September 2007
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Upwelling

Newsletter of the Friends of Hatfield Marine Science Center

www.hmsc.oregonstate.edu/friends

Wave energy research generates interest, activity at HMSC

Harnessing energy from ocean waves to provide a clean, renewable source of electric power has long been the vision of researchers in Oregon State University's College of Engineering. With OSU's emergence as a national leader in the development of wave energy technology, the HMSC is increasingly viewed as a likely location for facilities supporting continued research and development, and as a source of scientific expertise on the potential ecological impacts of large scale wave energy.

When OSU Electrical Engineering Professor Annette von Jouanne visited HMSC in May of 2006 to deliver a lecture on "The Promise of Wave Power", public interest in the topic was already high. Currently, a dozen wave energy projects are proposed along the Pacific

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HMSC helps local teachers promote Ocean Literacy

The Hatfield Marine Science Center, Oregon Coast Aquarium, and Oregon Hatchery Research Center served as host sites for a Summer Science Symposium held in August to help Lincoln County schoolteachers become better acquainted with the local science resources in their community, in an effort to improve students' "Ocean Literacy".

The school board has a stated goal of working with HMSC and other local institutions to enhance school district science curriculum and give "Lincoln County School District students an opportunity to be the best prepared oceanic science students in the country." The symposium was organized to help teachers prepare to meet that goal.

Coordinated by Kristin Takano, the school district's Community Curriculum and Resource Liaison, the 3-day professional development workshop provided teachers an opportunity to meet and learn from local scientists, participate in lab investigations, take behind-the-scenes tours at each of the facilities, and collaborate with colleagues on ways to strengthen connections between classroom instruction and local science resources. The symposium was developed in partnership with Oregon Sea Grant, the Oregon Coast Aquarium, Marine Discovery Tours, and the Oregon Hatchery Research Center, with a focus on activities

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Lincoln County schoolteachers out on the mudflats of Yaquina Bay during the 2007 Summer Science Symposium.

Research Briefs

Investigators explore submarine volcanoes off coasts of Oregon and New Zealand

It was a busy summer for ocean explorers at the Hatfield Marine Science Center, with two expeditions to opposite sides of the Pacific Ocean to study undersea volcanoes. One team departed from Astoria on August 3rd for the Juan de Fuca Ridge off the coast of Oregon, while the other team set sail from Auckland, New Zealand on July 28th to an area of intense geothermal activity along the Kermadec volcanic arc.

Bob Embley, a geophysicist in the NOAA Pacific Marine Environmental Laboratory's Vents Group at HMSC, served as co-principal investigator on the 2007 New Zealand American Submarine Ring of Fire Expedition. Their primary mission was to conduct a detailed exploration of Brothers Volcano, one of the most hydrothermally active submarine volcanoes yet discovered.

Sailing aboard the R/V Sonne, a former German trawler now dedicated to geoscience research, the expedition team consisted of 26 scientists and engineers from the United States, New Zealand, and Germany. Also on board was an autonomous underwater vehicle (AUV), which expedition scientists programmed to "fly" over the volcano, gathering various types of data for a detailed mapping of the caldera and its many hot black smoker chimneys and diffuse hydrothermal vent sites.

"Prior to the development of reliable AUVs, near-bottom mapping was conducted using instruments towed behind ships on long cables near the seafloor," explains Embley. "AUVs are starting to make significant impacts on ocean research and exploration because they operate independently of surface control, freeing up the research vessel for other tasks."

The "ABE" (Autonomous Benthic Explorer), developed by Woods Hole Oceanographic Institute, is equipped with sensors that collect magnetic field data and chemical anomalies in the water, as well

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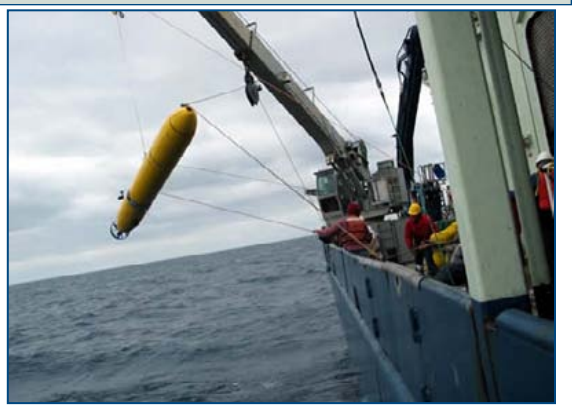

Autonomous underwater vehicle (AUV) being brought back aboard the R/V Atlantis after completing a mission to map the seafloor of Axial's caldera during the 2007 NeMO research cruise.

Inside this Issue:

Notes from the Director

HMSC has just finished up a very busy summer. SeaFest was, as usual, highly attended and a great deal of fun for all; collaboration with Marine Discovery Tours provided water taxi service on the Oregon Rocket -- a real crowd pleaser that also garnered over 235 pounds of food and $550 in cash donations to benefit Lincoln County Food Share. Our summer course offerings included, for the first time, a Marine Biology course designed for lower division undergraduate students, and the ever-popular Marine Mammal course, now in its third year. In late summer, the PISCO program offered a very popular program in Marine Science Conservation and Policy, bringing both instructors and students in from around the country.

Wave energy has been capturing the imagination of the public, and HMSC is quite involved. The Marine Mammal Institute's vessel Pacific Storm has been involved in deploying buoys and anchors, and the HMSC will host a scientific workshop in October on "Ecological Effects of Wave Energy Development in the Pacific Northwest". We may also host the newly developing "Center for Wave Energy Development" in collaboration with the OSU College of Engineering.

HMSC is developing a very strong reputation for student internships, offering hands-on experience in both research and marine science education. The past success of our Research Experience for Undergraduates (REU) program resulted in a 3-year renewal and expansion of the program. This year, we had 10 REU interns at HMSC and another 10 in Corvallis. Five of them will be attending the national Ocean Sciences Meeting in Orlando, Florida early next year, presenting results of their research at HMSC.

As usual, we have been assisted in all these endeavors by help not only from volunteers, but also from our many donors. Matching funding from Georgia-Pacific was instrumental in getting the REU grant renewed. We credit the Confederated Tribes of the Siletz Indians, Georgia Pacific, and Starbucks for helping ensure the success of SeaFest. Our many private donors assist with housing scholarships for students, public programs and youth education, and the library. We appreciate the help and interest from you all.

Wave energy

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coast of the U.S., of which seven are in Oregon's coastal waters. One of these is a proposed 50-megawatt wave park near Reedsport, for which preliminary permits have been filed with the Federal Energy Regulatory Commission. Oregon's Governor is encouraging the development and testing of wave energy technologies in the state, and the Reedsport facility is expected to become one of the nation's first utility-scale projects.

Over the past few years, as research progressed on the direct drive wave energy generator technology developed by von Jouanne's lab at OSU, a collaborative relationship between the university and various stakeholders on the coast was also developing. Lincoln County government officials, working in concert with Oregon Sea Grant Extension and commercial fishers and crabbers familiar with the central coast, came together in support of establishing a basic infrastructure for testing devices in the ocean. With state and federal permits secured, a small scale test berth site was recently created two miles off the coast of Newport, where three different wave energy test buoys are currently being deployed.

On August 23rd the R/V Pacific Storm, a converted fishing vessel now owned by the OSU Marine Mammal Institute, dropped an anchor at the site to serve as a mooring system for three wave energy test buoys to be deployed in September and October.

While engineers continue testing and improving various wave energy conversion technologies, other scientists are beginning to focus on questions about how wave energy development could potentially impact the marine environment. On October 11-12, the HMSC is hosting a scientific workshop on this very topic, which will bring together dozens of scientists to evaluate existing data and consider potential effects on fish, marine mammals, sea birds, and physical effects on the ocean and habitat.

The wave energy exhibit developed by Annette von Jouanne's team of engineering students at the Wallace Energy Systems & Renewables Facility in Corvallis provides visitors to HMSC with information about the technology and its potential.

Participation in the October workshop is limited to invited scientists, but in recognition of the high level of interest in the topic, portions of the workshop are being recorded for broadcast on local cable television (Channel 4 and Channel 21 on Charter Communications in Lincoln County). For further information on air dates and times, please contact HMSC Program Manager Ken Hall at 541-867-0212 or by email: ken.hall@oregonstate.edu).

Summer at HMSC offers students a range of educational experiences

The HMSC welcomes a greater number and diversity of students during the summer than in any other season, with a combination of internships, open enrollment courses, and outreach programs (and generally great weather) showing off our research and educational resources in their best light.

This year, we doubled the number of internships in our National Science Foundation-funded Research Experience for Undergraduates (REU) program, with 10 students placed at HMSC and another 10 in Corvallis. All of them got a first hand look at OSU's strength in marine sciences through their 10-week mentored research experience, and we hope to see some of them return as graduate students.

Another 40+ students took advantage of summer courses at HMSC, including the intensive 10-day Marine Conservation Science and Policy course led by Dr. Jane Lubchenco (OSU) and visiting professors Dr. Steve Gaines (UC Santa Barbara), Mr. David Festa (Director of Ocean Program for Environmental Defense), and Dr. Andrew Rosenberg (University of New Hampshire).

In addition, we conducted a number of outreach activities this summer to inform new and prospective OSU students and visitors about academic and research opportunities at HMSC. One group was composed of undergraduate students starting OSU this fall who participated in the college transitioning SMILE-STARs Program. SMILE stands for Science and Math Investigative Learning Experiences. It is a partnership between Oregon State University and 14 Oregon school districts -- mostly rural -- to increase the number of educationally disadvantaged students enrolling in college and encouraging them to pursue careers in science, math, health, engineering, and teaching.

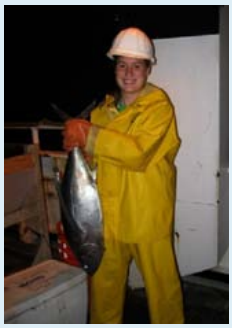
The HMSC also welcomed a large group of high school students participating in "A Taste of College", an Oregon State University outreach program for students in grades 10 through 12. As part of their two weeks on the main OSU campus where they earn two college credits, participants visited with Itchung Cheung, HMSC Academic Program Coordinator for a discussion about internships, programs, degrees, and careers in Marine Science and a behind the scenes tour that shows our educational facilities and some of the research activities underway. The students ended the day with two hands-on lab activities with the Oregon Sea Grant instructors.

And just before the start of the fall term, a group of students who serve as tour guides and "ambassadors" for OSU Admissions arrived for an overnight visit as part of their education about the many academic offerings they can speak about in their many interactions to future OSU students and families.

SMILE Program "graduates" spent a day with Oregon Sea Grant instructors learning about the marine environment and with HMSC's Academic Program Coordinator learning about the academic opportunities in the marine sciences that they can pursue at OSU.

Students in the Research Experience for Undergraduates (REU) program came from all over the U.S. to spend their summer at HMSC, and they accomplished an impressive amount of work during their internships. Here are just a few of the highlights...

Casey Benkwitt, an Environmental Studies and Sociology major at Bowdoin College in Maine, conducted research on the gastric emptying time of juvenile salmon to estimate a daily ration for these fish and better understand their response to food limitation in the ocean during their first few critical months at sea. Casey came to Newport a week early to take advantage of an opportunity to go out to sea with her mentor, NOAA Fisheries Biologist **Ric Brodeur**, and got some great photos.



Craig Brauer, a Biology major at Illinois Wesleyan University, did ground breaking work with his mentor **John Chapman** on parasitic bopyrid isopod crustaceans found in Yaquina Bay and other Pacific Northwest estuaries. Craig produced the first hand drawn illustrations for species identification and possibly identified a new method of collecting and identifying the species. The technique entails using the female parasitic isopod to collect males allows for species and sex specific collection, which has been until now impossible to do.

Continued - see REU interns on next page.

Summer interns supported by a grant from Georgia-Pacific hop aboard the yellow submarine for a photo with Vice President of Manufacturing Scott Wagener (left) and Tom Picciano of the G-P mill in Toledo.

REU intern highlights

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Jamila-Dawn Payton, a Fisheries Biology major at the University of Arkansas at Pine Bluff, worked under the mentorship of Molluscan Broodstock Program director **Chris Langdon** on a project that successfully demonstrated the ability to use Wax Spray Beads as a vehicle to transfer an antibiotic dose to larval fish. Through feeding experiments, Jamila was able to feed spiked beads to brine shrimp and then to larval fish.

Matt Stuckey, a Conservation & Resource Studies/Environmental Economics & Policy major at UC Berkeley, conducted research on the Pacific geoduck, a clam species He worked with **Bryan Black** on the application of dendrochronology to shellfish rings to reconstruct past sea surface temperatures. A pretty novel concept and merging of different fields.

Zahirah Salahuddin, a Marine Science and Anthropology major at the University of Maine at Orono, worked in the NOAA Alaska Fisheries Science Center labs at HMSC under the mentorship of **Cliff Ryer**. Her research on phototaxis and English sole produced a model that will be applied in further studies of Rock sole and Pacific Halibut, two species that co-habitat with the English sole in Alaskan waters.

News from Oregon Sea Grant and the HMSC Visitor Center

Donor contribution enables continuation of *Las OLAS* program

The Las OLAS outreach program, which offers opportunities for Lincoln County's Spanish-speaking families to participate in marine science education activities in their native language, will operate through the 2007-08 school year, thanks to a generous financial contribution by John Sherman of Otter Rock.

With initial funding provided by Oregon Sea Grant and Oregon Community Foundation, Las OLAS (Ocean Learning Activities in Spanish) began offering programs in 2006, and was also supported last year by a donation from Ms. Jeanette Hofer. From the start, the program has received a positive response from the target audience of Mexican families with elementary school aged children in Newport. Between 25 and 35 participants have been showing up for the monthly events, typically held on a Friday evening or weekend afternoon at the HMSC.

Participants at the September 21 *Las OLAS* family night hold up the banner they made in appreciation of John Sherman's support of the marine education program for spanish-speaking families in Lincoln County.

Coordinator Ana Maria Esparza-Smith leads activities in HMSC's seawater labs, classrooms, or outdoors, where participants are encouraged to get their hands wet, ask questions, and learn about marine and estuarine creatures and habitats in both Spanish and English. A primary goal of the program is to encourage children to develop an interest in science, while also helping adult members of the Spanish-speaking community learn about marine education topics and resources.

Topics to be addressed in this year's Las OLAS education program include tsunamis and emergency preparedness, safe and legal shellfish harvesting, and harmful algal blooms. The next family night events are scheduled for October 19 and November 16. For more information, call 867-0329.

Visitor Center events and programs

Explore stream dynamics during **Oregon Watershed Weeks** at the HMSC Visitor Center. The interactive stream table exhibit on loan from the Lincoln County Soil and Water Conservation District will be on display through October 19th.

October 20th is **Salmon Saturday** and at 1:30 p.m. in the Hennings Auditorium, Steve Johnson of the Oregon Department of Fish and Wildlife will discuss his research using acoustic tags to track and study salmon.

Have you met the new octopus?

Stop by to meet "Jimmy", the HMSC's newest resident cephalopod. He certainly lives up to his species name - he is a *giant*! Feeding times are Octopus Feeding: Monday, Thursday and Saturday at 1 p.m

Don't forget: The Visitor Center is open on its fall-winter schedule, 10 a.m.-4 p.m., Thursday through Monday (closed Tuesday and Wednesday). Also closed Thanksgiving, Christmas and New Year's Day.

New exhibits highlight PISCO research

Did you know that research conducted by the Partnership for Interdisciplinary Study of Oceans (PISCO) is featured in two locations in the Research Gallery? The surge tank aquarium - where tiles, scubbies and brushes are growing barnacles, mussels or alga - highlights PISCO's research on recruitment of new animals into tide pools. Locations in Oregon, California and Mexico are surveyed by fastening these manmade objects into the tide pools. The animals that settle there are counted. The currents that carry this plankton are measured with off shore moorings. An example of PISCO's mooring is hanging near the wolf eel tank. The yellow hardhat at the top contains the float, and the current meter is on the bottom. Other instruments that measure the quality of the seawater are also on display and labeled. These instruments are aiding with the detection of hypoxic waters which have appeared episodically off our coast for the past three years, and are often referred to as "dead" zones because of the extreme low oxygen levels. Check out these exhibits next time you are in the Visitor Center!

Introducing... Oregon Coast Quests

Oregon Sea Grant has teamed up with Lincoln County 4H, Oregon State Parks and Recreation, Newport Parks and Recreation, Lincoln City Head Start, Oregon Coast History Center, Mid-Coast Watershed Council, and Community Services Consortium to introduce Oregon coastal residents and visitors to a great free-choice learning opportunity -- the "Oregon Coast Quest".

What is a Quest?

Quests are fun and educational clue-directed hunts that encourage the year-round exploration of areas of natural and cultural significance in Lincoln County. In this self-guided activity, Questers are challenged to follow a map and find a series of clues designed to help them locate a hidden box -- and have fun learning along the way. Those who successfully find their way to the hidden box will find a small guest book, a stamp pad and unique rubber stamp, and additional information about the Quest site. They get to sign the guest book to record their find and make an imprint of the Quest box stamp in the back of their clue book as proof of accomplishment. The box is then put back for the next person to find. So that others can share in the fun, the location of the clues and box remain a secret.

Questing is an ideal place-based activity for individuals, small groups, and families. Turning a walk into a treasure hunt helps engage children with the environment. Participants share in and learn about important areas of natural, cultural, and historical significance. Furthermore, Quests offer both those who go on the treasure hunts and those who help create Quests for others gain a sense of pride and stewardship for the true treasures that can be found within their local community.

Where did Questing come from?

Questing was born out of a 150-year old tradition in the region surrounding Dartmoor National Park in southwest England. "Letterboxing," as this tradition is called, is a popular past time, with thousands of boxes hidden in both natural and cultural locations.

Cait Goodwin Rice helps kids get ready to take the Big Creek Park Quest -- one of seven Quests currently offered in Lincoln County.

In Vermont, an organization called Vital Communities built upon this tradition by developing the Valley Quest program. In the early 1990s, Vital Communities was concerned about the future of the Upper Valley region, and was hoping to develop a program that might foster sense of place, strengthen relationships between schools and communities, and build bridges across the generations.

The result was Valley Quest, with "Valley" referring to the place and "Quest" referring to a treasure hunt—made by children and adults working together—leading to the community's special places. Over time, the Valley Quest program has grown. More than 1,500 children, adults, families, scouts, students and historical society members have contributed to the creation of the 150+Quests found in the Valley Quest books.

Communities across the country have begun to replicate Valley Quest's success. For example, South Shore Quests began creating Quests and publishing annual clue booklets for their area in Massachusetts in 1998. Today, approximately 1000 visitors visit each of their 20 Quests every year.

A hidden clue on the Big Creek Park Quest.

Oregon Sea Grant has now brought this fun and educational activity to Lincoln County through the formation of the Oregon Coast Quests program, coordinated by Sea Grant educator Cait Goodwin, a seven-year veteran of the South Shore Quests program.

You can get your own copy of *The Oregon Coast Quest Book, 1st Edition*, available for purchase at the HMSC Visitor Center and other bookstores and gift shops throughout Lincoln County. The book contains directions and maps for eight Lincoln County Quests, including the Yaquina Estuary Quest and the HMSC Sustainability Quest.

Want to learn more about creating Quests?

Sign up to attend a Sea Grant workshop!

Saturday, October 20, 2007
1:00-4:00 pm.

Hatfield Marine Science Center
(meet at Visitors Center)
Newport, OR
$25.00 per participant
Space limited to 20 participants

For more information, or to register, please call 541-867-0159

Promoting Ocean Literacy

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ery Research Center, with a focus on activities relevant to marine and coastal resources being studied by local scientists.

While at the HMSC, teachers participated in an estuary investigation activity led by Fawn Custer, Lead Educator for Oregon Sea Grant's marine education programs, venturing out onto the Yaquina Bay mudflats to collect and observe a variety of shrimp in their natural habitat. They also heard from Dr. John Chapman, Invasion Ecologist at the science center, who explained the research he has been doing on a parasite that has invaded the mud shrimp population.

During their visit to the Oregon Hatchery Research Center, 26 miles up the Alsea Highway, teachers met Dr. David Noakes, professor and senior scientist at the hatchery, who shared the history behind the development of the research center and provided an overview of work that has been completed thus far. Following a tour of the research facility, teachers collected macroinvertebrates from Fall Creek and discussed how the insects help determine the health of the river.

During the visit to the Oregon Coast Aquarium, Kerry Carlin-Morgan, Director of Public Programs, helped teachers understand how Ocean Literacy principles and concepts fit with national, state, and district science standards. Developed by National Geographic, National Oceanic and Atmospheric Administration (NOAA), Centers for Ocean Sciences Education Excellence (COSEE), National Marine Sanctuary Foundation, and Sea Grant, the Ocean Literacy Standards are a guide to "understanding the ocean's influence on you and your influence on the ocean." The guide can be found at http://www.coexploration.org/oceanliteracy.

Seafloor explorations

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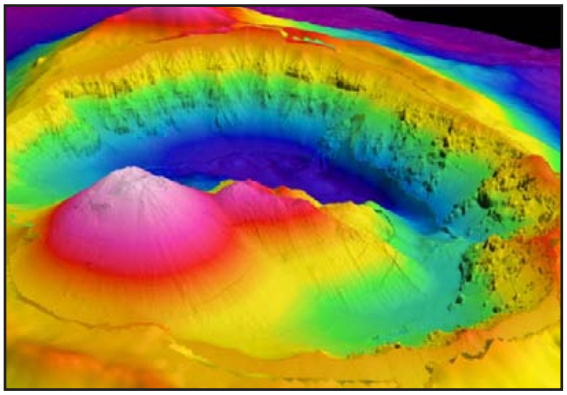
as depth, temperature, and other data that allow scientists to map the topography of the ocean floor and the extent of hydrothermal venting with greater accuracy and detail than ever before. The new map has a resolution of about 2 meters, so that features seen by a submersible's cameras can be related directly to the map.

Expedition member Susan Merle of the OSU-NOAA Cooperative Institute for Marine Resources Studies (CIMRS) used 3-D visualization software to "drape" multiple layers of data collected by ABE over the volcano topography and produce maps that are both rich in data and beautiful to look at. Many of these maps and "fly-through" visualizations are available for viewing on the NOAA Ocean Explorer website, along with daily logs and photos from the expedition: www.oceanexplorer.noaa.gov/explorations/07fire/welcome.html



Looking into Brothers Volcano caldera from the south to north (1.5 times vertical exaggeration), draped with high resolution ABE bathymetry. The smooth cone (left foreground) is the site of recent volcanic eruptions and has ongoing hydrothermal venting from its summit crater. The smaller cone to the right is probably older but still has an intense hydrothermal system at its summit. The rougher, eroded topography of the caldera wall are older, pre-caldera lavas and other volcanic rocks that have undergone submarine slope failure at least partly due to undermining by hydrothermal "weathering". *Image courtesy of New Zealand American Submarine Ring of Fire 2007 Exploration, NOAA Vents Program, NOAA-OE.*

Ron Greene, also of CIMRS, conducted hydrothermal plume surveys and collected water samples of chemical analysis in the helium isotope laboratory here at HMSC.

On the other side of the Pacific, the other group of HMSC scientists were focused on a portion of the Pacific submarine ring of fire much closer to home –- a seafloor spreading zone known as the Juan de Fuca Ridge, about 300 miles off the Oregon/Washington coast. Led by CIMRS Senior Researcher Bill Chadwick, the New Millenium Observatory (NeMO) 2007 cruise visited hydrothermal venting areas at Endeavour Ridge, Axial Seamount, and along the Cobb segment.

The Axial volcano, which last erupted in 1998, is one of the best places to conduct long-term experiments to learn about the interaction between an active volcano, seafloor hot springs, and the biological communities they sustain.

Scientific crew of the NeMO 2007 cruise.

With the collaboration of researchers from Woods Hole and the Monterey Bay Aquarium Research Institute, the 2007 NeMO cruise had both AUV and ROV (remotely operated vehicle) capabilities, enabling complementary observation and mapping of parts of the caldera floor that had never been explored in 10 years of visiting Axial Seamount. Researchers discovered evidence of "enormous" eruptions that have occurred in the past.

"The AUV and the ROV are a perfect combination," says Chadwick, "because the AUV gives us bathymetric maps with such incredible detail that we can actually see features at the same scale as the things we can see with the ROV's video and lights. This allows us to better interpret what we see."

Another key function of the cruise was to recover and re-deploy NeMO's long-term monitoring instruments such as Ocean Bottom Hydrophones (OBHs - which detect earthquakes), Bottom Pressure Recorders (BPRs - which measure uplift and subsidence of the seafloor), and Remote Access Samplers (RAS - which can take fluid and microbial samples every week for a year from a hydrothermal vent).

"All of these instruments can operate on the seafloor for one to two years, and they help us know what is happening at Axial when we are not here with a ship," explains Chadwick.

In addition to Chadwick and three other scientists from the Vents Program at HMSC (Andra Bobbitt, Leigh Evans, Matt Fowler), the scientific crew of the 2007 NeMO cruise included two dozen other researchers, one undergraduate student, and two high school teachers. Photos and daily log book entries from the cruise can be viewed online at: www.pmel.noaa.gov/vents/nemo/expeditions.html

Public welcomes return of SeaFest

The HMSC is an interesting place to visit any day of the year. The fourth Saturday in June, however, is becoming known as a particularly good day to visit, as the public is invited to tour the labs and research vessels and learn about what goes on behind the scenes at the Center during the day-long extravaganza known as SeaFest.

This year, the crowds arrived by land and by sea. Undeterred by morning drizzle and a vehicle accident that stopped traffic across the Yaquina Bay Bridge for nearly an hour, an estimated 3,700 people made their way to the HMSC on Saturday, June 23rd to attend SeaFest.

Hundreds took advantage of a water taxi service operated by Marine Discovery Tours by special arrangement with OSU's Ship Operations, allowing the public a first-ever direct connection between Newport's bayfront and the OSU dock.

At the dock, visitors were able to board the R/V Elakha for an up-close look at the undersea glider OSU scientists are using in oceanographic research. The R/V Pacific Storm, a converted fishing vessel now utilized by the OSU Marine Mammal Institute to track whales, was also on public display.

In addition to the ever-popular touch tanks, aquaria, and permanent exhibits in the HMSC Visitor Center, dozens of exhibits were created especially for SeaFest. Scientists engaged visitors with hands-on activities and demonstrations, inviting children to peer through microscopes, examine live specimens, and handle instruments used in the lab and field. Speakers in the Hennings Auditorium addressed the question of how the oceans are impacted by climate change.

The participation of local volunteers, exhibitors, food vendors, artists, and musicians at SeaFest contributes to the festival atmosphere and helps make it a true community event. Nearly 100 volunteers were in action on the day of the event, serving as greeters, information guides, parking attendants, and assistants for exhibitors and Kids Zone activities.

"We were very fortunate to have community partners like the Confederated Tribes of Siletz Indians, Georgia Pacific, and Starbucks supporting SeaFest as sponsors," said George Boehlert, HMSC Director. "Their financial contributions enabled us to provide space for community exhibitors at no charge and to maintain SeaFest as a free event to the public."

The HMSC thanks all who contributed to the success of this year's SeaFest.

SeaFest opening night speakers Stephen Hammond (left), Director of NOAA's Pacific Marine Environmental Laboratory at HMSC, and Gail Achterman, Director of the Institute for Natural Resources at OSU, with HMSC Director George Boehlert. Hammond, who is Acting Director of NOAA's Ocean Exploration Program, noted during his lecture that coral reefs and other calcifying marine organisms may be the first victims of large scale changes in ocean chemistry driven by oceanic uptake of carbon dioxide.

At the SeaFest opening ceremony, the high school students who represented Oregon at the National Student Oceans Summit in Washington, D.C. were recognized by Oregon Secretary of State Bill Bradbury for their research on the issue of rockfish bycatch.

Hatfield Marine Science Center
2030 SE Marine Science Drive
Newport, OR 97365

www.hmsc.oregonstate.edu/friends

Upcoming Events

Current Issues in Marine Science Research

"What does Climate Change Mean for Fisheries of the North Pacific Ocean?"

A lecture by

Dr. Gordon Kruse

President's Professor of Fisheries and Ocean Sciences
University of Alaska, Fairbanks

2007 Lavern Weber Visiting Scientist

Sunday, November 11

3 PM Hennings Auditorium
HMSC Visitor Center

Fall Seminar Series

The HMSC seminar series features scientific lectures by visiting and resident scientists at HMSC. Seminars take place Thursdays from 3:30pm to 4:30pm in the Guin Library Seminar Room. Friends of HMSC are invited to attend.

September 27 **Micky Kruse**, Senior Associate, Wostmann and Associates, Inc.
"E-landings - commercial fisheries landings data reporting system"

October 4 **Richard Brill** - Virginia Institute of Marine Science
"From lab bench to pelagic longlining - what physiology can offer fisheries science"

October 11 ***in Hennings Auditorium***
Gordon Kruse, President's Professor of Fisheries, University of Alaska, Fairbanks (and 2007 Lavern Weber Visiting Scientist at HMSC)
"Climate change and dynamics of Alaskan crab populations"

October 18 **John W. Ferguson**, Director Fish Ecology Division, NOAA Northwest Fisheries Science Center, Seattle
"Summit to the Sea: Research for salmon recovery in the Pacific Northwest"

October 25 **Dan Cooper** - Alaska Fisheries Science Center, Seattle
"Reproductive output of Atka mackerel: fat pets vs. wild skinny fish"

November 1 **Won Sang Lee** - Korean Polar Research Institute
"Sounds of the Southern Ocean: interpreting Antarctic hydrophone data"

November 8 **Steve Johnson**, Oregon Department of Fish and Wildlife
"Use of acoustic tags for tracking migration and survival of steelhead smolts"

November 15 **Dr. Robert Francis** - University of Washington
"Resilience Thinking and the California Current Ecosystem"

November 22 (Thanksgiving) No seminar

November 29 **Randy Keller**, College of Oceanic & Atmospheric Sciences, OSU
"Seamounts in the Gulf of Alaska"

December 6 **Francis Chan** - OSU College of Oceanic & Atmospheric Sciences
"Update on hypoxia in Oregon coastal waters"

Upwelling is produced and distributed 3 times a year to the Friends of HMSC membership. Your feedback is welcomed.
For more information, visit us online: www.hmsc.oregonstate.edu/friends - *Ken Hall, Editor* (email: ken.hall@oregonstate.edu)