FIFTY YEARS!

Fifty years ago, Oregon State University’s Hatfield Marine Science Center opened its doors as a fledgling research and education facility envisioned to help the depressed central Oregon coast economy revive. Today we are proud to be one of the most important and unique marine science facilities in the country, bringing together scientists from OSU and federal and state agencies to tackle some of the most pressing issues facing the world’s oceans, educating a new generation of students about these issues, and reaching out to inform the public about their impacts.

HMSC has been celebrating this venerable milestone throughout 2015 with events, seminars, historic photos and a blog (see page 5 for links). With a theme of “Honoring the past, celebrating the future,” we are also highlighting the Marine Studies Initiative, which includes a new research and education building and a dramatic expansion of OSU undergraduate programs in Newport.

“This is an opportunity to look at the past and honor the people and events that have made the Hatfield Marine Science Center such a special place,” said Bob Cowen, director of the center. “It’s also a time to celebrate the future, as OSU is launching its Marine Studies Initiative and working on plans to expand the center and its capacity.”

Celebratory events included an “All-HMSC Reunion” in April for current and former faculty, staff, and students from OSU and agency partners (see page 4), and a 50th Anniversary Celebration on August 7 (see page 5). The Celebration, attended by hundreds of community members and HMSC supporters, featured speakers, displays, a historical slide show, and a presentation by Dr. Rick Spinrad, “How Oceanography Saved the World.” Celebration speakers were OSU President Emeritus John Byrne, a former NOAA administrator; Dr. Bob Cowen, HMSC Director; Janet Webster, HMSC Librarian Emeritus; Dr. Rick Spinrad, NOAA Chief Scientist and HMSC alumnus; Marisa Litz, HMSC Graduate Student; Dr. Jack Barth, Associate Dean for Research, College of Earth, Ocean & Atmospheric Sciences; Dr. Ed Ray, President, Oregon State University; Michele Longo Eder, Oregon State University Trustee and a member of Newport’s commercial fishing community; The Honorable David Gomberg, Oregon State Representative, District 10, and Fritz Graham, Field Representative for Senator Ron Wyden. The program ended on a high note, with a new video featuring faculty, student and community perspectives on the Hatfield Marine Science Center’s future plans. The video, along with Dr. Spinrad’s presentation, can be found at hmsc.oregonstate.edu/50th.
Jellyfish are a natural part of the ocean’s ecosystem. They float by the millions, representing a range of phyla, shapes, sizes, and ecological functional roles. As a postdoc at the Hatfield Marine Science Center, I have the opportunity to study these fascinating creatures, exploring the relationship of jellyfish populations to that of their prey.

One well-known jellyfish characteristic is their ability to rapidly expand their populations, forming ‘blooms’ when conditions are favorable. Blooms of jellyfish can overlap with major forage fish fisheries (e.g. sardines, herrings, menhaden, and anchovies). Jellyfish and forage fish are all sensitive to the availability of their planktonic prey, and because large jellyfish like sea nettles (Chrysaora spp.) and moons (Aurelia spp.) eat many of the same prey items as these small fishes, there is the potential for competition between the two groups.

Increases in the frequency and size of jellyfish blooms in a number of marine ecosystems worldwide have sparked interest in possible causes. One reason may be that extensive harvest of small pelagic fishes creates a feeding opportunity for co-occurring jellyfish, allowing their population to increase. To test this, Hatfield Marine Science Center scientists are working with an international group led by the University of Southern Mississippi and funded by the Lenfest Ocean Program. The goal is to explore the role jellyfish and forage fish play in ecosystems supporting major forage fish fisheries, specifically how caloric energy moves through pelagic food webs. A second goal is to determine if the harvest of forage fish enhances jellyfish blooms. Importantly, because jellyfish and forage fish are influenced by similar environmental conditions but jellyfish are not fished, we hope to identify metrics such as a jellyfish-fish biomass ratio that can be used in the management of forage fish.

Notes from the Director

Honoring the past, celebrating the future. This, our 50th, has been a truly amazing year, as we stand at the threshold between an impressive past and a bright future. To mark this special moment in our history, we had the honor of hosting our past students, faculty, staff, and agency folks in April who came back for an All-HMSC Reunion – some after almost 50 years away. Although the Marine Science Center has grown dramatically since “the old days,” the camaraderie they experienced is still evident in our HMSC Community. Our August event engaged the coastal community, with a crowd of several hundred braving the dank summer fog for the 50th Anniversary Celebration. A festive reception in the Visitor Center, enjoyed by all, was followed by a lovely opportunity to honor our major donors to the Marine Studies Building Fund.

Speaking of the Marine Studies Building, I am proud to report that we have raised over $47 million toward our $50 million goal! Although we had a great start with a $20 million challenge grant, and a tremendous $25 million from the people of Oregon through the legislature, it is you – our HMSC supporters – who have been coming through for us with a generosity and enthusiasm that is humbling. The outpouring of support has us on a track to success – we *hope* to open the doors by September 2018. But just as important has been the validation of the work we do and the role we play in the coastal community. I hear over and over that the educational opportunities, the economic development and the scientific advances that will come with OSU’s ambitious Marine Studies Initiative and the expansion of programs at HMSC is a great fit for the community, and it doubles my own resolve to launch a world-class marine studies program that benefits the entire Oregon coast.

As appreciative as I am, I must add that our work is not yet done. We are still fundraising, not only for the last $3 million for the building but also for the cutting edge programs that will be offered as part of the Marine Studies Initiative. If you are interested in being part of our shared future, please contact my office at 541-867-0212.

Bob Cowen, HMSC Director

Research News

[Bloming Jellyfish]

By Dr. Kelly Robinson

Jellyfish are a natural part of the ocean’s ecosystem. They float by the millions, representing a range of phyla, shapes, sizes, and ecological functional roles. As a postdoc at the Hatfield Marine Science Center, I have the opportunity to study these fascinating creatures, exploring the relationship of jellyfish populations to that of their prey.

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Sea Grant Briefs

[Breaking in the Cyberlab]

For the last four years, researchers with the Free-Choice Learning Lab have been building a “Cyberlab” inside the Hatfield Marine Science Center Visitor Center. The lab allows social science researchers to remotely watch our exhibits and do human research studies on how visitors learn in their leisure time. Funded by the National Science Foundation, this huge project has thirty-five surveillance cameras, numerous microphones, a face-detection system, body cameras, motion trackers, and many databases that make up the instrumented museum.

The system is still in its start-up phase, so for one week at the end of August, Oregon Sea Grant invited nine researchers to really put the system through its paces. These international experts in free-choice learning divided into teams to take on three-day long research challenges. They were to use the CyberLab tools to frame a question, collect data, and analyze and report their findings each day.

On the culminating day, teams gave final presentations on their work using the Cyberlab tools. It was a remarkable result with some intriguing research questions to be further explored, and the Cyberlab proved to be up to the challenge.

For more, see blogs.oregonstate.edu/freechoicelab/

[Summer Fun]

A two-day Girls Engineering and Marine Science (GEMS) Camp was held in August at HMSC for 7th and 8th grade girls from coastal communities. Participants engaged in hands-on STEM activities with female faculty and graduate students, including building wave energy devices, setting up experiments and collecting data, and getting behind the scenes tours. Designed to increase interest in STEM careers, this program was sponsored by the Oregon Coast STEM Hub, the Oregon Coast Aquarium, and the local chapter of the National Organization for Women.

Aquarist Corner

[Babies on Board]

Skates are making a splash once again in the HMSC Visitor Center! While not the social media sensation they were in 2010 (the “dancing baby stingrays” have over a million hits on YouTube), we recently had a unique and exciting opportunity to watch skate development while still within the egg.

The story started with a skate egg case and a question – were the developing skates in the egg case still alive? Several techniques used to check on their well-being were inconclusive, so Jennifer Engelhard, OSU College of Veterinary Medicine, and HMSC’s Aquatic Animal Health Staff led by Dr. Tim Miller-Morgan employed a technique that has been used in other aquariums.

They cut a hole into the egg case and surgically affixed a clear piece of plastic over the hole so that it acted as a window into the egg. According to Jennifer, “After opening the egg case we discovered that the animals were indeed alive, breathing and moving!” A display stand was engineered to keep the egg safe from the other skates while allowing it to be viewed by the public. The three baby skates had not yet hatched as of press time but we look forward to the big event, and to watching them grow.

For more information or to become a member of The Friends of HMSC, please visit www.hmsc.oregonstate.edu/friends
An “All-HMSC Reunion Weekend” in April 2015 drew over 150 former faculty, staff, and students from OSU and agency partners. The Reunion was a chance for those who have contributed to the development of HMSC since its inception to reconnect with friends and colleagues. Reunion guests hailed from Newport, the state, the region, and from as far away as the east coast and Australia. Many were surprised at the growth of the Center, and were interested to learn of the diversity of our current research, education and outreach programs at Marine Science Day.
HMSC 50th Anniversary Celebration

[Honoring the Past, Celebrating the Future]

HMSC’s 50th Anniversary Celebration on August 7 featured speakers, displays, a historical slide show, and a video highlighting faculty, student and community perspectives on the HMSC’s future plans. A reception was held in the Visitor Center, with historical exhibits on display and a chance for visitors to express their vision of the future. HMSC Director Bob Cowen also took the opportunity to honor and update key supporters of the Marine Studies Building, currently in the fundraising stage (see page 2).

See hmsc.oregonstate.edu/50th for links to historic photos, a history blog, and a timeline of Hatfield Marine Science Center history.

Rick Spinrad’s talk, “How Oceanography Saved the World” can also be found at hmsc.oregonstate.edu/50th

See hmsc.oregonstate.edu for a new video celebrating HMSC’s bright future.

For more information about the 50th Anniversary or HMSC’s online historical archives, contact Maryann Bozza at 541-867-0234.
HMSC Academic Program News

[AFS Presenters]
HMSC students were well represented at this year’s American Fisheries Society meeting in Portland, Oregon. The fortunate proximity of this premier international conference allowed a record number of students to participate with poster or oral presentations. Conference participation is a critical piece of the research cycle, where scientists share their results and methods with their peers world-wide. We are grateful for the opportunities our students have to participate in professional conferences, which is enhanced by travel funds from donor-funded scholarships and awards.

[Internships]
Summer internships are an amazing way for HMSC to boost the fledgling research careers of undergraduates from OSU and beyond, and this summer was no exception. A whopping 27 interns came on board this year, each paired with a mentor who introduced them to the world of research. It was also a chance for them to connect with their peers in diverse fields, learning from and supporting each other through a steep learning curve. See page 7 for examples of their experiences.

[Summer Programs]
Summer programs expanded for a third year in a row - part of the first wave of opportunities to come with HMSC’s expansion as part of OSU’s ambitious Marine Studies Initiative. Courses including Ecology of Marine & Estuarine Birds, Coastal Oceanography, Field Techniques in Marine Mammals Conservation, and Undergraduate Research Credit, were added to the existing program. The goal was to offer a full credit load for students wanting to take advantage of this coastal, hands-on opportunity. For more information on OSU’s Marine Studies Initiative, see page 2.
Over the last several years, the Northwest Fisheries Science Center, in collaboration with the Pacific States Marine Fisheries Commission and Oregon State University, has been sampling young-of-the-year groundfishes and other small demersal fishes along the Newport Hydrographic (NH) line. An important question concerning these surveys is whether the NH line is representative habitat for demersal fishes along the central Oregon coast. Answering this question would help determine whether adding additional sampling lines to the long-term sampling project would be needed. In this analysis, beam trawl tows were taken from 16 stations along three sampling lines off of the central Oregon coast in September of 2012. In addition, high-definition videos were taken from these tows. From the beam trawl sampling there were no significant differences found in fish assemblages, dissolved oxygen, or temperature based on line, but there was a significant difference in communities and temperature based on depth. No clear pattern was found among the soft-sediment habitat variation. By comparing fish community composition and habitat across these transects, we addressed the overall question of whether the NH line is representative of a larger section of the central Oregon coast.

**INTERN: KATLYN HAVEN, OREGON STATE UNIVERSITY**

**TITLE:** Analysis of the distribution and abundance of young-of-the-year fishes off of the central Oregon coast  

**MENTORS:** W. WALDO WAKEFIELD; RICHARD BRODEUR & MATTHEW YERGEY  

Over the last several years, the Northwest Fisheries Science Center, in collaboration with the Pacific States Marine Fisheries Commission and Oregon State University, has been sampling young-of-the-year groundfishes and other small demersal fishes along the Newport Hydrographic (NH) line. An important question concerning these surveys is whether the NH line is representative habitat for demersal fishes along the central Oregon coast. Answering this question would help determine whether adding additional sampling lines to the long-term sampling project would be needed. In this analysis, beam trawl tows were taken from 16 stations along three sampling lines off of the central Oregon coast in September of 2012. In addition, high-definition videos were taken from these tows. From the beam trawl sampling there were no significant differences found in fish assemblages, dissolved oxygen, or temperature based on line, but there was a significant difference in communities and temperature based on depth. No clear pattern was found among the soft-sediment habitat variation. By comparing fish community composition and habitat across these transects, we addressed the overall question of whether the NH line is representative of a larger section of the central Oregon coast.

**INTERN: ROSS MEYER, UNIVERSITY OF IDAHO**

**TITLE:** Foreshock analysis of submarine transform fault earthquakes along the equatorial mid-Atlantic ridge  

**MENTORS:** JOE. H. HAXEL & ROBERT P. DZIAK

From August 2011 to May 2015 an autonomous hydrophone array, covering a large portion of the Equatorial Atlantic Ocean, was deployed along the Mid-Atlantic Ridge (MAR) from approximately 22° N to 10° S and 53° W to 8° W, to record signals generated by submarine seismic events. During the hydrophone deployment period, eighteen teleseismic earthquake events ≥ 5.4 mb recorded by land-based seismometers (USGS/NEIC) provide a basis set of larger transform events for detailed hydroacoustic processing and analysis including epicentral source locations from T-wave arrival patterns. Hydroacoustically derived origin times and epicentral locations are used to investigate the relationship between the timing and spatial distance of foreshocks prior to each mainshock event. Analysis of submarine foreshock patterns in this remote oceanic region provides insight for short-term predictability of large (mb≥5.4) seafloor transform fault earthquakes along the slow spreading (~2.5 cm/yr.) Equatorial Mid-Atlantic Ridge (EMAR). Results are further compared with predictive methods described by McGuire (2008) along the submarine transforms of the fast spreading (6-16 cm/yr.) East Pacific Rise to evaluate differences between these regimes.
Dulse: The Famous Seaweed that Tastes Like Bacon

Science communications can be challenging, so the power of a catchy headline can’t be underestimated. It’s no wonder then that OSU’s July 14th press release, “OSU researchers discover the unicorn – seaweed that tastes like bacon!,” went viral on social media.

Dulse is a common red marine seaweed found on the Pacific coast (Palmaria sp.) A recently patented new strain, which looks like translucent red lettuce, was developed initially as food for abalone. According to HMSC researcher Chris Langdon (pictured left), a professor in the Department of Fisheries and Wildlife at OSU and long-time leader of the Molluscan Broodstock Program, the strain his lab created is an excellent source of minerals, vitamins and antioxidants – and it contains up to 16 percent protein in dry weight.

The progression from abalone super-food to social media sensation began when Chuck Toombs, a faculty member in OSU’s College of Business, was looking for potential projects for his business students. He saw Langdon’s dulse growing in bubbling containers and the proverbial light went on. Toombs began working with OSU’s Food Innovation Center in Portland, where a product development team created products such as a dulse-based rice cracker and salad dressing. Several Portland-area chefs are now testing dulse as a fresh product and many believe it has significant potential in both its raw form and as a food ingredient. Toombs’ MBA students are preparing a marketing plan for a new line of specialty foods and exploring the potential for a new aquaculture industry. The vegan market alone could comprise a niche.

As for the bacon flavor? According to Langdon, “When you fry it, which I have done, it tastes like bacon, not seaweed. And it’s a pretty strong bacon flavor.”