



Join us for Marine Science Day at HMSC on Saturday, April 14 from 10am to 4pm

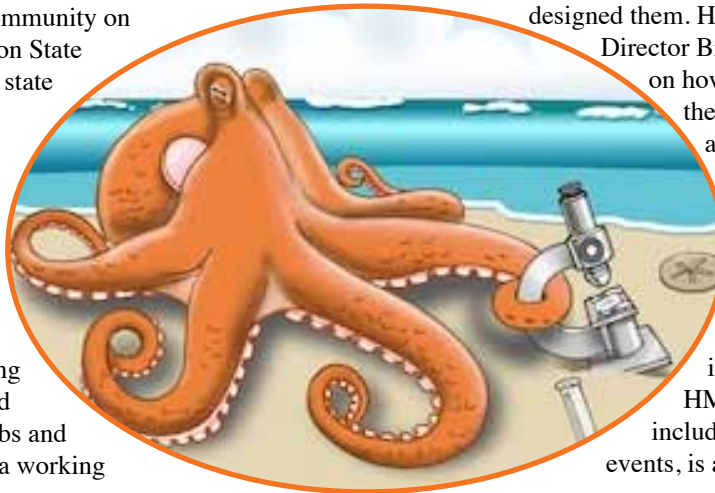
You're invited! Marine Science Day at HMSC, reminiscent of its predecessor SeaFest, will take visitors behind-the-scenes for an open house. Your hosts will be scientists and educators from the growing marine science community on Newport's South Beach: Oregon State University and the federal and state agencies of HMSC, as well as the Oregon Coast Aquarium and the new NOAA Marine Operations Center – Pacific.

In addition to special activities in the Visitor Center, including a sea turtle necropsy, visitors will meet scientists and experience cutting edge marine research first-hand in HMSC's marine research labs and classrooms. Visitors can view a working

genetics lab, try their hand at collecting biological data from fish, plankton and even a shrimp parasite, explore novel ocean-going and ocean floor instrument platforms and meet the scientists who designed them. HMSC's Marine Mammal Institute

Director Bruce Mate will give a presentation on how satellite telemetry is revealing the secrets of whale migration, and Oregon's First Lady Cylvia Hayes will be one of our special guests. Guided tours will include HMSC's seawater facilities and the aquatic animal husbandry lab.

Don't miss this special opportunity to experience the innovation and synergy that makes HMSC unique. More information, including program, tours, and special events, is available at: hmsc.oregonstate.edu.



Innovations

New Life History Transmitters Shed Light on Steller Sea Lion Deaths

A new study by Dr. Markus Horning of HMSC's Marine Mammal Institute and his collaborators suggests that the impact of predation on juvenile Steller sea lions in the Gulf of Alaska has been significantly underestimated. Orcas are the most common predators of Steller sea lions, though salmon sharks and Pacific sleeper sharks also are known predators, and great whites are suspected.

Using "life history transmitters", innovative devices implanted into wild sea lions soon after weaning, Horning has begun to collect data on the life – and death – of individuals from this declining population. Although the transmitters record, store, and transmit physiological parameters from the sea lions back to the lab, researchers must be patient; the data is not transmitted until the implanted transmitter is released when the animal dies.

One critical parameter measured is temperature, which tells a surprising story about the individual's last days and minutes of life. A sudden violent death – as by an orca or shark – shows a dramatic, instantaneous drop from a healthy body temperature to the same frigid temperature as the surrounding waters, in contrast to the slow temperature decline of a decomposing body. "The transmitters are amazing recorders of the life history of the animals, and can tell us in most cases how they died," Horning said. "Other traumatic deaths, including ship strikes and shooting should leave a different "signature" on the recorders" and are unlikely to result in the immediate release of the tags.

The specialized transmitters were implanted into 36 juvenile sea

lions from 2005 to 2011 along the Gulf of Alaska coast. Since then, 15 of the animals died and at least 14 of those deaths were by predation. While previous studies have pointed to a reduction of birth rates (fewer births per female) as a possible explanation for the population decline of 80 percent over the past four decades, these new data suggest instead that, as adult populations of Steller sea lions decline, predators are increasingly targeting younger individuals. This reduces future populations of potential breeding adults. The result may be a so called "productivity pit" – too few births to rejuvenate the population – from which their population will have difficulty recovering without a reduction of predators. For more information, see: <http://www.sealtag.org/> and <http://bit.ly/xYpUaF>.



Notes from the Director



Dr. George Boehlert, HMSC Director

After a busy summer filled with scientific sampling, internships, and visitors, in most years things slow down a bit in fall and even more in winter. As you will see in this newsletter, this was not the case for the transition from 2011 to 2012. We have had two “Science on Tap” events in just over two months, with Jack Barth and Markus Horning presenting exciting scientific talks to a full house hosted by Rogue Ales. Vessel issues heated up as the decision was made in rapid order to retire the Wecoma and replace her with the Oceanus – and then to get the Oceanus squared away to initiate scientific cruises. Congratulations to Demian Bailey and the staff of vessel support for moving things forward so rapidly. And within the Visitor Center, new funding from the National Science Foundation has led to big changes presently underway, with exciting new displays and research.

On a personal note, it is sad to hear of Senator Mark Hatfield’s passing. He serves as an icon for the State of Oregon; he also represents to many of us the kind of political figure we yearn for in this age of contention and overblown debate between the two major parties. We take considerable pride in having our Center named for him. Mark O. Hatfield’s legacy will remain and he will not be forgotten.

Finally, please accept my personal invitation to Marine Science Day, coming up very soon on Saturday April 14. The event will be similar to SeaFest, but focused more around HMSC’s science; Marine Science Day will be a chance for you to meet scientists and learn about the cutting-edge research and partnerships that make HMSC unique. It’s also a chance to see the working laboratories, classrooms, and infrastructure beyond the Visitor Center. For our members, volunteers and donors, it’s a unique opportunity to directly experience the science that your contributions support.

Hope to see you then.

A handwritten signature in black ink, appearing to read "George".

Honoring Senator Hatfield

“Be It Resolved by the Legislative Assembly of the State of Oregon: That we, the members of the Seventy-sixth Legislative Assembly, express our gratitude for United States Senator Mark Odom Hatfield’s lifelong service to the people of Oregon...”

These enduring words became part of Senator Hatfield’s legacy on February 24, 2012, when Senate Concurrent Resolution 202 passed unanimously in the Oregon Legislature. It was co-sponsored by Senator Joann Verger, representing Newport and the OSU Mark O. Hatfield Marine Science Center.

Senator Hatfield, who passed away on Aug 7, 2011, was supportive of the development of HMSC, which officially opened in June 1965 during his second term as Oregon governor. During his five terms as a U.S. Senator, the center grew into its 49-acre Newport campus, with new buildings and collaborative programs between OSU and government agency scientists. In 1983, the Center was officially named the Mark O. Hatfield Marine Science Center.

HMSC has since become an interagency campus known internationally for its cutting edge and diverse ocean and coastal research programs, with a mission of research, education and outreach in marine sciences through collaborative partnerships.

According to Dr. Lavern Weber, HMSC Director during Senator Hatfield’s tenure, “The Senator was a leader who gave considerable thought to the future. He thought about the quality of science, but also about the quantity of effort needed to address society’s pressing problems. One evening, I was on a vessel in Yaquina Bay with the Senator, looking over some research oyster beds. We discussed the need for research, and the Senator was clear; research of the highest quality was needed, but we also needed more research to assure progress for Oregon, the nation and the world. He wanted to help plan for the future. That is an important part of Senator Hatfield’s legacy.”



Thank you for your support. To become a member of the Friends of HMSC, or for more information, please see <http://hmsc.oregonstate.edu/friends/>

Sea Grant Introduces Students to ‘Careers in Science’

With support from a generous donor, Oregon Sea Grant hosted two “Careers in Science Investigation” programs in January for Lincoln County middle school students. Over 120 seventh and eighth graders from Eddyville, Toledo, and Waldport participated in hands-on marine science activities at HMSC. Students interacted with staff from Oregon Department of Fish and Wildlife, NOAA and OSU as they conducted adult steelhead dissections, collected data on ghost and mud shrimp, and went on a tour of a research vessel. The goal of these programs is educate students on local employment opportunities and stimulate interest in pursuing a career in science.

Photo: 8th graders from Toledo toured one of the NOAA ships and tried on survival suits



Goodbye Chaos Wheel....

After a 15 year run in the Visitor Center (VC), the Chaos Wheel exhibit was removed on January 24th. This exhibit represented one of the last displays originally constructed during the VC remodel occurring between 1995 and 1997. This fascinating exhibit relating to “patterns in chaos” was retired in order to make room for brand new wave tanks set for installation this year!



Welcome Pearl!

The Visitor Center’s newest octopus, Pearl, seems to be enjoying her new role as HMSC icon! She is still settling in, but has proven to be very sociable – for an octopus, of course – and seems to enjoy the ‘people’ part of her job. She rarely hides in her private space behind the curtain, instead gravitating toward visitors and staff. Pearl arrived at HMSC on December 7, and was placed in the exhibit after two months in quarantine. HMSC octopuses are generally kept for 6-9 months before being released back into the wild. Aquarists won’t hazard a guess as to her age, but the expected lifespan of a Pacific octopus is 3-5 years.



OSU's new research vessel arrives in Newport

by Pat Kight

Greeted by welcoming blasts from the horns of NOAA research ships berthed nearby, the Research Vessel *Oceanus* steamed under the arch of Yaquina Bay Bridge in a rainy mist on Tuesday and into her new home port at Oregon State University's Hatfield Marine Science Center. It was the end of a 28-day voyage for the *Oceanus*, which sailed out of its former home at Woods Hole Oceanographic Institute in Massachusetts on January 25 and cruised down the East Coast and through the Panama Canal before heading northward for Oregon and her new home port. Marine science fans on both coasts were able to follow the voyage via a Webcam affixed to the ship's mast, which also beamed its geographic coordinates to a Google map set up for the occasion.

OSU acquired the *Oceanus* via the University National Oceanographic Laboratory System (UNOLS), a consortium of 60 academic research institutions that operate 16 vessels around the country. OSU, a member of UNOLS, was retiring its venerable research vessel, R/V *Wecoma* (see photo) and looked to the consortium for a replacement. Although the two vessels are about the same age, a National Science Foundation rapid assessment determined that the *Oceanus* would be more cost-effective to operate for the next 5-10 years. By that time, OSU hopes to have a new ship.



The R/V *Wecoma* was honored for over 35 years of service to Oregon State University in a retirement ceremony on March 23rd. OSU and community leaders, current and former captains and crew, and some of the many scientists who sailed with her attended the ceremony on the dock at the HMSC campus.

Photo credit: Tracy Crews



The R/V *Oceanus* at the pier in her new homeport of Newport, Oregon. Visit her on the webcam at: <http://webcam.oregonstate.edu/oceanus/>

Photo credit: Nancy Jane Reid

Volunteer Corner

The **2012 HMSC Soup Kitchen** was a great success. The series of lunchtime events generated an enthusiastic response from all corners of the HMSC campus, as well as a total of \$850 (up almost 20% from last year) raised for Lincoln County Food Share. Community members cooked, baked and shopped for several fundraisers offering soup, bread and dessert, as well as for a taco bar, which was very well received, and a bake sale that was, well, very sweet! Thanks to everyone in the HMSC community who participated.



In addition to volunteering for the HMSC Visitor Center (VC), many members from our volunteer corps donate their time and energy to other local organizations. One couple that plays a very active role in the Newport community is **Tiby and Bernard Cooperstein**. Volunteering since 2005, together they have contributed 1,689 hours to the HMSC. They currently volunteer in the VC every Monday afternoon (even during the sometimes painfully slow off-season days), sharing their wealth of marine science related knowledge with the public. Tiby and Bernard also volunteer on a weekly basis at both the Newport Public Library as well as the Samaritan Pacific Communities Hospital. Tiby and Bernard's efforts in this community are exemplary and inspiring, we here at the HMSC feel very privileged that we're a part of their busy schedule!





Meet the US Fish and Wildlife Service!

As a collaborative, interagency campus, HMSC hosts a wealth of diverse activities on its 49-acre Yaquina Bay campus. **US Fish and Wildlife Service**, the federal agency that manages much of the nation's rich fish, migratory bird and wildlife resources, houses two programs and 13 staff in the USFWS building near the estuary trail. The mission of the USFWS Coastal Oregon Field Office is twofold: to manage the six National Wildlife Refuges that grace the Oregon Coast, and to work with agencies, organizations and private landowners to conserve species and their habitats off the Refuge lands.



*Aerial view looking north showing Three Arch Rocks NWR left center, Cape Meares NWR in the upper right and rocks within Oregon Islands NWR along the right side.
Photo by: Roy W. Lowe, USFWS*

The Oregon Coast National Wildlife Refuge Complex includes Bandon Marsh, Cape Meares, Nestucca Bay, Oregon Islands, Siletz Bay and Three Arch Rocks, spanning 320 miles of rugged coastline. Diverse wildlife habitats include coastal rocks, reefs and islands supporting large seabird colonies and pinniped haulouts and rookeries, old-growth forest, and highly productive tidal marshes and estuaries. USFWS staff reach out to the coastal community in many ways including the Shorebird Sister Schools Program which introduces grade school students to these long-distance migrants and the importance of Oregon's estuarine habitats to their survival.

The Ecological Services division of the USFWS is a counterpart to the Refuges, providing technical assistance, funding, and expertise to assist others with conservation of coastal ecosystems. This office leads coastal recovery efforts for listed species, including the western snowy plover and Oregon silverspot butterfly. The Coastal Program and the Partners for Fish and Wildlife program are managed to provide funding and expertise to landowners interested in restoring and managing native habitats.

The Service celebrated several milestones on the coast in 2011. Service staff and community volunteers planted over 13,500 plants on the central coast for Oregon silverspot butterfly. A Habitat Conservation plan for plovers was approved, providing protection for the birds and their nesting habitat and regulatory certainty for beach users. And for the first time since listing, the snowy plover broke every record and met all recovery goals in Oregon.



*The Rogue Reef Unit of Oregon Islands NWR hosts the largest breeding area for threatened Steller sea Lions in U.S. Water south of Alaska.
Photo by: Roy W. Lowe, USFWS*

The recently completed restoration of the **Ni-les'tun Tidal Marsh at the Bandon Marsh National Wildlife Refuge** is a major success for the Newport and Bandon USFWS staff and many restoration partners including Ducks Unlimited and the Coquille Indian Tribe. This project on the Coquille River estuary restored 418 acres of intertidal salt marsh, freshwater marsh and riparian areas that are habitat for migratory birds and anadromous fish including salmon, steelhead and cutthroat trout. The restoration project, in the works for over a decade, allowed the unimpeded return of daily tides to the previously diked and drained lands for the first time in nearly a century.

"After more than 10 years of land acquisition, planning, design and construction by a host of partners, the largest tidal marsh restoration in Oregon is now complete," said Roy W. Lowe, Project Leader, of the Oregon Coast National Wildlife Refuge Complex. "Time and the tides will slowly and surely return the land form and vegetation back to a fully functioning tidal estuary." For more information, see: www.fws.gov/oregoncoast/



*High tide aerial view looking east of the recently completed Ni-les'tun Tidal Marsh Restoration Project on Bandon Marsh NWR.
Photo by: Roy W. Lowe, USFWS*

2011 REU Students take the 2012 Ocean Sciences Meeting by Storm!



Photo: This year's Ocean Sciences meeting in Salt Lake City, UT was not only an exciting one, but also one filled with OSU and HMSC representation!

2012 HMSC Scholarships, Fellowships and Awards – 18th Annual Markham Marine Science Research Symposium

Every year HMSC supports student research through financial support and recognition for their work at HMSC. On average \$80-\$100K are awarded each year to students in multiple departments and colleges. Wednesday, June 20th marks the 18th annual Markham Marine Science Research Symposium. Students who have received awards in the past 1-2 years at HMSC will be

presenting their current research findings made possible by the support of HMSC scholarships and awards. All of these funds originate from generous private donations to HMSC. This year's student award recipients will also be presenting posters of their proposed research at the symposium.

See: <http://hmsc.oregonstate.edu/awards.html>

Developing Research Pathways: From Community College to Graduate School

From mudflats to the open sea...a reflection of summer research

by Drew Hill

All of my professors at Portland Community College were excited to hear I was awarded an internship at Hatfield Marine Science Center (HMSC) through the COSEE program. I didn't know what to expect but once I arrived, it didn't take me long to realize I had landed in a supportive and enthusiastic community focused on marine science. For one short summer my mentor was Dr. Brett Dumbauld, a professional USDA researcher and we worked on current issues of ecology and how to conduct research. My first summer at HMSC was a formative experience as I discovered that the physical and mental demands of field-based research and analysis appeal to my work ethic, curiosity, and interest in biological marine systems.

Needless to say, I am excited about returning to HMSC as an intern with the Research Experience for Undergraduates (REU) program. This summer I will be working with Dr. Ric Brodeur and in addition to researching diet-overlap of jellyfish and juvenile salmon, I hope to be involved in publishing this summer's research and participate in a 10-day NOAA trawl survey. Graduate school is the next educational step for me and I am sure I will be well prepared because of my research experiences at HMSC with the COSEE and REU programs. If you have any questions about my experience, you can find me (Drew Hill) at HMSC this summer!

2012 Summer Research Experience for Undergraduates (REU) program at HMSC and CEOAS

This summer will be the ninth year of the NSF Research Experience for Undergraduates (REU) program at HMSC. We will again have 20 students participating in the joint program between HMSC and the College of Earth, Oceanic and Atmospheric Sciences (COEAS). Half of the students will be located in Corvallis and the other half here at Hatfield. We had an overwhelming number of applicants for the REU program (over 270 applications).

How do marine biology classes and summer research internships at HMSC lead to designing smartphone apps and protocols for identifying stranded marine reptiles, fish and cephalopods?

by Danielle Asson

While chowing down on a cheeseburger at the Newport Café and discussing the challenges of graduate school coursework with Itchung, I was sharing an uncomfortable thought about designing a kind of smartphone app for marine research. Anyone overhearing the conversation would also discern how comfortable I was with working with researchers at the Hatfield Marine Science Center. Yet under the same breath, I could hear a note of anxiety in my voice at the thought of needing to press on to finish up the submission of my paper from my summer REU experience. Where is this going? In short I was thankful for my formative experiences as an OSU undergraduate who made the decision to spend a spring term out on the coast for that intensive marine biology course. I also stayed after the spring term to pursue a summer Research Experience for Undergraduates (REU) at HMSC. 2 years later, who would have thought I would find myself in the Marine Resource Management Graduate program developing a smart phone app to report and identify stranded marine animals on the Oregon coast.

It is not unusual to see stranded marine animals and birds along the coast. While various networks nationwide exist to report marine mammals, and sea birds, no network exists to report other stranded marine animals, namely fish, cephalopods, and reptiles. Networks do exist for reporting stranded sea turtles; The Sea Turtle Stranding and Salvage Network is a nationwide network begun in 1980 that includes federal, state, and private partners. However, this network is not complete, as there are no coordinators for the west coast on the United States, even though turtles have been found stranded as far north as Alaska. Many people know sea turtles are endangered, but they are not necessarily aware of whom to call in a timely manner. When a stranded

fish, squid or turtle is found in Oregon, calls are frequently placed to many different organizations, because there is not a single publicized location to send information. The specifics of the information provided are generally unreliable as well.

Therefore, I am designing and evaluating a protocol to enable “citizen scientists” to identify stranded marine reptiles, fish, and cephalopods along the coast. The purpose of my project is to create an opportunity for tourists and resident beachcombers to participate in ongoing and necessary marine research. This protocol, designed in English and Spanish as a downloadable document as well as a smartphone application, will create a central location in which users can access information to identify species, know what information to record, and where to report it.



Photo: Danielle Asson presenting poster on Smartphone app.

Needing the Right Stuff to get through the tough stuff - Marine Biology Spring Term 2012

OSU marine biology students are tough. Imagine a 16-credit course where you eat, breath and sleep marine biology for 10 weeks, Monday through Friday, 8 am to 5 pm, sometime earlier and sometimes later and sometimes on the weekend and LOVING IT! That's what 22 undergraduates with the “right stuff” will be doing as they take up residence at the Hatfield Marine Science Center beginning April spending their spring quarter in an intensive course in Marine Biology. These lucky students divide their time between lectures in the classroom, field study along the coast (Cascade Head, Boiler Bay, Strawberry Hill, Seal Rock and Yaquina Bay) and laboratories in one of our wet labs. They will be observing, identifying and collecting seaweeds and invertebrates, trawling for fish aboard the R/V *Elakha* and mucking through the mudflats; this is the “tough stuff”.



Hatfield Marine Science Center

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www.hmsc.oregonstate.edu/friends

Upwelling is produced and distributed 3 times a year to the Friends of HMSC membership. Your feedback is welcome.
(email: maryann.bozza@oregonstate.edu)

Science on Tap is Back!

“Science on Tap” sponsored by HMSC, is back to an enthusiastic welcome after a hiatus of several years. These scientific presentations are geared for the larger community, but have also attracted a strong contingent from the South Beach marine science community of scientists, staff, volunteers and their families making for a dynamic atmosphere. Two recent events attracted capacity crowds at Rogue Ale’s South Beach waterfront location, Brewer’s on the Bay.

Dr. Jack Barth was the first speaker of the 2012 series. His January presentation, “New Eyes on our Changing Ocean: Underwater Robotic Gliders and the Ocean Observatories Initiative” introduced the use of autonomous underwater gliders and other emerging technologies for remote ocean observation and research. Barth is a Professor of Oceanography and Associate Dean for Research in Oregon State University’s College of Earth, Ocean, and Atmospheric Sciences. His research explores the relationships between ocean circulation

and ecosystems in coastal waters, including low-oxygen (hypoxic) zones off the coast of Oregon. Barth’s research team uses gliders to study this region, and has logged over 51,000 km of measurements over the last six years. He described gliders as an invaluable tool in understanding the rapid changes underway in the ocean environment; for more information, see: <http://gliderfs2.coas.oregonstate.edu/gliderweb/>

The Marine Technology Society of Oregon cosponsored the season’s second Science on Tap on Thursday March 15, with OSU Professor of Wildlife **Dr. Markus Horning**, with HMSC’s Marine Mammal Institute. Dr. Horning took the audience a bit further afield - north to Alaska, and south to Antarctica! The presentation, “The secret lives of seals: using high-tech marvels to pry into distant ocean depths”, described the science and technology behind telemetry, or remote measurement of environmental parameters. Many events in the lives of seals and sea lions are rarely observed, in particular in remote locations around Alaska and Antarctica. Dr. Horning described how, through advances in remote monitoring technology, he and his team can now follow the life and death of individual animals in the Bering Sea or under Antarctic ice. For more information, see: www.sealtag.org. Science on Tap events are posted at: hmsc.oregonstate.edu/events.html



Photo: Markus Horning, at far right, presents at Science on Tap at the Rogue in March.