Coral Reef Mapping Cruise to Study Reefs of Manu’a Islands, American Samoa

Scientists from the Coral Reef Ecosystem Division (CRED) of the NOAA Pacific Islands Fisheries Science Center and the American Samoa Department of Marine and Wildlife Resources (DMWR) are about to embark on a 13-day research cruise to map and characterize the coral reef ecosystems around the Manu’a Islands of American Samoa: Ofu, Olosega, and Ta’u.

Located 100 km east of Tutuila, the Manu’a Islands are part of the same volcanic chain as Tutuila but are geologically younger and much less populated. Ofu and Olosega are steeply sloping islands that are connected by a bridge across a shallow reef flat. Ta’u is similarly steep, and it is surrounded by a narrow shelf.

Marie Ferguson, John Rooney, and Jeremy Taylor of CRED and Tee Jay Letalie of the DMWR will travel from Tutuila on board the Pago Pago Marine Charter’s Bonavista II on Nov. 1. Then, they will conduct 11 days of surveying around the islands of Ofu, Olosega, and Ta’u, as well as at some nearby seamounts, before returning to Tutuila on Nov. 13.

A towed underwater camera sled will be used along transects around these islands to record video of the seafloor and to take still photographs. Towed-camera surveys will be conducted at depths of ~20–100 m, depths at which very little work has taken place previously. Video footage and photographs that are collected will be examined to provide information about the benthic habitats that occur around these islands; analyses, for example, will result in data on the location and extent of coral reefs, as well as on the different types of corals, fishes, and algae that live on these reefs.

The aim of this survey, funded by NOAA’s Coral Reef Conservation Program, is to increase our understanding of the benthic habitats and associated fish communities around the Manu’a Islands. These data will allow us to characterize and map the benthic habitats and associated communities of demersal fishes, providing essential baseline information that can be used to support effective management activities, such as boundary delineation and evaluation of effectiveness of marine protected areas, in American Samoa.

This work builds on previous habitat mapping and reef monitoring activities that CRED scientists have conducted in American Samoa. Information about habitat mapping undertaken by CRED in American Samoa is presented in this handout.
Habitat Mapping in American Samoa

Since 2002, CRED has conducted six biennial surveys, monitoring multiple components of coral reef ecosystems, in American Samoa as part of the Pacific Reef Assessment and Monitoring Program. To give context to this monitoring, and to provide information about deeper areas that cannot be surveyed by CRED dive teams, CRED since 2004 also has conducted habitat mapping around the islands of American Samoa.

A number of different techniques have been used to conduct mapping in American Samoa. Multibeam mapping uses acoustic techniques (sound waves) to map seafloor bathymetry (depth), providing information about the topography, complexity, and substrate (hard versus soft) of the seafloor. CRED conducted multibeam mapping around Tutuila and the Manu’a Islands in 2004 and 2006, work that resulted in almost complete coverage of bathymetry data around these islands. The offshore banks Tulaga Seamount and Northeast Bank (Muli Seamount) have been partially mapped. Mapping of Vailulu’u Seamount in 2006, east of Ta’u, showed significant growth of this volcanic crater when compared to results from multipartner mapping expeditions conducted in 2005. Where it is too shallow to safely carry out multibeam mapping from ships or small boats, satellite images have been used to derive depths to fill in gaps in the multibeam bathymetry and complete coverage in maps of important shallow areas.

Bathymetry map of (top left) Ofu and Olosega and (top right) Ta’u. Bathymetry map of (left) Tutuila. Inset shows 3D visualization of Tutuila’s southeastern shore, with a mountain to seafloor view (from left to right) of Fagatele Bay, Larsons Bay, and Coconut Point.
To interpret and validate the multibeam data that it has collected and to find out more about the types of benthic and fish communities that live upon the seafloor, CRED carries out optical surveys with towed underwater camera sleds.

In 2002, 2004, and 2008, CRED conducted surveys with a towed underwater camera sled around Tutuila, Ofu, Olosega, and Ta'u. Camera sleds recorded both video and still photographs along transects around these islands. Analyses of video collected during the nearly 90 tows conducted around Tutuila during these three years show the coral reef ecosystems that occur at depths (30–90 m depth) deeper than those at which CRED typically conducts visual diver surveys. These deeper coral reefs, called “mesophotic reefs,” are rare and important habitats, and they include corals and other species that specialize in the low-light conditions of these depths.
Mesophotic coral reefs around Tutuila at depths of ~70 m, as seen in video footage collected by a towed underwater camera sled in 2008.

In November 2012, scientists from CRED and the American Samoa Department of Marine and Wildlife Resources will conduct a survey around Ofu, Olosega, and Ta’u with the aim of collecting an intensity of video tracks similar to the extent of survey coverage previously achieved around Tutuila. During an 11-day operation, a towed underwater camera sled will be used to record video and take still photographs of the seafloor along transects around these islands. Camera tows will be conducted at depths of ~20–100 m, depths at which very little work has taken place previously. The collected video footage and still imagery will be analyzed to increase understanding of the benthic habitats and associated fish communities that are present. This work, funded by NOAA’s Coral Reef Conservation Program, will provide essential baseline information for effective management of coral reef and fisheries resources around American Samoa.

For more information:

Coral Reef Conservation Program: http://coralreef.noaa.gov
NOAA Pacific Islands Fisheries Science Center: http://www.pifsc.noaa.gov
Pacific Islands Benthic Habitat Mapping Center: http://www.soest.hawaii.edu/pibhmc/
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