HMSC Mission Statement

The Hatfield Marine Science Center advances the mission of Oregon State University and its partner agencies though ***collaboration*** and ***innovation***. As OSU's campus for ***research, education,*** and ***outreach*** in marine and coastal sciences, and through its partnerships, HMSC improves scientific understanding of marine systems, coastal processes and resources, and applies this knowledge to social, economic, and environmental issues.

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Director's Message

Dr. Robert K. Cowen, Director

Looking over the accomplishments of the last 48 years, it is clear that the Hatfield Marine Science Center has evolved into a leading marine research laboratory with many unique attributes, most notably its numerous partnerships. With representation of seven colleges in OSU and six Federal and State agencies, HMSC plays an important role as OSU's coastal campus and portal to the Pacific Ocean. HMSC provides facilities, infrastructure, and access to our partnerships that advances OSU's mission. With an overarching goal of improving the understanding and stewardship of marine and coastal systems, the organizational diversity within HMSC is its strength. The shared goals and, yet, diversity of expertise, leads to broad and effective collaborations, many of which you will see displayed in the pages of this report.

Over the past seven years, HMSC has experienced many changes and new programs. The NSF-sponsored Research Experience for Undergraduates program is part of a thriving summer internship program with 35 interns in summer 2013 attracting diverse funding sources. Our youth education programs have grown with partnerships among Sea Grant, the Oregon Coast Aquarium, and Lincoln County School District. Our Visitor Center, with over 150,000 visitors last year, has evolved into a social laboratory for free choice learning that leads national and international research. USGS became the sixth agency partner, and within OSU, the Marine Mammal Institute and the Northwest National Marine Renewable Energy Center were established.

HMSC's community partnerships have likewise blossomed. HMSC's collaborative work in partnership with community leaders in industry, non-profits and local government, have led to a focused economic development strategy around marine science and ocean observing. Led by the Port of Newport, a community effort brought NOAA's Marine Operation Center of the Pacific to Newport, and other developments include ocean observing infrastructure and the offshore marine renewable energy test berth. Such partnerships are critical to the continued development and prosperity of HMSC and community alike.

As I take the helm as the new Director of HMSC, I do so on the shoulders of the Directors before me who have so ably steered HMSC along its course. I wish past Director, George Boehlert, godspeed in his retirement journey and thank him for his ten years of service to HMSC. As George before me, I am privileged to be able to work with the many dedicated staff, colleagues and students at OSU and our partner agencies, the amazing volunteers who staff our Visitor Center year round, and the local community of Newport, Lincoln County and all along the Oregon coast. The future of HMSC is very exciting as OSU makes plans for expanding the educational mission here and in so doing extending its academic mission to encompass the entire coast of Oregon. I look forward to this leg of HMSC's incredible voyage and sharing in all of its great successes.

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For more information, or to contact the OSU Hatfield Marine Science Center, please go to hmsc.oregonstate.edu.

1939
Oregon State College (OSC) establishes biological lab on Yaquina Bay with Prof. Roland Dimick; focus is on oyster and clam culture

1955
Dr. Wayne Burt establishes oceanography classes at OSC

1961
OSC Oceanography program acquires the R.V. Acona

OSC becomes Oregon State University

1964
OSU Oceanography program acquires the R.V. Yaquina

1965
Marine Science Center (MSC) main building, visitors center and dock built

1966
Dr. Burt and Dr. Thomas Scott appointed director and deputy director of MSC

OSU Oceanography program acquires the R.V. Pauite

Fostering Collaborative Partnerships for Almost Half a Century

Oregon State University's Hatfield Marine Science Center (HMSC) is one of the leading marine laboratories in the U.S. Since its inception in 1965 as OSU's marine research station and public Visitor Center, HMSC has become internationally recognized for its interdisciplinary approaches to marine research.

OSU's Hatfield Marine Science Center:

- Conducts cutting-edge research on ocean and coastal ecosystems, fisheries and other marine resource management issues, and geosciences including undersea earthquakes and volcanoes
- Serves as a national model for academic-government-industry collaboration in marine research, education, and outreach
- Represents an interagency employment base of over 300 people and a combined budget of over $40 million

HMSC's collaborative scientific community fosters partnerships:

- Within OSU, with programs from seven colleges and four interdisciplinary centers, and
- Outside OSU, with eight resident state and federal agency activities and multiple collaborating national and international universities

Located on the shores of Yaquina Bay in Newport, Oregon, HMSC's technology, location, infrastructure, multi-agency presence, and breadth and depth of marine and coastal scientific expertise position OSU to address issues of high economic, scientific, and aesthetic value in marine and coastal systems.

Diversity of Research at HMSC

HMSC fosters a research culture that values multi-disciplinary approaches to complex scientific and pressing social/economic questions. Research diversity is one of the signature strengths of HMSC.

marine biology and ecology
marine fisheries
geochemistry
ocean exploration
botany
marine genomics
zoology
free-choice learning
regional climate-ecosystem dynamics
oceanography
aquaculture
marine chemistry
marine microbiology
population dynamics
marine acoustics
marine geology
marine mammal ecology
marine renewable energy

Research

Advancing trans-disciplinary, multi-agency approaches and cutting-edge innovation through partnerships with commercial, government, and non-governmental entities and across traditional disciplinary bounds within OSU.

Education

Mentoring OSU graduate and undergraduate students through experiential coursework, faculty and agency research, and first hand exposure to HMSC's collaborative culture .

Outreach

Engaging youth, the public, teachers, and policymakers. HMSC's Visitor Center connects the public as well as K-12 students and teachers directly to HMSC science, and marine educators convey the excitement of state-of-the-art research as it unfolds in real-time.

Collaboration

1968
OSU receives first institutional Sea Grant award

OSU Oceanography program acquires the R.V. Cayuse

1969
OSU Oceanography program acquires the R.V. Sacajawea to replace Pauite

1970
ODFW builds facility at MSC

1971
OSU designated one of the first four Sea Grant Colleges

1972
Dr. John Byrne designated director of MSC

Li House built for residency

1973
Year-round instruction at MSC begins

Main access road paved

Dr. Bruce Mate joins the faculty & Whale Watch Program begins

National and International Research Collaboration

Agency - OSU collaboration began in 1970 with the co-location of ODFW at the Marine Science Center, followed by the EPA in 1972. The original attraction was the Newport facility's state-of-the-art seawater laboratories for experimental wet lab research. As the level of collaboration increased, however, agency research increased to 8 different programs housed in 6 agency buildings. Today, the level of academic and interagency collaboration is unprecedented at a marine laboratory.

- George Boehlert
HMSC Director
2002-2012

Spotlight on NOAA-OSU Collaboration

At the heart of HMSC's collaborative culture is the long-standing partnership between Oregon State University (OSU) and the National Oceanic and Atmospheric Administration (NOAA). Established in 1982, the Cooperative Institute for Marine Resources Studies (CIMRS) fosters collaborative research in diverse, interdisciplinary fields including marine ecosystems and climate, fisheries science, aquaculture, oceanography, geology, acoustics and marine-resource technology. CIMRS draws on the scientific expertise and innovation of academic and federal agency scientists, advancing and aligning the missions of each organization. CIMRS scientists are a mix of OSU Faculty from multiple departments and agency researchers from NOAA's Northwest Fisheries Science Center, Alaska Fisheries Science Center, and Pacific Marine Environmental Laboratory. NOAA and other agency scientists serve as OSU courtesy faculty, mentoring students and adding a valuable component to university life. For more information see: http://oregonstate.edu/cimrs/

Research

NOAA in Newport

In addition to CIMRS, a NOAA – OSU Cooperative Institute, HMSC hosts three NOAA programs: the Northwest Fisheries Science Center, the Alaska Fisheries Science Center, and the Vents Program of the Pacific Marine Environmental Lab. HMSC also partners with NOAA's ship support facility, the Marine Operations Center – Pacific, which was relocated to Newport in 2011 and is responsible for the operation, staffing, and homeporting of ten NOAA research vessels.

Research conducted by OSU and agency scientists at HMSC informs resource management and helps bridge the gap between science and policy. The level of academic and interagency collaboration makes HMSC a nexus for cutting edge marine research, learning and outreach, nationally and internationally.

photo by: Harrison Aerial Photography

Senator Mark O. Hatfield

shared OSU's vision for 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 dedicated as the Mark O. Hatfield Marine Science Center.

USDA

The US Department of Agriculture's Agricultural Research Service (ARS) at HMSC partners with OSU and the shellfish aquaculture industry in the Pacific Northwest region to address industry and ecological issues. Current research is focused on finding alternative pest control methods for burrowing shrimp, which undermine the sediments under cultured oysters. Other research partnerships of the ARS include study of summer mortality in oyster growing areas, and development of genetically improved stocks of commercially important shellfish.

EPA

The Environmental Protection Agency's Pacific Coastal Ecology Branch (PCEB) is developing approaches to assess the effects of human activities on the ecological resources of Pacific Northwest estuaries, improving EPA's ability to protect the environment. PCEB scientists are working on ways to improve the protection of estuaries from excess nutrients, on the effects of climate change on estuaries, and on how to evaluate the important ecological services of estuaries such as healthy fish, shellfish, and wildlife populations. PCEB's research supports the Program and Regional Offices of EPA and the Agency's mission to protect the environment and human health.

USFWS

US Fish and Wildlife Service, the federal agency that manages much of the nation's rich fish, migratory bird and wildlife resources, manages the six National Wildlife Refuges that grace the Oregon Coast. In addition, staff work with agencies, organizations and private landowners to conserve species and their habitats off the Refuge lands. 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.

USGS

The US Geological Survey's Newport Duty Station, established in 2010, is HMSC's newest agency addition. USGS scientists partner with government, industry and non-profit organizations to define, develop and evaluate models predicting climate change effects in Pacific Coast estuaries. Their research and technical assistance helps to support the best possible stewardship of the Nation's natural resources, emphasizing fish populations and aquatic ecosystems of the West.

1974
Offices added for Sea Grant Marine Advisory Staff

1975
OSU Oceanography acquires the R.V. Wecoma

1976
Library and education building completed

1977
Dr. Lavern Weber is hired as MSC director

Oceanography department adds faculty for MSC

1979
Newport Aquaculture Laboratory is built

Fisheries & Wildlife students are in residency for a term

1980
EPA moves Pacific Marine Division to MSC

Marine Biology intensive quarter begins

Supporting Communites through Research Collaboration

Our Dynamic Coastal Oceans

What's new on the Oregon Coast? From marine reserves to wave energy, ocean acidification to upwelling and hypoxia, the Oregon Coast is a dynamic system that serves as a major portal to the physical and biological study of the ocean. Remote observing technologies of the ocean observing initiative include cabled observatories, offshore moorings, and mobile, remotely operated robotic 'gliders'. These new tools bring valuable ocean data directly to lab and office computers, allowing scientists at OSU and beyond to address previously unanswerable questions about complex ocean processes. These activities also bring economic development to coastal communities, with HMSC serving as a dynamic hub for a growing marine science community.

OSU, with its Land Grant mission of public service, is responsive to the needs of Oregon's coastal communities. Research in diverse fields, from seafood technology to marine ecology and resource management, helps communities build long-term economic stability and maintain vibrant working waterfronts.

- Gil Sylvia,
Director, Coastal Oregon
Marine Experiment Station

Research

Research Addressing Practical Problems

The OSU Coastal Oregon Marine Experiment Station (COMES) has served as a critical link between Oregon's Land Grant University and coastal communities since 1988. As an Agricultural Branch Experiment Station dedicated solely to coastal and marine issues, COMES supports Oregon's fishing, seafood, and aquaculture industries through research and development. Improved utilization of marine resources, increased production of commercially harvested and cultured seafood, and development of value-added seafood products are just some of the ways that COMES faculty, staff and students make a difference in the lives of coastal Oregonians. Based on the Oregon Invests database, in 2010-2011 COMES programs generated over $13 million in economic impacts and produced the equivalent of 30-40 new jobs for Oregon and Pacific Northwest coastal communities. Website: http://marineresearch.oregonstate.edu

Oregon Marine Reserves

In 2009, the Oregon State Legislature passed House Bill 3013, initiating a collaborative, public, stakeholder-driven process toward establishing marine reserves within Oregon's Territorial Sea. Marine reserves protect designated areas within Oregon's Territorial Sea or adjacent rocky intertidal habitats from extractive and development activities. Action by the legislature follows over a decade of research by oceanographers, marine biologists and other ODFW and university scientists along with Sea Grant Extension agents on the ability of marine reserves to enhance the abundance, size and diversity of marine life, including commercially valuable fish stocks, in Oregon's coastal waters.

ODFW

The Oregon Department of Fish and Wildlife (ODFW) through its Marine Resources Program (MRP) based at HMSC, conducts monitoring, sampling, research and management in support of both commercial and recreational marine fisheries. MRP's goal is to increase both the quality and quantity of stock assessments and biological information collected through improved at-sea and dockside sampling programs and through carefully designed research projects. MRP also addresses emerging fishery resources concerns, such as evaluating changes in regulations, developing alternative fishing gear, providing information on stocks with unknown status, developing alternative survey methods, and improving stock assessments. Collaborative partners include Oregon State University, NOAA's National Marine Fisheries Service, and the fishing community.

Whales and Waves

The OSU Marine Mammal Institute (MMI) based at HMSC is a global leader in discovering behavior and critical habitats of marine mammal species, including cetaceans (whales, dolphins and porpoises) and pinnipeds (seals and sea lions). To understand how these species interact with their environment and the human activities affecting them, MMI's researchers use satellite tracking, genetics, remote observation technologies, and other innovative techniques.

Locally, MMI scientists are assessing the potential impacts of wave energy infrastructure on migrating and summer resident gray whales off the Oregon Coast. In addition to input on site selection for wave energy devices, MMI is designing and testing innovative deterrent systems, to help whales negotiate around these devices and avoid collisions with associated cables.

As interaction between ocean users, including commercial fishing, remote observatories and wave energy devices become more complex, MMI's multidisciplinary research and expertise are an invaluable resource for managers and communities along the Oregon coast. Present studies involve work from the Arctic to the Antarctic and involve industries throughout the world. See: http://mmi.oregonstate.edu

1981
NOAA Research Support Facility built

1982
Cooperative Institute for Marine Resources Studies is founded

1983
MSC becomes HMSC in honor of Senator Mark O. Hatfield

NMFS/AFSC Fisheries Behavioral group arrives with Dr. Bori Olla

1984
Pacific Marine Environmental Laboratory VENTS Program arrives with Dr. Bob Embley and Dr. Steve Hammond

1985
Winton Housing increases housing capacity from 40 to 88

US Fish & Wildlife stations Roy Lowe at HMSC

Dr. Bill McNeil appointed CIMRS director

1987
Coastal Oregon Productivity Enhancement (COPE) is located at HMSC

Supporting Industry through Research Collaboration

OSU's transdisciplinary research has significant impact on Oregon and the world. We collaborate with all sectors - academic, industrial, governmental and non-governmental - to improve fundamental understanding and create solutions to local, national and global challenges. Our broad spectrum of fundamental and applied research supports OSU's vision of healthy people, a healthy economy and a healthy planet.

- Rick Spinrad
OSU Vice President for Research

Renewable Energy from the Ocean

photo by: Pat Kight, Oregon Sea Grant

Ocean waves offer a vast source of clean, renewable energy, and that potential is especially strong along the Oregon coast. HMSC is helping make it a reality. Through the Northwest National Marine Renewable Energy Center (NNMREC) - one of three US Department of Energy funded marine renewable energy centers nationwide - Oregon State University is working with the Oregon Wave Energy Trust, a variety of device developers, and others on wave energy prototypes. HMSC is a key partner in both improving understanding of environmental effects as well as in developing an ocean test berth for commercial scale marine power technologies which was deployed in 2012 off Yaquina Head in Newport. For more information, see: http://nnmrec.oregonstate.edu/

HMSC's Sarah Henkel is a faculty researcher assessing the potential impacts of wave energy on sea floor habitat. Her research will analyze the oceanographic and sea floor characteristics of NNMREC's test berth site, before and after installation.

HMSC's Wet Pet Vet

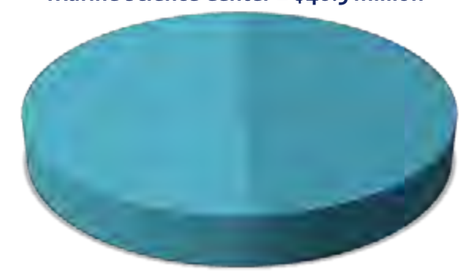
As part of Oregon Sea Grant's research and outreach team at HMSC, OSU veterinarian and professor Tim Miller-Morgan promotes conservation in the world's tropical seas - one fish at a time. His Aquatic Animal Health Program provides outreach, education, and service to the ornamental fish industry, regionally, nationally and internationally. By educating individuals that make up the ornamental fish supply chain from collectors, importers, wholesalers and retailers down to the hobbyists who purchase them, his program strives to reduce mortality and increase captive breeding programs to protect fish populations and biodiversity worldwide. See the Wet Pet Vet's blog at: http://blogs.oregonstate.edu/wetvet/

Impacts

Oregon State University continues to conduct more research than all other Oregon University System campuses combined, with $261.7 million in research funding in 2011. The OSU Hatfield Marine Science Center campus is a major economic driver on the Oregon Coast, employing over 300 staff with a total annual research and operating budget over $40 million. OSU's faculty research programs represent about half of that budget, with six federal and state agencies making up the rest.

The growth of OSU's marine research and education enterprise in both Newport and Corvallis has led to regional economic development strategies focused on marine science and ocean observing. This strategy has been embraced by the City of Newport, Lincoln County, and the local economic development agencies. HMSC has played a central role in stimulating this strategy.

Total 2012 Budget of OSU Hatfield Marine Science Center = $46.5 million



Oregon State University $23.7 million

Federal and State Agencies $22.8 million

Research

Research Support for the Oyster Industry

Oysters are a major product of the $100 million west coast shellfish culture industry, and HMSC research supporting the industry includes local impacts of ocean acidification and its effect on hatchery oysters. Scientists are determining the threshold at which oysters, clams and mussels – including those that are commercially important – become affected by acidification, which is linked to rising atmospheric CO_2. This research takes advantage of HMSC's world-class seawater system and experimental wet lab facilities, which helped researchers secure a $2 million, four-year grant from the National Science Foundation. USDA research investigating population control methods for a mud shrimp interfering with oyster culture also provides industry support.

ProjectCROOS

unites state-of-the-art science and commercial salmon fishermen in a unique project that aims to save salmon and the Oregonians who depend on them for their livelihood. In this innovative collaborative project, the fishermen serve as frontline researchers, collecting data as they fish to provide valuable clues about where and when different stocks of Chinook salmon are located during their ocean years. Using this real time data, OSU geneticists are hoping to help fishermen target healthy stocks while avoiding weak stocks in order to conserve resources and maximize economic benefits.

Fishermen with ProjectCROOS send their harvest data and salmon tissue samples to HMSC for analysis. Barcoded ID tags placed on harvested salmon at sea are used for data coordination. These tags also allow consumers to access harvest data and learn about the salmon fishery using the web or through electronic kiosks in supermarkets.

1988
Estuary nature trail is built

Weber appointed CIMRS director

COMES established

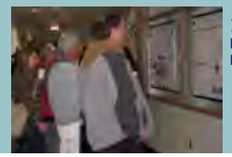
1989
COMES begins partnership with the fishing industry to establish whiting as a valued Oregon fishery

1990
New library completed, named in memory of Marilyn Potts Guin

Dr. Mate selected as director of Marine Mammal Program

Seawater system completed

1991
U.S. Environmental Protection Agency building completed



1992
First Markham Research Symposium

1993
National Oceanic and Atmospheric Administration (NOAA) Northwest Fisheries Science Center staff arrive

Academic Opportunities through Collaborative Partnerships

A culture of student research is a signature strength of HMSC. Our students are engaged in collaborative research opportunities in the field, at sea and back in the lab. Students experience a diversity of real-world settings focused on real-world problems alongside academic and government marine scientists - gaining valuable career experience.

- Itchung Cheung
HMSC Academic
Program Manager

Experiential Education - Immersed in a Sea of Possibilities

Central to HMSC's mission of "research, education and outreach through collaborative partnerships" are university students. HMSC supports students - ranging from non-science majors and community college to undergraduate interns and graduate students - with world-class, interdisciplinary, hands-on learning. In addition to a variety of introductory and specialized courses, HMSC has three thematic terms, forming the foundation for experiential education at the coast. Coastal Ecology and Resource Management in the fall quarter, Marine Biology in spring quarter and the summer Marine and Environmental Studies Program offer a combination of field, wet lab and classroom learning. One highlight of students' experience is an individual research project completed with a faculty or agency scientist as mentor. HMSC's coastal campus allows students from OSU and beyond to "eat, sleep and breathe" marine science for a total immersion experience. See: http://hmsc.oregonstate.edu/welcome-academic

Graduate Students on the Cutting Edge of Marine Research

From genetics to trawling, microbes to whales, HMSC graduate research spans the breadth of marine science. Mentored by research faculty and government agency scientists, students conducting research at HMSC gain real world experience in transdisciplinary, interagency research. Exposure to a broad range of scientific collaboration enhances students' experience and enriches their ensuing professional careers. Graduate students hail from many OSU Colleges and Departments, but share the experience of being part of a vibrant, interdisciplinary marine science community that continues far beyond commencement.

Surfin' Salmon

José Marín Jarrín, a recently graduated Ph.D. student at HMSC, studied juvenile Chinook in an unusual habitat – the surf zone. Since sandy beach surf zones occur along 70% of the Oregon coastline, providing an abundant supply of potential prey and shelter from predators, they may serve as an intermediate habitat for Chinook salmon between the estuary and the open ocean. Jose collected juvenile Chinook salmon using a beach seine, finding that densities of juveniles in the surf zone vary widely and are positively related to estuarine water temperature. Higher temperatures may influence movement and prompt juveniles to leave the estuary and surf in the breaking waves.

Internships

Hatfield Marine Science Center offers a wide range of marine science and education internships. Opportunities abound for university and community college students in diverse fields of study, from marine biology to ocean engineering and science education. See: http://hmsc.oregonstate.edu/internships

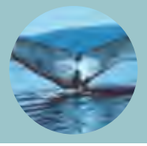
Research Experience for Undergraduates

The Research Experiences for Undergraduates (REU) program, funded by the National Science Foundation, supports active research participation by students from across the U.S. As an REU intern based at HMSC, biology undergraduate Melissa Prechtl's mentor was NOAA Senior Scientist Bill Peterson. Her research investigated the effects of ocean acidification on hatching and development of two copepod species and one species of euphausiid. A highlight was a weeklong research cruise on the NOAA research vessel *Miller Freeman*. Melissa presented her research at the 2011 Association for the Sciences of Limnology and Oceanography (ASLO) conference in Puerto Rico.

NOAA Hollings Scholar Internship

Maha Haji, a NOAA Hollings Scholar and an engineering student from UC Berkley, focused on the environmental effects of wave energy for her research internship at HMSC. An important component of her mentor Sarah Henkel's research is potential impacts of wave energy infrastructure on marine organisms. As an engineering student, Maha asked a different question: what are the potential impacts of organisms on the infrastructure? Her study found that after exposure to the oceanic environment, and potentially fouling by marine organisms, less force was required to break the kinds of cables that may hold wave energy devices in place.

Academics



1994
Marine Mammal Program endowed

1995
Markham HMSC Director's Chair endowed

U.S. Fish and Wildlife Service building completed

1996
Modular housing added

1997
New Visitor Center completed and dedicated

Ship Operations and dock expand

1998
COPE ends

OSU Seafood Lab opens in Astoria

1999
Yellow submarine donated by OMSI

Education and Outreach Through Collaborative Partnerships

Education and outreach in marine sciences is central to HMSC's mission; understanding how we make challenging marine issues and current research accessible to the public is as important as the content. OSU's Free-Choice Learning Research Program uses the Visitor Center as a learning laboratory to optimize interactive learning for each visitor and to push the field of public science education forward.

- Shawn Rowe
Oregon Sea Grant

Sea Grant Oregon

The Hatfield Marine Science Center excels in public education and outreach for youth, families, and adults. Featuring live marine animals and interactive exhibits, HMSC's Visitor Center has hosted over 10 million public visitors from all over the world since 1966; annually 150,000 visitors and 10,000 students from K-12 classes visit HMSC. Managed since 1997 by Oregon Sea Grant, the Visitor Center partners nationally to directly connect OSU faculty and agency scientists engaged in state of the art research with public audiences, teachers and students. These partnerships, including the Center for Ocean Sciences Education Excellence, Pacific Partnerships (COSEE), combined with Sea Grant's innovation in free-choice learning research, make OSU a leader in marine science education. See: http://hmsc.oregonstate.edu/visitor/

photo by: Pat Kight, Oregon Sea Grant

"Careers in Science" start at HMSC

Oregon Sea Grant's "Careers in Science Investigation" programs introduce middle school students to the breath of career opportunities in marine science. Students participate in marine science with professional scientists from OSU and HMSC partner agencies, including diverse, hands-on activities such as fish dissections, data collection on ghost and mud shrimp, and research vessel tours. The goal of these programs is to educate students on local employment opportunities and stimulate interest in pursuing a career in science.

Education

Outreach

Free-Choice Learning

Based at the Hatfield Marine Science Visitor Center, the **Free-Choice Learning (FCL) Laboratory** is well on its way to becoming a premier research facility for researchers at OSU and around the country. Buoyed by a $2.6 million, five-year grant from the National Science Foundation, the FCL Lab is developing new tools such as facial recognition, eye-tracking and handheld augmented- reality systems to study visitor behavior. For the first time, learning researchers will be able to automate the collection of real-time behavioral data related to visitors' learning experiences. This will allow exhibits to tailor content to each visitor's knowledge level and will support experimental approaches to exhibit development and research. Visit the FCL Blog at: http://blogs.oregonstate.edu/freechoicelab/ for more information.

Supporting Local Teachers

Boasting multiple locations for state-of-the-art marine research and education, Lincoln County, including HMSC, serves as a national leader on a diverse array of marine science innovations. Funded by the Oregon Department of Education, the award-winning Oregon Coast Aquatic and Marine Science Partnership (OCAMP) directly connects Lincoln County teachers with this vast resource of knowledge, helping students in Lincoln County Schools become among the most ocean literate in the nation. Through hands-on activities and direct interaction with scientists, marine educators foster teachers' professional development with a focus on ocean literacy and aquatic and marine science. Collaborating with the Lincoln County School District and Oregon Sea Grant at HMSC are the Oregon Coast Aquarium, the Bureau of Land Management, and Oregon Health Sciences University.

Marine Science Day

Marine Science Day at HMSC, on the second Saturday in April, attracts several thousand visitors each year. As an open house for OSU and the six federal and state agencies on the HMSC campus, as well as the Oregon Coast Aquarium and NOAA Marine Operations Center–Pacific, the event highlights marine science and education through tours, displays, and demonstrations. Over 30 different scientist-supported exhibits provide an interactive, behind-the-scenes experience fostering a direct connection between marine scientists and visitors of all ages.

Marine Investigations Camp

Oregon Sea Grant day camps at the Hatfield Marine Science Center for youth 8 to 18 years old introduce participants to marine science through experiential activities: fieldtrips, hands-on programs, research vessel tours, and interactions with researchers. Scholarships provided to local youth through generous donations by the Friends of HMSC and Georgia Pacific help to support ambitious ocean literacy goals set forth by local leaders in education.

2000
RV Elakha launched

Dr. Clare Reimers appointed CIMRS Director

2001
Dr. Weber retires

2002
Dr. George Boehlert hired as director of HMSC

First SeaFest event at HMSC

2003
First USDA ARS personnel arrive

NOAA Barry Fisher Building dedicated

HMSC Hosts Census of Marine Life workshops

2004
NSF-Research Experience for Undergraduates begins

Friends of HMSC forms

2005
HMSC Strategic Plan completed

Educational partnership with Oregon Coast Aquarium begins

2006
Economic Development Strategies around Marine Science initiated

Science Through Scholarship and Service

Publications are an 'exclamation point' in the research cycle. They feed the process of science by documenting discovery, stimulating new research and recording achievement. The library serves as a focal point for this piece of the research cycle, archiving and providing access to information, data and knowledge.

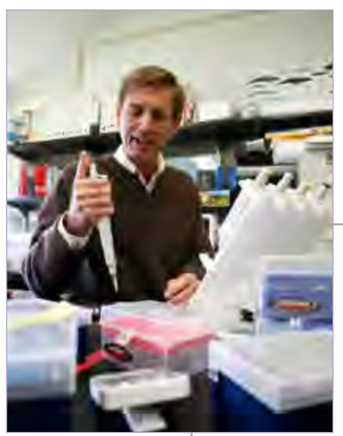
- Janet Webster, Director of HMSC's Guin Library

Communicating Science

Scientists at the Hatfield Marine Science Center communicate the results of their research to their peers and the interested public in many forms, including journal articles, presentations, blogs, and reports. Well over 100 scientific articles from HMSC, including numerous theses and dissertations, are published each year, adding to an impressive legacy of publications in the scientific community's most prestigious professional journals. Many are the result of interagency partnerships and exemplify HMSC's culture of collaboration.

Sharing research results and ideas increases our understanding of the world while inviting all to share in the process of scientific discovery. Research conducted at HMSC benefits our community, the nation and the world because we address issues and questions that challenge our physical, economic and social progress and the health of our ocean ecosystems.

HMSC's comprehensive Station Bibliography can be accessed through the Guin Library website: http://guin.library.oregonstate.edu/



Scholarship

Recognition

In 2011, HMSC's Scott Baker was recognized for his distinguished record of research, scholarship and professional service with a prestigious Pew Fellowship in Marine Conservation for "outstanding global leaders or teams who are working to preserve and protect the world's oceans and marine species." As a conservation geneticist, cetacean specialist, and OSU professor, Scott Baker serves as associate director of the OSU Marine Mammal Institute and mentors an international cadre of students. For more information, see: http://mmi.oregonstate.edu/ccgl

Service to Science

Service to the science community is also an important component of scholarship. HMSC's faculty and agency scientists serve as leaders in their respective research fields and support the peer-review process of science publication as editors, reviewers, and mentors.

Ric Brodeur, senior scientist with NOAA's Northwest Fisheries Science Center and OSU courtesy faculty, served until recently as editor of the Fishery Bulletin, a quarterly peer-reviewed scientific journal published by the National Oceanic and Atmospheric Administration, and Jessica Miller, an OSU fisheries ecologist organized the 14th Salmon Ocean Ecology Meeting in Newport in 2012.

Donors

Lavern Weber Visiting Scientist Program

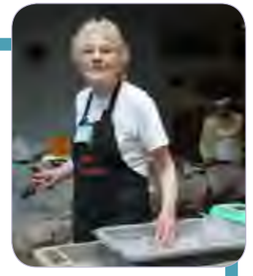
Lavern Weber, HMSC Director from 1977-2002 (right) and George Boehlert, HMSC Director from 2002-2012 (left) on the HMSC campus.

The Lavern Weber Visiting Scientist Program is one of the many ways HMSC fosters marine research through collaboration. Visiting Scientists bring expertise in diverse disciplines, and lay the foundation for professional collaborations across universities and agencies. Through the Weber Visiting Scientist Program, distinguished researchers become part of HMSC's research community, sharing expertise and diverse perspectives with professional colleagues, students, and local citizens. Formal presentations, informal conversations and collaborative projects serve to initiate lasting professional friendships.

Funded by donations to a named endowment and matching funding from the OSU Research Office, the Fellowship honors Dr. Lavern Weber, who directed HMSC from 1977 until 2002. The program supports a distinguished scientist for visits of up to several months duration.

*Lavern Weber Visiting Scientists include **Dr. Bronwyn Gillanders** of the University of Adelaide (right), whose visit initiated a number of new projects comparing fisheries of the North Pacific with those of the South Pacific and Southern Ocean, and **Dr. Fred Allendorf** (not shown) of the University of Montana, who collaborated with HMSC scientists using genetic techniques in species as diverse as microbes and whales.*

HMSC's Volunteers



HMSC Visitor Center volunteers who donate their time, energy and expertise exemplify the spirit of community service and help Sea Grant's programs thrive. They support HMSC's mission primarily as marine science interpreters, although some use their considerable skills and life experience to contribute "behind the scenes" in a variety of capacities.

Kent and Ruth Kroneman have volunteered well over 3500 hours since 2008. As a Master Electrician and Certified Broadcast Engineer, Kent puts his electrical skills to use behind the scenes as the Visitor Center's "go to fix-it guy", and constructs mini-ROVs for Sea Grant's popular ROV Challenge Marine Education Program.

Ruth came to HMSC with a lifelong interest in marine biology and 35 years of experience as a rock, water, and soil analyst. Combining her contagious enthusiasm and attention to detail, Ruth feeds the Visitor Center exhibits' marine life several times each week. In this role, Ruth answers countless questions from the visiting public and alerts staff to changes in feeding behavior.

HMSC's Donors

As a generous donor and a valued member of the HMSC community, John Sherman is involved in many aspects of the Visitor Center's operations. He has sponsored a number of exhibits and donated equipment to help staff, interns and volunteers work safely and efficiently in a challenging environment.

HMSC donors are members of the Friends of the Hatfield Marine Science Center, and their generous contributions support HMSC's mission in so many ways. Over $100,000 in donor-supported scholarships are awarded to HMSC students each year, and other support includes K-12 programs, equipment purchases and events like Marine Science Day and Science on Tap. http://hmsc.oregonstate.edu/friends

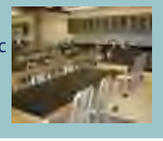
2007
Wave Energy environmental effects workshop

HMSC Master Plan completed

2008
Marine Mammal Institute established

Northwest National Marine Renewable Energy Center established

2009
Recovery Act drives renovations at HMSC



2010
USGS Joins HMSC

HMSC undergoes strategic review

2011
NOAA's Marine Operations Center of Pacific arrives

Marine Biology program celebrates 30th year at HMSC

2012
R/V Wecoma retired; replaced by R/V Oceanus

Ocean observing programs expand off coast

NNMREC Test Berth Site initiated

George Boehlert retires as HMSC Director

2013
OSU President Ed Ray champions educational expansion at HMSC

Dr. Robert K. Cowen named Director of HMSC

Infrastructure

As a leading marine laboratory in the Pacific Northwest, the OSU Hatfield Marine Science Center's infrastructure, location, and expertise uniquely position OSU to address issues of high scientific and economic value in marine and coastal systems.

Seawater, a Critical Resource for HMSC

HMSC's world-class facilities are integral to HMSC's mission. A shared seawater system has been a unique and indispensible feature of the campus since 1965, collaboratively supported to provide an essential resource to HMSC's modern research and teaching laboratories. The system provides quality seawater to OSU and agency buildings, delivered via an 800,000-gallon seawater tank filled twice daily during high tide. In addition to laboratories, seawater is essential for sustaining live aquatic organisms in HMSC's Visitor Center, for the education and enjoyment of the visiting public.

Supporting Seagoing Research

Oceanographic research vessels are a significant asset to OSU's seagoing marine research programs. OSU's ship support buildings and dock at HMSC serve as homeport to the 177' vessel *Oceanus*, the 85' Marine Mammal Institute vessel *Pacific Storm*, and the 54' coastal vessel *Elakha*. *Oceanus* was transferred to OSU from Woods Hole Oceanographic Institution in March 2012 to replace her sister ship, *Wecoma*. Adjacent to the OSU ship support facility is the new home of NOAA's Marine Operations Center – Pacific, with support staff and dock facilities for six NOAA research vessels. See: http://ceoas.oregonstate.edu/facilities/

Genetics Research Reaches New Heights

In support of interdisciplinary genetics research, HMSC collaboratively acquired a state-of-the-art instrument, the Roche Bioscience Junior 454 Genome Sequencer (nicknamed "Junior") in 2011. In spite of its small size, Junior has exponentially expanded HMSC's genetics and genomics research capabilities as well as the scope of research questions that HMSC and visiting scientists can address. Junior's output is genetic sequence data for species as wide-ranging as marine microbes, oysters, krill, salmon, rockfish, and whales, spanning the breath of HMSC's diverse marine science.

OSU's Guin Library at HMSC

HMSC's Guin Library has gained well-deserved recognition nationally for the quality of its collection, the expertise of its professional library staff, and its inspiring atmosphere. It houses the university's marine science collection, including over 36,000 volumes with a strong focus on the biological and management issues of the marine and estuarine environment. The library staff also maintains the HMSC Station Bibliography of well over 100 publications produced annually by the mix of university, state and federal researchers and managers based at HMSC. See: http://guin.library.oregonstate.edu/

Credits:

This publication was produced by the OSU Hatfield Marine Science Center
Maryann Bozza, editor
Candace Rogers, graphic design

Printed: October 2013