



OLYMPIC COAST NATIONAL MARINE SANCTUARY

A Report for Sanctuary Advisory Council Members

Reporting Period: May 13 - July 14, 2017

ABOUT THE SANCTUARY

Olympic Coast National Marine Sanctuary spans 3,188 square miles of marine waters off the rugged Olympic Peninsula coastline. The sanctuary extends 25 to 50 miles seaward, covering much of the continental shelf and several major submarine canyons.

The sanctuary protects a productive upwelling zone home to numerous marine mammal and seabird species, diverse populations of kelp and intertidal algae, and thriving invertebrate communities. The sanctuary is also rich in cultural resources, with over 150 documented historical shipwrecks and the vibrant contemporary cultures of the Makah, Quileute, and Hoh Indian Tribes and the Quinault Nation.

OFFICE REPORT

OLYMPIC COAST NATIONAL MARINE SANCTUARY NEWS AND PROGRAM UPDATES

Organized by Olympic Coast National Marine Sanctuary (OCNMS) management plan priority areas.

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ACHIEVE EFFECTIVE AND COORDINATED MANAGEMENT

University of Washington Marine Policy Analysis Students Review Sanctuary Plans

The University of Washington's School of Marine and Environmental Affairs (SMEA) graduate students have been studying Olympic Coast National Marine Sanctuary's (OCNMS) Management Plan, related performance measures and implementation reports. They will look at how well selected performance measures reflect OCNMS goals; if select strategies state "measurable targets"; the consistency of reporting; and, discuss the strengths and weaknesses of conducting external review for an organization, as opposed to completing the review internally. A summary of the class's efforts will be presented at the September OCNMS Advisory Council meeting.

Olympic Coast Law Enforcement Discussed

A biannual meeting on Olympic Coast National Marine Sanctuary Law Enforcement was hosted by NOAA's Office of Law Enforcement (OLE). State and federal agencies participated, with jurisdiction enforcing regulations that protect sanctuary resources. Discussion items included updates on OLE staffing, a briefing on a working group looking at small vessel violations, and the sharing of information. OLE has the primary responsibility for enforcing sanctuary regulations, but relies on coordination with Washington Department of Fish and Wildlife and the U.S. Coast Guard to achieve enforcement presence in sanctuary waters.

IMPROVE OCEAN LITERACY

Students Soar Through First Annual Olympic Coast Remotely Operated Vehicle Competition

On May 20, Olympic Coast National Marine Sanctuary (OCNMS) collaborated with University of Washington and Marine Advanced Technology and Education (MATE) to host the first annual Olympic Coast MATE Remotely Operated Vehicle (ROV) Competition. Thirteen student teams comprised of 60 students from schools throughout Olympic Peninsula participated in the underwater robot competition held at Forks Athletic and Aquatic Club in Forks, Washington. During the competition,



students demonstrated their yearlong efforts in designing, developing, and piloting ROVs (Remotely Operated Vehicles) or underwater robots. This year's competition theme was Port Cities of the Future: Commerce, Entertainment, Health and Safety. Students were required to pass multiple technical and safety inspections, deliver an oral presentation on their engineering design, as well as provide a marketing display to entice potential partners or clients. The final challenge was for students to complete missions in the pool, which emulated real world situations where ROVs complete the work. Awards were given to the top performers in both the Scout and Navigator competition levels, as well as discretionary awards given by the judges for exceptional achievements.

Olympic Coast Welcomes Hollings Scholars



OCNMS welcomed Hollings Scholars Hannah Macdonald and Megan Boice for the summer of 2017. Hannah is a rising senior at Michigan State University where she is studying Earth Science, Marine Ecosystem Management, and Environmental Studies and Sustainability. Hannah grew up in Alpena, Michigan and has spent time working with Thunder Bay National Marine Sanctuary. Megan is a rising senior at Western Washington University and is studying Biology with a marine emphasis, with a minor in chemistry. She grew up in Boise, Idaho. Each will be planning and leading three week-long summer camp programs in partnership with Feiro Marine Life Center. The



camp will use hands on activities for the students to be able to gain ocean literacy skills and become lifelong stewards of the ocean.

The Hollings Scholarship is designed to support undergraduate studies in oceanic and atmospheric science, research, technology, and education, to increase public understanding and support for stewardship of the ocean and atmosphere and improve environmental literacy as well as recruit and prepare students for public service careers with NOAA.

Junior Oceanographers Discover Olympic Coast and Feiro Marine Life Center

For the first camp, Hannah developed and led a four-day summer camp for children from ages 5-6, in partnership with Feiro Marine Life Center. Students learned about different types of marine species and ecosystems as well as the threats that they face. The camp focused on interactive and hands-on learning activities, which included exploring “Big Mama,” the sanctuary’s life-sized, inflatable humpback whale modeled after the living and swimming humpback whale in Olympic Coast. They also dissected an Albatross bolus and conducted a beach clean-up. Each day the students were able to spend time learning about species that live in the Feiro Marine Life Center, as well as a highlighted species from Olympic Coast National Marine Sanctuary. On the last day of camp, parents were welcomed to watch a humpback whale behavior show as the students dressed up in pectoral fins and a personalized fluke.



Return of Humpback and Gray Whales Presentation at Peninsula College



On June 5, John Calambokidis of Cascadia Research Collective gave a presentation entitled *Giants of the Salish Sea* on the latest research on the return of humpback and gray whales to our region. Approximately 130 people attended the event, which was sponsored by Peninsula College, Cascadia Research Collective, Olympic Coast National Marine Sanctuary, The Whale Trail, and Feiro Marine Life Center. Sanctuary Superintendent Carol Bernthal provided opening remarks about the sanctuary and the importance of marine protected areas to our ocean and these magnificent creatures. Prior to the presentation, OCNMS staff also featured "Big Mama" a life-sized walk-in model of a regionally famous humpback whale, attracting numerous excited community members of all ages. “Big Mama” acts as our sanctuary ambassador to help connect people to the rich natural resources of Olympic Coast and the importance of marine protected areas.

Olympic Coast National Marine Sanctuary Participates in Native Educators Symposium

On May 31, OCNMS education staff provided a presentation on ‘Building Observation Tools’ as part of the native Educators Symposium hosted by Suquamish Tribe and the Potlatch Foundation. Approximately 50 educators of indigenous youth from around Puget Sound and Olympic Peninsula met to present and share on integrating science, culture and art, stories and knowledge, environmental justice, observational tools and place-based education, youth resiliency, and student success. This was the first of several meetings and workshops planned to build an accessible community to share stories, ideas, programs, and strategies that can bring about best practices in teaching and learning for indigenous youth. Building a community of educators and specialists focusing on teaching and learning for indigenous youth encourages a stronger emphasis on marine and environmental education relevant to Tribal and non-tribal communities, while enhancing marine stewardship and the next generation of resource scientists, managers and educators.

Olympic Coast Students Engage in Ocean Science Education Opportunities



OCNMS, together with partners Feiro Marine Life Center, Pacific Education Institute and Seattle Aquarium, conducted another successful year of Ocean Science education with Washington coastal schools. Ocean Science Program provided hands-on experiential learning opportunities to 312 students and 48 parent chaperones from eight schools and their 16 teachers along Washington’s coast. Participating schools enjoyed a classroom visit focusing on the marine food web, as well as a field trip to their local beach for intertidal monitoring or sandy beach exploration activities, depending on beaches available to them. Students also conducted NOAA marine debris surveys and focused on actions we can take personally and at community levels to support a healthy ocean. Student groups were provided with waterproof cameras to photo-document their field investigations and marine debris collections. Schools were also given the

opportunity to conduct a second field trip to either Feiro Marine Life Center or Seattle Aquarium. Participating schools included Clallam Bay, Neah Bay, Quileute Tribal School, Queets-Clearwater, Lake Quinault, Pacific Beach, Ocean Shores and Simpson elementary schools. Ocean Science integrates NOAA Ocean Literacy concepts and principles into western Washington formal and informal educational programs. It is supported by North Pacific Coast and Grays Harbor marine resource committees.

Olympic National Park Trained on National Marine Sanctuaries

Olympic Coast National Marine Sanctuary and the National Marine Sanctuary System were highlighted during Olympic National Park’s annual staff training, attended by approximately 100 new and seasoned staff members. An orientation included multiple breakout sessions and allowed for more intimate discussion that followed presentations of the sanctuary’s educational and outreach programs, research projects, and resource protection programs, as well as information about marine life, habitats, history and culture.

Additionally, five Olympic National Park coastal interpretive rangers attended a full-day training on OCNMS with a comprehensive overview of the National Marine Sanctuary System and Olympic Coast site specifics about resource protection policies and procedures for Marine Mammal Strandings, Marine Debris, Olympic Coast Area-To-Be-Avoided, and the sanctuary’s Overflight Regulation.

Twenty-four interpretive rangers from the Olympic National Park Visitor Center, Hurricane Ridge, and coastal areas joined sanctuary staff at Salt Creek for in introduction of the rocky intertidal area and tidepool exploration. A highlight of the day was sighting a giant Pacific octopus. Sanctuary staff also provided a guided cruise of Olympic Coast National Marine Sanctuary to 10 Olympic National Park enforcement and interpretive rangers aboard the R/V *Tatoosh*. The cruise and tidepool exploration activities are valuable culminating experiences, providing a sense of place to complement their formal training.



North Olympic Watershed (NOW) Science Reaches More Than 920 Students!

OCNMS, with partners Feiro Marine Life Center and Olympic National Park, engaged more than 920 fourth and fifth grade students throughout the Sequim, Port Angeles, and Crescent school districts during the North Olympic Watershed (NOW) Science program.

During the fall, fourth grade students participated in ocean science education by engaging in classroom presentations and field investigations at Olympic Coast Discovery Center and Feiro Marine Life Center. Through hands-on activities, students developed a greater awareness about the importance of the National Marine Sanctuary System, albatrosses, the marine food web, plankton, and the harmful effects of marine debris. With their newly enhanced desire to care for our life support system, the ocean, students took the Ocean Hero Pledge and developed individual action plans to reduce the impact of marine debris.

During the spring, the fifth grade program began with staff from both Olympic Coast National Marine Sanctuary and Feiro Marine Life Center conducting a one-hour classroom visit where students were exposed to the introductory principles of watershed science. A six-hour field study allowed students to participate in a full day of experiential learning focused on the health of the watershed as habitat for salmon. Activities included a walk of the Peabody Creek watershed, water quality data collection and observation, as well as ocean acidification experiments. Students worked with sanctuary educators to make the global connection between human actions and changing ocean chemistry. To wrap up their time, students discussed behavioral changes that can be made to help reduce the amount of carbon dioxide being released into our atmosphere, and ultimately to help reduce the impact of ocean acidification.

NOW Science programs are aligned with Next Generation Science Standards. Students completed pre- and post-lesson surveys displaying an overall increase in awareness and knowledge gained regarding the lessons.



Olympic Coast Discovery Center Volunteers Complete Training



On May 26, nine new docents completed their series of six training sessions in order to begin volunteering in Olympic Coast Discovery Center (OCDC). The training sessions consisted of various presentations, most given by Olympic Coast National Marine Sanctuary (OCNMS) staff, representing each of OCDC's exhibits and current sanctuary and marine issues. The 2017 spring OCDC volunteer training also included an all-day field trip to Neah Bay to incorporate a hike to Cape Flattery where volunteers witnessed some of the sanctuary's natural resources and interpretive tour of Makah Cultural and Research Center to learn about tribal culture and history. Trainees also learned about intertidal species and habitats at Salt Creek Reserve during a half-day tidepooling excursion. Volunteers in the OCDC interpret OCNMS resources and programs to public

visitors, and assisting them with their trips to Olympic Coast.

Olympic Coast's Big Mama Exhibit Featured at NOAA Open House

On June 9, OCNMS's new traveling exhibit "Big Mama" was one of many attractions and tours featured at NOAA Open House event at NOAA Western Regional Center in Seattle. Approximately 1,227 attendees explored the life-sized walk-inside model of "Big Mama" the humpback whale while learning about Olympic Coast science and stewardship programs.



Peninsula College Students Visit Olympic Coast National Marine Sanctuary

Students from the Marine Biology class at Peninsula College in Port Angeles visited OCNMS classroom to learn about marine mammals and tour Olympic Coast Discovery Center (OCDC). Peninsula College instructor Barbara Blackie incorporates this visit to OCNMS every year as part of their curriculum.

New Mexico State University Intern Helps Support Olympic Coast Discovery Center

Olympic Coast National Marine Sanctuary welcomed Hailey Frost for a short-term internship with Olympic Coast Discovery Center (OCDC). Hailey will be a junior at New Mexico State University in Las Cruces, New Mexico where she is planning to major in Biology. Her keen interests in marine biology led her to seek out a volunteer internship with OCNMS during a couple of weeks this summer while visiting family in the Seattle area. Hailey helped support education projects and improvements for the OCDC, informational materials for docents, and more. She also worked on a wildlife viewing calendar and assisted with interpreting OCNMS to visiting guests in the Discovery Center.



Tribal Educators Give Remotely Operated Vehicles a Try

Olympic Coast National Marine Sanctuary education staff presented on deep sea exploration and remotely operated vehicles (ROVs) to 13 tribal educators from Washington state. The workshop, hosted by Suquamish Tribe, focused on showcasing science teaching and learning as cultural in order to improve science education for native students. Participating teachers enjoyed topics including understanding indigenous knowledge systems, storytelling to teach science, watershed monitoring, ROVs, traditional arts, and resource management in a changing ocean environment.

Quileute Tribal School Summer Program Incorporates Ocean Acidification and Ocean Exploration

OCNMS staff, in partnership with Northwest Indian College, brought ocean investigations to the Quileute Tribal School (QTS) summer program, focusing on ocean acidification (OA) and ocean exploration. Fourteen QTS summer school students conducted investigations looking at impacts of OA on intertidal organisms and how it relates to our marine food web, as well as exploring the deep ocean with remotely operated vehicles. The camp started with a general introduction to oceanography, important tribal seafoods, Harmful Algal Blooms, and moved onto ocean acidification and OA-affected species such as clams and oysters. The following day students learned about robotics (build-your-own ROV), the deep sea, ocean animals—with a visit to the low-tide rock wall—and exploration of marine mammal skulls.



CONDUCT COLLABORATIVE RESEARCH, ASSESSMENTS, AND MONITORING TO INFORM ECOSYSTEM-BASED MANAGEMENT

Olympic Coast National Marine Sanctuary Continues Long-term Oceanographic Monitoring Program

OCNMS started the seventeenth year of its oceanographic mooring program by successfully deploying 10 coastal, summer-time moorings between Makah Bay and Cape Elizabeth. The transit of the R/V *Tatoosh* from Port Angeles to the coast and mooring operations were delayed several days due to high winds and rough sea conditions in the Strait of Juan de Fuca and coastal Washington. However, staff and partners took advantage of calmer waters (and sunny skies) over the Memorial Day holiday weekend to complete the job. Instruments on the deployed mooring arrays will collect temperature, conductivity, salinity, and density data throughout the water column. Additionally, dissolved oxygen and pressure data will be collected one meter off the bottom, and water velocity and direction, fluorescence, and turbidity data will be collected four meters below mean lower low water at several sites. CTD cast profiles of temperature, conductivity, pressure, dissolved oxygen, fluorescence and light transmission were conducted at all mooring sites. None of the casts detected hypoxic conditions, with the lowest values of roughly 3.0 mg/L recorded at the Makah Bay 42 meter mooring site. An over-winter mooring off La Push was also recovered, giving OCNMS its fifth set of wintertime, water-column temperature data. A preliminary review of the data indicates sub-surface water temperatures were colder than the previous two winters, but not as cold as the winters of 2011-2012 and 2013-2014. Monitoring oceanographic conditions off the Washington coast has been identified as a key scientific priority for OCNMS and is invaluable to resource managers and partners investigating a number of biological and oceanographic phenomenon, such as harmful algal blooms and marine heatwaves.

Vessel Crew Assists With Troubleshooting Biological Sampling Equipment Critical to Detecting Harmful Algal Blooms in Real Time

On May 2, an Environmental Sample Processor (ESP) was deployed on the Northeast Enhanced Moored Observatory (NEMO mooring) from the University of Washington's R/V *Jack Robertson*. It is the third deployment of an ESP off the Washington coast for the U.S. IOOS OTT project "Detecting harmful algal blooms in the Pacific Northwest" (<https://ioos.noaa.gov/project/detecting-harmful-algal-blooms-pacific-northwest>). The ESP detects and measures concentrations of the toxin domoic acid and harmful algal species in near real time. After successfully collecting data, a problem with a pump was suspected and ESP operations were suspended as a result.

The NEMO mooring is located about 15 miles off La Push, and is in close proximity to OCNMS' Teawhit Head oceanographic mooring sites. In conjunction with OCNMS mooring deployments and a recovery on May 28, the R/V *Tatoosh* transported a team of technicians from The Applied Physics Laboratory of the University of Washington (APL-UW) out to the NEMO site to trouble-shoot the ESP's problem, while also visually inspecting a wind sensor on a surface buoy. The ESP's pump, used to transport surface water down to the submerged ESP for analysis, was verified to be working; thus, ESP operations resumed. It was determined the ESP's flowmeter failed. Watch the "Real-time HABS" website for updates (http://www.nanoos.org/products/real-time_habs/home.php). This multi-organizational team effort may prevent adverse health impacts on coastal community members.



SANCTUARY PERMITTING

Issued Permits and Authorizations

OCNMS-2012-006-A1 – Dr. Simone Alin, Pacific Marine Environmental Laboratory

Project Title: Wave Glider in Support of Ocean Acidification Research

Permitted Activity: Discharge to sanctuary waters, by an autonomous surface vehicle referred to as a wave glider

Project Location: Proposed discharge sites are Cape Flattery, Cape Alava, and Second or Third Beach

Permit Duration: Originally, a five-year permit, it will be extended by 3 months.

Comment: This permit was amended to extend the time period through the end of the 2017 field season.

OCNMS-2017-005 – National Marine Mammal Laboratory

Project Title: Aerial surveys of OCNMS Steller sea lion sites with an unmanned aircraft

Permitted Activity: Deployment of an unmanned aerial system (UAS)

Project Location: Carroll Island and Sea Lion Rock

Permit Duration: Three weeks.

Comment: A small multi-rotor unmanned aircraft will be launched from a small vessel and used to obtain aerial imagery of a recently established Steller sea lion (Eastern US stock) rookery complex at Carroll Island and Sea Lion Rock where more than 110 pups were born in 2016. Imagery will be used to determine the number of pups and non-pups present at each site and used to calculate abundance and trends. Images will also be analyzed for branded animals.

OCNMS-2017-006 – International Pacific Halibut Commission (IPHC)

Project Title: IPHC Fishery-Independent Setline Survey

Permitted Activity: Disturbance to the seafloor from the temporary deployment of fixed longline fishing gear (including the groundline, hooks, weights, and anchors).

Project Location: In 2017, IPHC survey is planning for 47 specific stations in federal waters throughout OCNMS, in subsequent years the survey is expected to be conducted at only the 28 annual grid stations.

Permit Duration: Five years.

Comment: The area within OCNMS has been fished commercially for Pacific halibut since the 1880s, and IPHC has conducted research in this area since the 1920s. The current IPHC fisheries-independent setline survey has been in place since 1998, covering the range of Pacific halibut from the U.S. West Coast to the Bering Sea and Aleutian Islands. This is the first permit application from the IPHC that OCNMS has received.

Pending Permit Requests

OCNMS-2016-010 – Chris Morgan, NatureBridge

Project Title: NatureBridge Drift-Card Citizen Science Project

Permitted Activity: Discharge to sanctuary waters, specifically discharge of biodegradable (thin plywood) drift cards from shoreline locations

Project Location: Proposed discharge sites are Cape Flattery, Cape Alava, and Second or Third Beach

Permit Duration: One year requested; multi-year permit may be considered

Comment: This permit supports continuation of a NatureBridge field science program to engage students in education of marine currents and ocean stewardship. Approval from the Makah Tribe is pending.

OCNMS-2014-001 LOA– Sanctuary Superintendent Permit Letter of Authorization to Ocean Exploration Trust

Project Title: Olympic Coast Canyon and Ocean Acidification Cruise

Permitted Activity: Deployments of remotely operated vehicles (ROVs), autonomous underwater vehicle (AUV), discharge of expendable bathythermographs (XBTs), collections of benthic biota and geological samples.

Project Location: Quinalt, Quileute, Juan de Fuca Canyons, and USS *Bugara* site

LOA Duration: 2017 field season

Comment: Letters of Authorization to conduct activities under the Sanctuary Superintendent Permit are used for activities conducted by sanctuary staff, either independently or in close cooperation with partners.

OCNMS-2017-007 – UC San Diego

Project Title: Determining gut microbial community composition in marine grazers along a latitudinal gradient

Permitted Activity: To disturb the seabed in order to collect common intertidal gastropods and bivalves from two (2) different sites in OCNMS.

Project Location: Chilean Memorial, near Rialto Beach, Olympic National Park and Point Grenville, Quinalt Nation

Permit Duration: For the 2017 field season.

Comment: This project is designed to quantify responses of intertidal mollusks to anthropogenic ocean acidification.

OCNMS-2017-008 – Ocean Outreach, Inc.

Project Title: USS *Bugara* Investigation

Permitted Activity: Incidental seafloor disturbance from a remotely operated vehicle (ROV)

Project Location: USS *Bugara* wreck site, off Cape Flattery

Permit Duration: The 2017 field season.

Comment: This is the second planned mission to the USS *Bugara* in 2017; while similar, each mission will contribute in unique ways to the understanding and management of this important maritime heritage resource.

REGIONAL / NATIONAL MARINE SANCTUARY SYSTEM NEWS

Washington State Coast Resilience Assessment Final Report

The Washington Coastal Management Program, in partnership with the Office of U.S. Representative Derek Kilmer (Washington 6th District) and Washington Sea Grant, contracted a comprehensive assessment and report for long-term resilience in coastal Washington. The *Washington State Coast Resilience Assessment Final Report* provides specific recommendations to help the state and partners improve resilience and protect coastal communities, infrastructure, and the natural environment from extreme weather hazards, rising sea levels, and potential earthquakes and tsunamis.

http://ruckelshauscenter.wsu.edu/wp-content/uploads/2013/06/Washington-Coast-Resilience-Assessment-Report_Final_5.1.17.pdf

Final Phase of Puget Sound Current Survey

CO-OPS recently embarked on the last phase of its Puget Sound Current Survey. For the past two summers, CO-OPS collected data that will be used to update tidal current predictions for commercial and recreational mariners who depend on the information for safe navigation, to validate hydrodynamic models, and for scientific understanding of the circulation of the sound. As the nation's coasts and inlets age and change shape due to erosion, deposition, dredging, and sea level rise, NOAA periodically resurveys them to provide the most accurate predictions possible.

<http://oceanservice.noaa.gov/facts/tide-gauge.html>

100 Year Anniversary of NOAA Commissioned Office Corps

May 22 marked the 100th anniversary of the NOAA Commissioned Officer Corps, formed in 1917 as the U.S. Coast and Geodetic Survey Officer Corps. The commissioned service provided a cadre of professionals with surveying skills vital for defense purposes as the United States entered World War I. The expertise of Coast and Geodetic Survey officers and civilians was called upon again during World War II to provide nautical and aeronautical charting knowledge, geospatial data for artillery units, and reconnaissance surveys.

With 321 officers, today's NOAA Corps serves throughout the agency's line and staff offices to provide environmental intelligence and operational expertise that supports NOAA's products and services from the bottom of the ocean to the surface of the sun. The combination of commissioned service and scientific knowledge makes these officers uniquely capable of leading some of NOAA's most important initiatives.

NOAA Corps officers, alongside their civilian counterparts, command NOAA's fleet of sixteen ships to survey our waterways, study our ocean resources, and monitor atmospheric conditions. They pilot NOAA's fleet of nine specialized aircraft to collect critical environmental data for weather and flood prediction, nautical charting, resource management, and emergency response. www.oma.noaa.gov/learn/noaa-corps/about/history

Channel Islands Seafloor Mapping and Exploration

Teams from Channel Islands National Marine Sanctuary, NCCOS, OCS, and private partner Marine Applied Research and Exploration were aboard NOAA Research Vessel *Bell M. Shimada* to map and explore the sanctuary. The cruise included autonomous underwater vehicle (AUV) mapping, remotely operated vehicle (ROV) exploration, ship-based sea-floor mapping, and fisheries acoustics surveys. The mission included 14 successful ROV dives and eight AUV deployments. The ROV dive team explored the Santa Cruz Canyon and two ridge features southeast of Santa Rosa Islands. The ROV collected stunning photos and videos of six-gill sharks, *Lophelia* corals, *Antipathes* black corals, rockfish, and giant Pacific octopuses. An additional 61 nautical square miles of sea floor were mapped with the ship-based ME70 sonar. The data will fill gaps in sanctuary maps, characterize sea-floor habitat, and help inform management decisions within and around the sanctuary.

Blue Whale Shipstrike Fatality Occurred During Spring Whale Migration

An endangered 79-foot adult female blue whale was found dead north of San Francisco, California. Due to extensive blunt force trauma and broken ribs, the necropsy team cited shipstrike as the preliminary cause of death. This shipstrike occurred during the period of typical spring whale migration northward as they follow their food sources northward up the Pacific coast. Prior to the onset of migration activities the Greater Farallones and Cordell Bank national marine sanctuaries asked the operators of large ships to slow their speeds roughly in half to 10 knots (~11 mph) as they enter the shipping lanes toward the Golden Gate Bridge.

Other pro-active efforts by sanctuary staff include: broadcast and published local notice to mariners, Whale Alert 2.0 - a smartphone application, an email list-serve, broadcasts over NOAA Weather Radio, and education/outreach posters developed in collaboration with the Pacific Merchant Shipping Association.

<http://farallones.noaa.gov/eco/vesselstrikes/>



ONMS Announces Maritime Heritage Program Interim Director

Frank Cantelas joined Office of National Marine Sanctuaries as interim director of Maritime Heritage Program (MHP) for a six-month detail. Frank has been the marine archaeologist for NOAA's Office Ocean Exploration and Research (OER) for the past eleven years and manages many of the OER grants awarded to sanctuaries for shipwreck and cultural heritage work. He has also worked on a number of collaborative projects with ONMS maritime heritage program including examining the USS *Independence* in Monterey Bay National Marine Sanctuary. Frank will lead MHP in a time of transition while we continue our search for a permanent MHP director. One of his main tasks will be to develop a strategy that enhances the management of cultural resources contained within the system and to improve MHP's capacity to serve ONMS sites.

MPA Center Joins U.S. Delegation at United Nations Oceans Conference



The Marine Protected Area (MPA) Center represented NOAA’s Office of National Marine Sanctuaries as part of the U.S. Delegation to the United Nations Oceans Conference held June 5-9 (<https://oceanconference.un.org>). The conference was held to focus global attention and generate voluntary commitments to support the implementation of the U.N.’s Sustainable Development Goal 14 (SDG14) on oceans. More than 1,200 voluntary commitments from countries, international organizations, NGOs, and others were registered to support SDG14, which includes measurable targets for many issues affecting ocean health, including marine protected areas, overfishing and marine debris. MPA Center Director Lauren Wenzel spoke at a side event on the key role of regional MPA networks in supporting effective management of MPAs. She also attended numerous partnership dialogues and side events to meet with partners. This was the first U.N. conference on sustainable oceans, and NOAA was listed as partner in several actions, including supporting the ocean acidification network, MPA mapping, and supporting MPA effectiveness through regional networks. A follow-up conference will be held in 2020, hosted by Portugal, to evaluate progress toward SDG14 and its targets.

Pacific Northwest HAB Forecast Fosters Record-setting Razor Clam Harvest

Recreational razor clam harvesters in Long Beach, Washington, set a record for one-day digger trips (17,800 diggers) on April 30, 2017. The record number of trips was triggered by the Washington Department of Fish and Wildlife’s decision to increase the bag limit on razor clams when a NOAA-funded forecast warned that a future spike in algal toxins would necessitate closing the fishery for the remainder of the season. The decision generated \$7M in local revenue and 77,800 digger trips in 11 days, as locals and tourists flocked to the beach to take advantage of the higher bag limits. Algal blooms occur annually, and monitoring and closures of shellfisheries are standard. The NOAA-sponsored forecast predicting harmful algal bloom (HAB) location and concentration is in demonstration mode this year. NOAA is developing a plan to transition the forecast to permanent operations. <https://coastalscience.noaa.gov/news/habs/record-setting-razor-clam-harvest-enabled-new-pacific-northwest-hab-forecast>

Possible Cause Identified for 2015 West Coast Harmful Algal Bloom

New research sponsored by NCCOS explains what might have caused the high toxicity in Monterey Bay, California, during the massive 2015 toxic bloom of the marine diatom *Pseudo-nitzschia* along the U.S. West Coast (<https://oceanservice.noaa.gov/news/sep15/westcoast-habs.html>). The study, published in *Geophysical Research Letters*, shows that the bloom toxicity was enabled by the relative availability of nitrate and silicate, nutrients required by diatoms. Monitoring the nitrate:silicate ratio could be an approach to predicting toxicity in a bloom. The massive toxic bloom stretched from central California to the Alaska Peninsula and resulted in significant impacts to coastal resources and marine life. NOAA worked closely with federal, state, tribal, academic, and other partners to respond to the unprecedented harmful algal bloom. NCCOS contributed internal and sponsored research to understand the causes of the bloom, and NCCOS Event Response funding provided support for sampling and toxin analysis.

Humpback Whale Research Mission Benefits from New Partnerships, New Technology

Stellwagen Bank National Marine Sanctuary led a multi-institution whale-tagging mission that successfully deployed tags on 16 humpback whales. Highlights of the mission included the tagging of mother-calf pairs, video footage showing nursing, and the tagging of five whales in a seven-member feeding group. Data from the tags will provide important information on cooperative and/or competitive behaviors and mother-calf interactions. The team used a mix of digital acoustic recording tags (DTAGs) and customized animal tracking solutions (CATS) tags to provide synchronous motion (depth and direction), acoustic recordings, and video footage. Partners included NOAA’s Northeast Fisheries Science Center, Boston Harbor Cruises, Center for Coastal Studies (Provincetown, Massachusetts), Oregon State University, Stanford University, and University of New Hampshire. <http://stellwagen.noaa.gov>

MARINE-RELATED NEWS COVERAGE

MPA News Poll: Amid a Changing Climate and Ocean, What Can MPA Managers Do? Establishing an MPA as a sentinel site for ocean acidification.

“Managers today need to think carefully about projected changes to MPA resources in order to establish ecological baselines and initiate studies that are able to detect change over time. At the Olympic Coast National Marine Sanctuary, we commissioned a report (Miller et al. 2013) that describes potential future scenarios, specifically at OCNMS. Based on anticipated climate variability, we can prepare to manage for change and uncertainty. That will include adaptive management — allowing us to reconsider sanctuary goals and strategies as new information becomes available or as climate perturbations unfold.”

<https://mpanews.openchannels.org/news/mpa-news/mpa-news-poll-amid-changing-climate-and-ocean-what-can-mpa-managers-do>

First Annual Olympic Coast MATE ROV Competition in Forks

“On Saturday, May 20, 13 teams, including 60 students from schools throughout Olympic Peninsula, met to compete in the first annual Olympic Coast MATE ROV Competition. During the competition, students demonstrated their yearlong efforts in designing, developing and piloting ROVs (Remotely Operated Vehicles) or underwater robots. This year’s competition theme was Port Cities of the Future: Commerce, Entertainment, Health and Safety.”

www.forksforum.com/news/first-annual-olympic-coast-mate-rov-competition-in-forks

Chance to Learn About Whales Offered Monday

“A free presentation about the return of humpback and gray whales — and a chance to walk through an inflatable whale — will be offered Monday at Peninsula College.”

www.peninsuladailynews.com/entertainment/chance-to-learn-about-whales-offered-monday

NOAA Corps, a Small Group of Uniformed Scientists and Specialists, Turns 100 Today

“If you take a walk through the halls of the Department of Commerce, you’ll notice among scientists and administrators a handful of uniformed officers. You won’t recognize the insignia as a branch of the military — these officers are nonmilitary, although they play a vital role in defense.”

www.washingtonpost.com/news/capital-weather-gang/wp/2017/05/22/noaa-corps-a-small-group-of-uniformed-scientists-and-specialists-turns-100-today/?utm_term=.482f30ee8b7c

Moon Honored With First Billy Frank Jr. Award

“Longtime NWIFC commissioner, and Hoopa Tribal member, Mel Moon was the first recipient of the Billy Frank Jr., Leadership Award on March 9. The award recognizes Moon for his high degree of initiative, commitment, leadership and accomplishment in advancement, protection and recognition of tribal sovereignty, treaty-reserved rights and natural resources in western Washington.”

www.tworivertribune.com/2017/05/moon-honored-with-first-billy-frank-jr-award/

Ocean Acidification is Affecting Numerous Organisms Along the West Coast

“The United States is stepping away from the Paris Climate Agreement, but the consequences of climate change will be more difficult to leave behind. Take ocean acidification, a major emerging threat to West Coast fisheries.”

<http://klcc.org/post/west-coast-ocean-acidification-rates-among-highest-world>

Ocean Acidity Increasing Along Pacific Coast, Study Finds

“The results of a study along the west coast of North America shows acidified ocean water is widespread along the shoreline and is having devastating impacts on coastal species. The three-year study of ocean currents was conducted along the California and Oregon coasts by researchers from Oregon State University.”

www.cbc.ca/beta/news/canada/british-columbia/ocean-acidity-increasing-along-pacific-coast-study-finds-1.4144786

West Coast Transient Orcas Are Booming While Resident Orcas In Salish Sea Struggle

“New research shows some of the orca populations that visit the Salish Sea are booming while the orcas who spend most of their time there are suffering. It comes down to what the different orcas eat.”

<http://kuow.org/post/west-coast-transient-orcas-are-booming-while-resident-orcas-salish-sea-struggle>

June is Orca Month

“June is Orca Month in Seattle and orca whales are expected to be out in full force in the Puget Sound. The purpose of the month is to bring awareness about orcas, Sarah Hanke of Puget Sound Express said. Orca whales are some of the most studied in the world.”

www.king5.com/news/local/welcome-to-orca-month/445433022

Big Ships Asked To Slow Down To Reduce Noise For Iconic Whales

“If you think trying to carry on a conversation in a noisy restaurant or bar is difficult, imagine how whales in the noisy waters of the Salish Sea feel.”

<http://knkx.org/post/big-ships-asked-slow-down-reduce-noise-iconic-whales>

UW Professor’s Study Links Food Scarcity to Orcas’ Failed Pregnancies

“A new study nails dearth of chinook salmon as the primary cause of the endangered resident orca whale’s failure to rebound. A team of researchers has isolated lack of food as the primary factor — bigger than vessel traffic, bigger than toxins — limiting recovery of resident killer whales.”

www.seattletimes.com/seattle-news/environment/uw-professors-study-links-food-scarcity-to-orcas-failed-pregnancies

How Did Whales Get so Big, so Quickly? Scientists Think They've Found the Answer

“Scientists think they have answered a whale of a mystery: How the ocean creatures got so huge so quickly. A few million years ago, the largest whales, averaged maybe 15 feet long. That's big, but you could still hold a fossil skull in two hands. Then seemingly overnight, one type of whale — the toothless baleens — became huge. Modern blue whales get as big as 100 feet, the largest creatures ever on Earth. Its skull is now bigger than a minivan and could probably fit more than five people inside, researchers said.”

www.chicagotribune.com/news/nationworld/science/ct-how-whales-got-so-big-20170524-story.html

Minke Whale Washes Ashore: Animal found Sunday on Long Beach Peninsula

“In a relatively rare sighting, a dead minke whale, with its diaphragm pushed outside of its mouth, washed ashore Sunday on Long Beach Peninsula, about a quarter-mile north of Klipsan Beach Approach.”

www.columbian.com/news/2017/may/29/minke-whale-washes-ashore/

Culvert Case Decision A 'Win For Salmon' In Washington

“A big court decision could open up new habitat for salmon in Washington and end up costing the state billions of dollars. The case stemmed from poor maintenance and design of road culverts, which can block fish passage upstream.”

<http://kuow.org/post/culvert-case-decision-win-salmon-washington>

Two Rockfish Species Make a Comeback as Conservation Limits Pay Off

“For fishermen and seafood lovers, there is good news about two species of rockfish. Stocks of bocaccio and the darkblotched rockfish have been rebuilt after years of conservation restrictions to protect populations knocked down by a combination of poor ocean conditions and overfishing.”

www.seattletimes.com/seattle-news/environment/two-rockfish-species-make-a-comeback-as-conservation-limits-pay-off/

Salmon are Losing Their Sense of Smell. Thanks, Carbon Emissions.

“Salmon are starting to lose their sense of smell and their fear of predators, according to research from federal and university scientists in Seattle. Their preliminary work, presented in May at a symposium on ocean acidification at the University of Washington, documents yet another way carbon dioxide emissions are messing with the world's oceans.”

<http://kuow.org/post/salmon-are-losing-their-sense-smell-thanks-carbon-emissions>

Seafood Is Getting Less Nutritious

“Ocean warming and acidification are hurting the nutritional value—and the taste—of some seafood. For many, picturing the effects of climate change on the ocean likely conjures visions of melting ice caps, rising sea levels, and bleached coral reefs. Yet these phenomena, unfortunate as they are, seem quite removed from most of our day-to-day lives. But according to new research, climate change could soon hit much closer to home, threatening the nutritional quality of seafood.”

<https://www.hakaimagazine.com/article-short/seafood-getting-less-nutritious>

Green Crab Count Rises to 72 on Dungeness Spit

“Trapping efforts continue at Graveyard Spit on the Dungeness Spit as federal and state resource managers continue to find the invasive European green crab.”

www.peninsuladailynews.com/news/green-crab-count-rises-to-72-on-dungeness-spit

Are We at a Crossroads in the Green Crab Invasion on Dungeness Spit?

“State biologists are holding out hope that the European green crab invasion at Dungeness Spit can be contained. We may now be going through a critical period, which could result in a permanent infestation or possibly the final throes of the invasion.”

<http://pugetsoundblogs.com/waterways/2017/06/24/are-we-at-a-crossroads-in-the-green-crab-invasion-on-dungeness-spit/>

Researchers Prove Cormorants Can Hear Under Water

“For the first time, researchers have shown that marine birds can hear underwater. This offers new possibilities for the protection of marine birds in trafficked waters. Seals, whales and other marine animals can hear underwater. The cormorant also has this ability, which new research from University of Southern Denmark (SDU) shows.”

<https://phys.org/news/2017-05-cormorants.html#jCp>

Researchers Probe Explosion of Pyrosomes Off the Northwest Coast

“Call it the invasion of the pyrosomes. Researchers from NOAA Fisheries' Northwest Fisheries Science Center are collaborating with colleagues from Oregon State University and the University of Oregon to unravel the mystery of why the

strange jelly-like organisms have exploded in number off the Northwest Coast in recent months.”

www.nwfsc.noaa.gov/news/features/pyrosomes/index.cfm

Strange ‘Sea Pickles’ Keep Washing Ashore in the Pacific Northwest — and Scientists are Baffled

“There are strange sea creatures known as “sea pickles” invading the Pacific Northwest. These gelatinous and somewhat translucent organisms, called pyrosomes, have been seen congregating, sometimes by the thousands, close to shore from Northern California up to southeast Alaska — clogging fishing nets and washing up on beaches, according to the National Oceanic and Atmospheric Administration.”

www.washingtonpost.com/news/speaking-of-science/wp/2017/06/28/strange-sea-pickles-keep-washing-ashore-in-the-pacific-northwest-and-scientists-are-baffled/?utm_term=.6905d745bad1

Chris Oliver Named Assistant Administrator for NOAA Fisheries

“Secretary of Commerce Wilbur Ross, with concurrence from the White House, selected Chris Oliver as assistant administrator for NOAA Fisheries. Oliver assumes his new position this week. As assistant administrator, Oliver will oversee the federal agency responsible for recreational and commercial fisheries that contribute more than \$200 billion to the nation's economy and support nearly two million jobs.”

www.nmfs.noaa.gov/stories/2017/06/19_new_asst_admin.html

Dan Haifley, Our Ocean Backyard: How to Ensure the Future of West Coast Sanctuaries

“My last six columns explored the national marine sanctuaries that protect 15,500 square miles, or 5 percent, of America’s west coast outer continental shelf waters permanently from offshore oil drilling. The rest — 294,473 square miles or an area a bit larger than California and Nevada combined — under federal control are eligible for drilling, though they are protected until 2022 due to executive action taken by then-President Barack Obama.”

www.santacruzsentinel.com/environment-and-nature/20170617/dan-haifley-our-ocean-backyard-how-to-ensure-the-future-of-west-coast-sanctuaries

Adopt a Beach Pilot Program Set on Peninsula

“They’re easy to point out. The couple who parks on the same bench at dawn. The children who know the safest spots to build sand castles at every tide. The runner who treads through sand and ocean breeze every evening at sunset.”

<http://www.peninsuladailynews.com/news/adopt-a-beach-pilot-program-set-on-peninsula/>

Scientists Stunned by Antarctic Rainfall and a Melt Area Bigger than Texas

“Scientists have documented a recent, massive melt event on the surface of highly vulnerable West Antarctica that, they fear, could be a harbinger of future events as the planet continues to warm.”

www.washingtonpost.com/news/energy-environment/wp/2017/06/15/scientists-just-documented-a-massive-melt-event-on-the-surface-of-antarctica/?tid=ss_tw&utm_term=.bbb5ea62d31e

Study: Western U.S. Snowpack Could Decline 60 Percent by 2040

“The lead author of the new study says a 30 percent decline in mountain snowpack is ‘very likely’ and greater losses are possible. The report points the finger at human-induced changes in the climate.”

www.newsdeeply.com/water/community/2017/05/24/study-western-u-s-snowpack-could-decline-60-percent-by-2040

OCNMS ONLINE

Visit our website at: <http://olympiccoast.noaa.gov/>.

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<https://twitter.com/olympiccoast>

Please take a few moments to peruse the site. Your feedback is greatly appreciated.

Comments and suggestions can be sent to:

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OCEAN-RELATED WEBSITES

National Oceanic and Atmospheric Administration

<http://www.noaa.gov/>

National Ocean Service

<http://oceanservice.noaa.gov/>

Office of National Marine Sanctuaries

<http://sanctuaries.noaa.gov/>

NOAA Marine Debris Program

<http://marinedebris.noaa.gov/>

NOAA Online Media Library

<http://sanctuaries.noaa.gov/photos>

Encyclopedia of National Marine Sanctuaries

<http://www8.nos.noaa.gov/onms/park/>

NOAA Ocean Explorer

<http://oceanexplorer.noaa.gov/>

National Data Buoy Center

<http://www.ndbc.noaa.gov/rmd.shtml>

Washington's Ocean Resources

<http://www.ecy.wa.gov/programs/sea/ocean/index.html>

CoastWatch – West Coast Regional Node

<http://coastwatch.pfel.noaa.gov/>

Northwest Association of Networked Ocean Observing Systems

<http://www.nanoos.org/>

NOAA's Pacific Marine Environmental Laboratory

<http://www.pmel.noaa.gov/>

OLYMPIC COAST NATIONAL MARINE SANCTUARY

Learn More About Your Sanctuary

The Sanctuary Office Report is produced bi-monthly by Olympic Coast National Marine Sanctuary in conjunction with sanctuary advisory council meetings. To learn more about the sanctuary, please visit our website at: <http://olympiccoast.noaa.gov/>.

To learn more about the sanctuary advisory council, please visit: http://olympiccoast.noaa.gov/involved/sac/sac_welcome.html.

Office of National Marine Sanctuaries (ONMS)
Olympic Coast National Marine Sanctuary is one of the marine protected areas in the National Marine Sanctuary System encompassing more than 600,000 square miles of marine and Great Lakes waters from Washington State to the Florida Keys and from Lake Huron to American Samoa. The system includes 13 national marine sanctuaries and Papahānaumokuākea and Rose Atoll marine national monuments. Visit the ONMS website at: <http://sanctuaries.noaa.gov/>.

Get Involved!

To learn how to get involved in the sanctuary visit: <http://olympiccoast.noaa.gov/involved/welcome.html>.

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