



PAPAHĀNAUMOKUĀKEA Marine National Monument

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Expedition's New Discoveries Tie Northwestern Hawaiian Islands to Johnston Atoll

(Honolulu, HI) Members of a research expedition to Papahānaumokuākea Marine National Monument returned last week after 26 days of conducting research dives on deep coral reefs below 200 feet in the Northwestern Hawaiian Islands (NWHI) and Johnston Atoll. The primary mission of the expedition was to collect marine specimens for characterization of biological diversity and connectivity to better inform management of these special places.

Researchers returned with specimens of new species of deep-water algae from the NWHI, and the first recorded specimens of black coral from Johnston Atoll. In addition, researchers logged observations and photographs of over 20 species of fishes never before recorded from the NWHI, and 15 species of fishes never before recorded at Johnston Atoll.

"This represents a significant increase in the known biodiversity of Hawaiian coral reefs, and provides insights into how Johnston Atoll contributes to the diversity of our reefs in Hawai'i," said Randall Kosaki, NOAA's Deputy Superintendent of Papahānaumokuākea Marine National Monument and Chief Scientist of the expedition. "It also underscores how poorly explored the deeper portions of coral reefs are, and how much remains to be discovered. This documentation of diversity is timely and critical, because climate change threatens much of this diversity before we even know it exists."

The team visited Nihoa, Mokumanamana, French Frigate Shoals and Laysan Island in Papahānaumokuākea Marine National Monument, and then Johnston Atoll National Wildlife Refuge in the Pacific Remote Islands Marine National Monument, approximately 860 miles (1,390 km) west of Honolulu. Johnston is regarded as a key "stepping stone" for a number of central and south Pacific marine species to colonize the NWHI. For example, table coral (*Acropora cytherea*) is common throughout the tropical Pacific and at Johnston, but in Hawai'i its distribution is limited to French Frigate Shoals and neighboring atolls. French Frigate shoals is the closest point in the Hawaiian Archipelago to Johnston, which is only 500 miles to the southwest.

Scientists collected samples of fish, corals, other invertebrates and algae for population genetics analysis; surveyed deep coral reefs and associated reef fish communities; searched for invasive alien species of coral and algae; and conducted archaeological surveys of the *Howland*, a late 1800s whaling ship that wrecked at Johnston Atoll.

This expedition marked NOAA's first full deployment of closed-circuit rebreathers on a research cruise. Rebreathers recycle the gases that divers breathe, removing carbon dioxide and actively managing oxygen levels. Using rebreathers, scientists explored mesophotic coral ecosystems – deep coral reefs at depths between 150 and 300 feet. The use of this technology enabled scientists to conduct technical dives to access and characterize previously unexplored depths within the Monument - and beyond - more safely and efficiently.





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Scientists from the Hawai'i Institute of Marine Biology (HIMB) also conducted surveys of coral disease on the research cruise. Coral disease has decimated reefs in Florida and the Caribbean, and is thought to be exacerbated by climate change and increasing sea surface temperatures.

“The NWHI and Johnston Atoll exhibited low levels of coral disease, and represent healthy coral reef ecosystems,” said John Burns, a coral researcher at HIMB. “This is an important baseline to have as we enter an era of accelerated climate change.”

The scientific team included researchers from NOAA's Office of National Marine Sanctuaries' Papahānaumokuākea Marine National Monument and Gray's Reef National Marine Sanctuary, the University of Hawai'i, the Hawai'i Institute of Marine Biology, and the Bernice P. Bishop Museum.

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Papahānaumokuākea is cooperatively managed to ensure ecological integrity and achieve strong, long-term protection and perpetuation of Northwestern Hawaiian Island ecosystems, Native Hawaiian culture, and heritage resources for current and future generations. Three co-trustees - the Department of Commerce, Department of the Interior, and State of Hawai'i - joined by the Office of Hawaiian Affairs, protect this special place. Papahānaumokuākea Marine National Monument was inscribed as the first mixed (natural and cultural) UNESCO World Heritage Site in the United States in July 2010. For more information, please visit www.papahanaumokuakea.gov.

Johnston Atoll National Wildlife Refuge is part of the Pacific Remote Islands Marine National Monument. For more information, visit www.fws.gov/johnstonisland.

