

## OLYMPIC COAST NATIONAL MARINE SANCTUARY

# Summary of 2016 Accomplishments for Research Vessels *Tatoosh* and *OC-2*



Photo: NOAA OCNMS

R/V *Tatoosh* is a 38ft Munson aluminum boat with jet propulsion and diesel engines, cruising speed 20 knots; shown here departing Port Angeles Boat Haven .



Photo: NOAA OCNMS

R/V *OC-2* is a 22ft Zodiac Hurricane RHIB shown here approaching the boat ramp at Quileute Marina in La Push, WA.

## Introduction

Research vessels *Tatoosh* and *OC-2* are tasked with conducting research, observation, education and outreach missions off the rugged Washington coast in Olympic Coast National Marine Sanctuary (OCNMS). In 2016, R/V *Tatoosh* successfully completed her 21st consecutive year of service to OCNMS. The port engine failed towards the end of the season and was replaced with a remanufactured one, increasing confidence and reliability going forward. The vessel's safety equipment is in excellent condition, essential for remote operations in harsh environments. R/V *OC-2* is in very good condition for its age and is utilized for nearshore monitoring, staff training, and day projects where trailering and local deployment are convenient. This year it was utilized on a near shore kelp bed monitoring project.

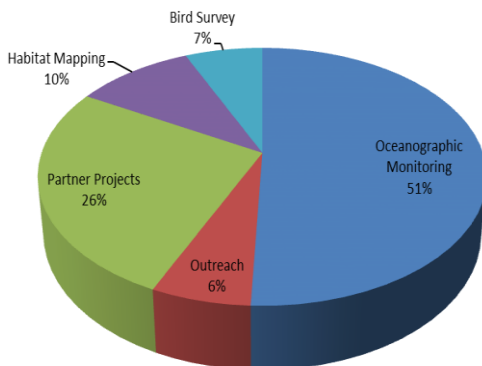
## Oceanographic Moorings

In 2016 OCNMS completed the 16<sup>th</sup> year of its nearshore monitoring program; deploying, maintaining, and recovering moorings at ten sites along the coast

between May and October. The monitoring program measures dissolved oxygen, temperature, conductivity, turbidity, and currents. These parameters can be used to assess and model climate change, larval dispersal, hypoxia, productivity, and harmful algal blooms throughout the sanctuary.

Moorings were positioned on five transects along the 135 mile sanctuary coastline in water depths ranging from 15 to 42 meters. For the winter, a 42 meter mooring was deployed off Teahwhit Head with TidbiT temperature loggers and will be recovered when our regular TH42 mooring is deployed in the spring. The OCNMS winter mooring will serve as a complement to the winter version of UW APL 's ChaBa buoy. OCNMS winter mooring will provide a unique winter dataset for temperature throughout the water column during the winter months. OCNMS also collaborated with the Quileute Tribe's Department of Natural Resources to complete the 2016 mooring program; the tribe contributed the time of Biological Field Technician Rio Foster, Harvest Management Biologist Joshua Etherton, and Marine Biologist Jennifer Hagen to assist as vessel crew and members of the science team.

## 2016 R/V *Tatoosh* Projects



## Summary

- Support area: 3,310 square miles
- Days at sea: 35
- Project hours: 130
- Approximate cost per day: \$1,311
- Fuel: 3,072 gallons diesel
- Total Distance Run: 1,820 Nautical Miles
- Research: long-term monitoring projects maintained and innovative partnerships with other research organizations formed

## Vessel Acquisition

OCNMS research vessels, particularly R/V *Tatoosh*, have served the sanctuary for much longer than their forecasted service life. In the *ONMS Small Boat Requirements Study* published in 2006, R/V *Tatoosh* was scheduled for replacement in 2008 and R/V OC-2 in 2012.

Rigorous preventative maintenance and substantial capital investments have kept the vessels operational with some interruptions to field work. R/V *Tatoosh* is nearing the end of its useful life. Unavoidable wear on the hull and power plant reduce the vessels reliability and have resulted in costly repairs and loss of operating sea days.

Replacement efforts for R/V *Tatoosh* have been highly prioritized, and designs for a replacement vessel are underway. A larger, more stable vessel will not only expand the potential for OCNMS operations but also make it a more viable asset for our partners.

## Habitat Mapping

OCNMS began seafloor mapping from the RV *Tatoosh* in 2010. Since then, it has been a long process to switch from loaner equipment to getting the boat outfitted with its own equipment. 2015 was a productive year for habitat mapping. Unfortunately, during preparation for the 2016 field season, it was discovered that the boat's multibeam sonar head was delaminating. A replacement sonar has been acquired, but the mounting system needs to be altered during the winter repair period in order to begin using the new equipment.

## Harmful Algal Bloom

The Olympic Region Harmful Algal Blooms (ORHAB) Partnership was formed in June 1999 by local residents and coastal communities in response to unpredictable

closures of the shellfisheries. Closures were due to outbreaks of marine biotoxins and domoic acid contamination of razor clams and other bivalves, which can cause paralytic shellfish poisoning (PSP). It became clear that in order to manage these outbreaks there was a need to better understand underlying dynamics of these disruptive harmful algal bloom (HAB) events. Research efforts, made possible by federal funding from NOAA, have been underway since the summer of 2000. In collaboration with ORHAB and the Quileute Tribe's Department of Natural Resources, OCNMS has collected water samples in tandem with servicing OCNMS' oceanographic moorings. Quileute technicians analyze the water samples for presence and density of HAB organisms. OCNMS has also collected samples from targeted areas of concern on dedicated

Northwest Fisheries Science Center (NWFSC) HAB trips in response to the HAB outbreaks along the west coast. More information is available at: <http://www.orhab.org/>

## NWFSC Subtidal Research

Two teams of NOAA scientists joined forces in August 2016 for the second consecutive year to conduct subtidal dive surveys in Olympic Coast National Marine Sanctuary. Survey transects replicated work completed in decades past to evaluate changes associated with re-introduction and expansion of the sea otter population along the outer coast of Washington.

This research is a collaboration between NOAA's Olympic Coast National Marine Sanctuary and NOAA Fisheries' Northwest



Photo: NOAA OCNMS

Dr. Cathy Pfister takes water samples for ocean acidification research onboard R/V OC-2

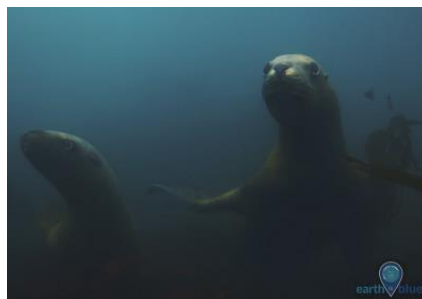


Photo: David J. Ruck

Sea lions check out divers at Cape Alava during filming for ONMS Earth is Blue Campaign



Photo: Heather Jackson

NWFSC Diver Greg Williams gets ready to splash off R/V Minnow during subtidal dive surveys.

Fisheries Science Center, who provided staff time and expertise from their scientific dive team.

Divers returned to locations visited in 1987, 1995 and 1999 to evaluate community changes associated with growing sea otter numbers, expansion of their range and changes in availability of their food sources, or prey. Long-term monitoring is essential to understand the health of marine populations as well as changes that occur in response to predation by sea otters and other pressures on marine resources.

R/V *Tatoosh* provided dive support for this project alongside R/V *Minnow*.

### **Cetacean Monitoring with Acoustic Recorders**

Little is known about the coastal movements of cetaceans, particularly the southern resident killer whale community, in the winter months. This data gap has been identified as a key element in better understanding the role of potential risk factors to this cetacean population. This project focuses on southern resident killer whales presence in OCNMS during winter months using bottom-anchored acoustic moorings. The project objective is to better determine the movements and occurrence of these whales and identify their important habitats.

These moorings were recovered by

R/V *Tatoosh* this year in partnership with NWFSC and Oregon State University.

### **Underwater Filming**

Videographers from Office of National Marine Sanctuaries' Earth is Blue campaign came to the Olympic Coast, spending two days diving off R/V *Tatoosh* at Cape Alava and Tatoosh Island. Footage from their dives can be found at:

<http://sanctuaries.noaa.gov/earthisblue/wk101-olympic-coast.html>

and will be used for education and outreach purposes.

### **OA Kelp Bed Research**

Dr. Cathy Pfister from University of Chicago spent two days on OC-2 and three days on R/V *Tatoosh*

collecting water samples to understand the extent to which kelp forests remove carbon dioxide, increase pH, and potentially serve as an ocean acidification refuge for calcifying species. This research is in conjunction with Washington Department of Natural Resources and NOAA's Coastal and Ocean Climate Applications.

We expect to utilize OC-2 more in the 2017 season to continue this collaboration.

## **Success**

Despite fiscal and mechanical challenges, R/V *Tatoosh* and R/V OC-2 were successfully operated and managed by Olympic Coast National Marine Sanctuary for 35 sea days and 130 project hours in the 2016 field season. Both platforms were vital to maintaining important long-term monitoring projects with partners in addition to meeting the needs of new partners.

This field season was the third for Survey Technician Kathy Hough and last for outgoing vessel operator LT Justin Ellis. NOAA Corps officer, LTJG Alisha Friel came to OCNMS in January 2016 and took over as vessel operator in June.

The demand for vessel use is projected to remain high in 2017 with new partnerships forming and inter-agency collaboration becoming the norm. R/V *Tatoosh* and OC-2 continue to be important assets in OCNMS, and the sanctuary intends to continue pursuing acquisition of a larger and more capable vessel to meet the multitude of research needs on the Washington coast.

Thank you to the Quileute Tribe's Department of Natural Resources for providing valuable staff time in support of the OCNMS 2016 mooring program. Thank you to the OCNMS volunteers who have contributed their valuable time as crew members aboard R/V *Tatoosh* and R/V OC-2. We couldn't do it without you!

### **OCNMS Volunteers**

*Brian Marts*

*Rick Fletcher (Retired Staff)*

*Carolyn Wilcox*