2016 NOAA Ship *Nancy Foster* Research Expedition

Photo: NOAA

NOAA Ship *Nancy Foster* is equipped with scientific equipment used on research expeditions.

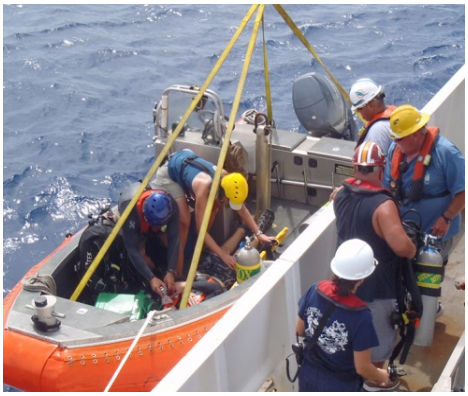

Photo: NOAA

A small boat is launched from the ship to aid with on the water operations.

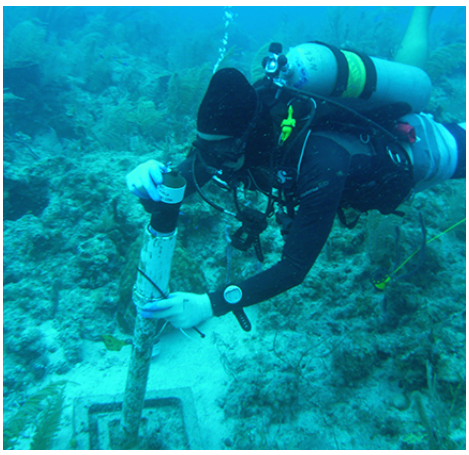

Photo: NOAA

Scientists check acoustic instrumentation that tracks fish movements across the seascape.

Project Overview

From August 10 to 22, a NOAA-led research team will conduct SCUBA operations and undertake a variety of research missions to collect information necessary to inform management decisions within the Florida Key's National Marine Sanctuary. The research cruise operational area is the Marquesas and Tortugas region of the sanctuary. Scientists will conduct habitat mapping and collect imagery to validate habitat maps; tag fish with acoustic transmitters to understand their movement patterns; service instruments deployed in the sanctuary to listen to fish tagged with acoustic transmitters; and deploy drop cameras, stereo-cameras and a wave glider to provide visual and acoustic observations that complement direct diver observations.

Fish Tagging

Reef fish populations are being studied in the Florida Keys to better understand their movement patterns, including depth and associations of fish assemblages with various habitats and ecological features. For example, fish tagged in the Tortugas region have been observed moving between the Dry Tortugas National Park's Research Natural Area and Riley's Hump in Tortugas South Ecological Reserve.

To understand how fish species use their environment and determine patterns of use, various techniques will be used. One technique is acoustic telemetry, which is a term that describes using acoustic tags to track animal movement. With acoustic telemetry, scientists are able to better understand how fish might use specific locations over the course of several years, especially since some of these acoustic tags will last up to 5 years. Scientists will employ stereo cameras to record fish populations in waters too deep for divers' abilities. And finally, a new autonomous surface vehicle or "wave glider" will be used to enhance this research mission. Equipment on the wave glider will detect the signals of acoustically tagged fish and underwater sounds produced by fish (especially groupers).

The scientific information gained can dramatically improve how we manage our marine resources by aiding with the identification of critical habitats that support the entire lifespan of target species. Beyond these ecological interests, the results of this research have important implications for managing marine protected areas such as the Tortugas Ecological Reserve.

NOAA Ship *Nancy Foster*

NOAA Ship *Nancy Foster* is named for Dr. Nancy Foster, in tribute to her outstanding contributions in advancing NOAA's mission through her leadership across NOAA including serving as Director of the National Marine Sanctuary Program. Dr. Nancy Foster served in various leadership positions across the agency from 1977 to 2000. *Nancy Foster* supports applied research with operations including the characterization of habitats and fauna in our nation's National Marine Sanctuaries and coastal waters, bathymetric surveys, physical and chemical oceanography studies, maritime heritage surveys, and pollution assessments.

Habitat Mapping

Target areas for seafloor habitat mapping include the Marquesas and Tortugas regions. In addition to ship based mapping, drop camera surveys will be conducted over habitat features of interest or for habitat validation purposes. Data and information collected on this mission will be used to update and enhance existing habitat maps. Benthic/seafloor habitat maps help managers assess, protect, and preserve the condition of sanctuary resources, including sensitive habitats and ecosystems. Habitat maps are an essential tool for designing scientific research questions, informing management decisions, and assessing change in sanctuary resources over time.

The Florida Keys NMS encompasses nearly 2900 square nautical miles surrounding the Florida Keys island chain and the Tortugas (boundary in red). The sanctuary is adjacent to Everglades, Biscayne and Dry Tortugas National Parks

Weather Observations

NOAA's National Weather Service will participate in this research mission to both provide on-site marine weather observations and forecasts and to gain a better understanding of ship-board and research expedition needs related to weather observations. NWS meteorologists will conduct meteorological and oceanographic observations; give daily shipboard marine weather briefings to support safety of life at sea and weather sensitive decision-making pertaining to voyage planning, execution and dive operations; test communications between NWS personnel ashore and at sea; and determine areas for improvement regarding the quality, value, and presentation of NWS weather, water, and climate data, forecasts, and warnings.

Expedition Team

Participating institutions in this year's *Nancy Foster* cruise include Florida Key's National Marine Sanctuary; NOAA's National Centers for Coastal Ocean Science; NOAA's National Weather Service; Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute, and Harbor Branch Oceanographic Institute.

About Florida Key's

Florida Keys National Marine Sanctuary protects 2,900 square nautical miles of critical marine habitat, including coral reef, hard bottom, sea grass meadows, mangrove communities and sand flats, as well as shipwrecks and maritime heritage resources. The sanctuary protects these resources, which are critical to supporting the tourist and fishing based economy of the area. The ecosystem attracts tourists who enjoy diving, boating, and other forms of ocean recreation, and sustains valuable commercial and recreational fisheries. The sanctuary also helps preserve the nation's maritime history by protecting shipwrecks and other irreplaceable heritage resources. NOAA and the state of Florida manage the sanctuary.

Photo: Chris Parsons

Mutton snapper spiral upward just before spawning at Riley's Hump.

Photo: NOAA

A rock beauty peers from a deep reef crevasse.

Photo: NOAA

A blue hamlet emerges from its shelter at the reef during the 2015 research cruise.

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