the first time ever, as well as their detailed rift zones, submarine landslide scars, and post-erosional volcanic cones.



ROV *Deep Discoverer* comes upon the bow of the *Amakasu Maru No.1*.

Engaged a broad spectrum of the scientific community and public in telepresence-based exploration.

- Had participation from more than 30 scientists and students on a regular basis during the expedition, including participants from the United States, Japan, and Russia.
- Broadcast live video of dives over the Internet, garnering more than 479,000 views. Additionally, the live video was continuously streamed throughout the expedition at the Maui Ocean Center and the Waikiki Aquarium.
- Worked in partnership with the National Park Service to establish a live viewing station at the USS *Arizona* Memorial in Hawaii, to allow guests to watch live as scientists searched for the Japanese Destroyer *Hayate*.
- Conducted live interactions with the Exploratorium, Inner Space Center, and the University of Connecticut, directly reaching more than 100 students educators and members of the general public.

For More Information
http://oceanexplorer.noaa.gov/okeanos/explorations/ex1606/welcome.html