



OREGON SEA GRANT

Program Guide

2010–2012



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2010–2012

Oregon Sea Grant
Corvallis, Oregon

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Sea Grant is a unique partnership with public and private sectors, combining research, education, and technology transfer for public service. This national network of universities meets the changing environmental and economic needs of people in our coastal, ocean, and Great Lakes regions.



Credits:

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Oregon Sea Grant’s mission is to develop and support an integrated program of research, outreach, and education that helps people understand, rationally use, and conserve marine and coastal resources. Our activities respond to the needs of ocean stakeholders and act to stimulate the Oregon economy.

Oregon Sea Grant (OSG) is a statewide program headquartered at Oregon State University. Sea Grant is a state-federal partnership, with the majority of its federal support coming from the National Oceanic and Atmospheric Administration. Funding for Sea Grant also comes from Oregon State University, other state and federal appropriations and grants, and contributions from local governments, industry, and other sources.

Oregon Sea Grant is committed to carrying out and supporting efforts that will make a difference, both in the way people perceive the ocean and its resources and in the way they act to use and conserve those resources.



Leadership

The leadership team fosters continuous planning, guidance, budgeting, and innovation to improve our integrated approach to serving the people of Oregon and the region. This team is headquartered at Oregon State University in the Kerr Administration Building.

We strive to meet and anticipate the region's changing needs through an integrated program of research, outreach, and education, with the goals of creating an informed and engaged society, and investing in and using sound science.

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Competitive Research

“Coastal Science Serving Oregon”

Sea Grant has, time and again, demonstrated that its programs return value to the state that is many times greater than the initial investment.

—John Cassady, former VP for research, Oregon State University

Oregon Sea Grant (OSG) supports competitive, peer-reviewed research allowing top ocean and coastal scientists to apply their skills to issues of critical importance to the state, the region, and the nation. The process is guided by a program-wide commitment to

- improving human health and safety related to ocean and coastal use
- promoting social progress and economic vitality
- enhancing the sustainability of coastal ecosystems

OSG conducts a biennial competitive grants program, from request for proposals to oversight of funded projects. Through its program development funds, Sea Grant also provides rapid response to emerging problems and opportunities that arise outside the scope of the biennial competition.

In addition, fellowships and internships provide undergraduate and graduate students with opportunities to develop a working knowledge of coastal and marine issues, management, and policy through assignment to an external organization or agency.

Every two years, we distribute National Oceanic and Atmospheric Administration research grants through a rigorous, competitive, peer-reviewed process. In addition, Sea Grant faculty seek and obtain their own grants to study issues ranging from community preparedness for climate change to understanding how people learn.

All research projects are expected to include outreach components to ensure that the results of cutting-edge science will be put to work on the ground—and at sea.

Researchers come from the leading ranks of academic science in Oregon, often partnering with others from the Pacific Northwest and beyond to explore questions of broader regional, national, or international scope.

Current research

In the 2010–2012 funding period, we are supporting research in the six key issue areas identified in our Strategic Plan, directed toward creating an informed and engaged society, and encouraging the investment in, and use of, sound science:

- Multiple Uses and Spatial Planning
- Oceans and Human Health
- Watersheds and Water Resources
- Community Resilience to Coastal Hazards and Climate Change
- Fisheries and Seafood
- Coastal Learning and Decision Making

Multiple Uses and Spatial Planning



Kaety Hildenbrand

Demand for ocean space and pressure on ocean resources are rapidly increasing. New uses of ocean space, such as alternative-energy development and marine reserves, have provoked

ocean and coastal stakeholders to become more involved in planning and decisions related to allocation of ocean space.

These conditions create a culture of competition and highlight the critical need for knowledge and understanding about how current ocean uses affect each other and how they cumulatively affect the environment.

Two new uses being considered in Oregon are marine reserves and renewable energy. Oregon Sea Grant's efforts are focused on filling critical gaps in knowledge through interdisciplinary research that seeks to understand social, economic, and ecological aspects of multiple uses of ocean space and implement spatial management based on sound science.

We will serve the state and region as a trusted broker by working in partnership with government, industry, and nongovernmental

organizations to develop processes for engaging diverse interests in solution-oriented and science-based planning for use of ocean space, and through training and facilitation of improved communication among user groups. We will help seek innovative and practical solutions for ocean-use conflicts, including engagement of a wide range of stakeholders in decision making.

SEA GRANT-FUNDED PROJECT, 2010–2012:

A Community-Based Framework for Identifying, Estimating, and Evaluating Ecosystem Services Associated with Oregon’s Proposed Marine Reserves (R/CC-12)



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Oregon’s marine reserves process provides a tangible, study-ready opportunity to develop techniques that begin to apply the concept of ecosystem-based management to real-world marine management issues. Many researchers, managers, and stakeholders see marine reserves as promising tools in the sustainable management of marine resources. However, implementation and monitoring are often difficult and contentious, and ongoing evaluation of performance nonexistent. The proposed creation of marine reserves at two sites in Oregon creates an opportunity to establish and test a community-based framework for identifying, estimating, monitoring and evaluating the costs and benefits of marine reserves. Michael Harte’s team is studying the dynamic complexity of social, cultural, economic, and ecological processes, and the trade-offs associated with the establishment of marine reserves. The project is also considering the value local coastal communities hold in the relative benefits and costs of marine reserves.

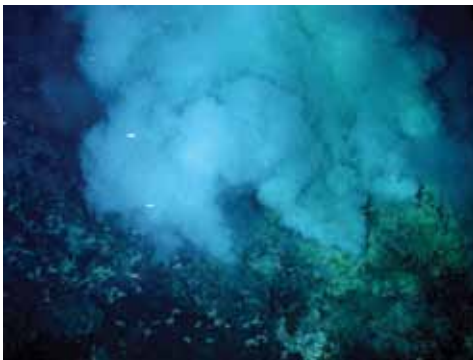
Human health and safety are undeniably linked to the health of our ocean and coastal ecosystems, which provide benefits such as clean water, seafood, marine pharmaceuticals, and recreational opportunities. Safety is also important, particularly for recreational users and commercial fishermen.

Conversely, threats to ocean and coastal health, such as harmful algal blooms, pollution, aquatic invasive species, and fish disease, can increase risks to humans who use and rely on coastal and ocean resources.

Oregon Sea Grant supports research that seeks to assess and expand knowledge of biophysical processes that drive ecological conditions affecting human health and safety, improving forecasting of those conditions and developing and improving public notification and response strategies. Funded research will move beyond understanding to forecasting threatening conditions, with an emphasis on developing applications that provide early warning systems and reduce overall risks. We will support ocean exploration and the discovery of new drugs and other products that can enhance human health and our economy.

SEA GRANT-FUNDED PROJECT, 2010–2012:

Bioactive Natural Products from Deep-Sea Hydrothermal-Vent Organisms
(R/BT-48)



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The escalating problem of drug resistance, especially in infectious diseases and cancer, requires a constant influx of new compounds to inspire the next generation of therapeutic agents. The marine envi-

ronment has emerged as a key source of natural-product drug leads. Screening unique organisms from rare or extreme ecosystems is a proven approach to discovering novel compounds with important biological effects. Deep-sea hydrothermal vents are among the most dynamic and extreme environments on Earth. Because unique invertebrate and microbial organisms inhabit the regions near these vents, there is a strong likelihood that new bioactive, small-molecule natural products will be discovered, given that chemical diversity is directly proportional to biological diversity.

The primary objective of Dr. Zabriskie's project is to screen field-collected specimens of deep-vent invertebrates and bacterial mats, and laboratory-cultured vent bacteria, for bioactive natural products that may serve as useful pharmacological tools and drug leads, especially for the treatment of infectious diseases. Samples of deep-sea-vent invertebrates and bacterial mats, either freshly collected or previously collected and stored frozen, will be obtained from collaborators in the PMEL/NOAA Vents program who access these deep-ocean sites using manned and unmanned submersibles. Achieving this objective will yield valuable knowledge about a new resource for biomedical research and will further our basic understanding of organisms that inhabit and interact in these extreme environments. This project will also associate additional scientific and economic value to these natural resources. It will also provide important outreach opportunities and serve as an educational platform for student trainees.

Watersheds and Water Resources

Oregon's salmon-bearing watersheds are under the pressure of a growing human population and land use that often results in changes in water quality, habitat, and water rights issues. Watersheds also can provide a pathway for invasive species and breeding grounds for fish diseases.

Oregon Sea Grant will target research on better defining the relationships between climate change, upland and coastal land use, restoration efforts, and other changes and downstream impacts to coastal communities and ecosystems and on preventing and mitigating the impact of aquatic invasive species. Engaging the general public and groups such as local governments, outdoor hobbyists, agriculturalists, rural and urban landowners, and woodland managers in solution-

focused initiatives may help to sustain watershed health and conserve water resources.

Oregon Sea Grant will advance understanding of the roles of natural hydrology, riparian ecology, and safe and sustainable land use and development, and provide training and capacity building that helps protect a safe and clean water supply. Oregon Sea Grant will also promote social progress and economic vitality by strengthening regional partnerships and facilitating improved decision making with regard to watersheds and water resources and providing a better understanding of the economic impacts and effective management or prevention of aquatic invasive species.

SEA GRANT-FUNDED PROJECTS, 2010–2012:

Response of Marsh Insects and Benthic Invertebrates to Dike Removal in the Salmon River Estuary: Follow-up, Synthesis, and Education (*R/HBT-12*)



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The Salmon River estuary is a model system for studies of tidal marsh restoration. Previous Sea Grant-

supported research suggests that this estuary is on a trajectory toward recovery after reestablishment of tidal flow beginning in 1978. However, both the natural variability of the system and the time needed to fully restore the tidal marshes remain uncertain, indicating the need for continuing assessment of sensitive indicators of wetland status, such as invertebrates. In addition, this spectacular site, with its history of exploitation and subsequent conservation efforts, is well suited for educating undergraduates and the community at large about estuarine ecosystems and coastal issues. The estuary will perform a unique role in training both future biologists and future teachers, and will serve as a laboratory for an innovative approach in which education and outreach

are integrated with scientific research.

Haberman's project will work to establish a continuing monitoring program for macroinvertebrates and abiotic factors in the Salmon River estuary. The program will assess estuarine recovery, provide authentic research experiences for biology and education majors, create K–12/ community curricular materials, and will provide knowledge of the research and associated educational curricula to scientists, managers, educators, and community members.

A Predictive Approach to Risk Analysis and the Economics of Early Detection and Rapid Response for Aquatic Invasive Species (*R/NIS-19*)



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Budgets for invasive species (IS) detection and management tend to be relatively low, compared to the increasing threats posed by invaders. Current budgets tend to focus on control programs, with little investment in prioritization, exclusion, prevention, and early detection programs. Oregon lawmakers have recognized that investing in such programs carries a high potential return, but they have also expressed a need for research-based information to substantiate such investments. Thus the need for intuitive economic models that assess IS risks, analyze the most effective control points, and prioritize strategies to empower policy makers and resource managers in lowering associated threats and costs.

Dr. Gopinath's team hopes to predict aquatic invasive species introduction and establishment, and to assess the costs and benefits of early detection and rapid response and alternative management strategies. Subsequent evaluation with stakeholder and coastal-dependent communities will contribute to the identification of best policies and strategies for preventing and controlling the introduction and spread of aquatic invasive species. The project and its applications will empower

policy makers with greater confidence in invasive species management decisions, which can lead to increased resources.

Community Resilience to Coastal Hazards and Climate Change

Phyllis Griffin, USC Sea Grant



The coastal areas of Oregon in recent decades have experienced considerable population and development pressure, which is expected to continue. During the same period,

coastal Oregon has seen an increase in the frequency and intensity of winter storms, which have brought record storm damage, flooding, shoreline erosion, and bluff failures.

Just off the coast, the Cascadia subduction zone poses the very real risk of a high-magnitude earthquake and a severe tsunami. Climate change also has the potential to increase the risks associated with erosion, flooding, sea-level rise, compromised water quality, invasive species, and oceanographic changes that could affect aquatic life, including commercial fisheries.

Coastal residents and leaders are struggling to understand and respond to the confluence of these trends. Rural Oregon coastal communities may be more vulnerable and less resilient to climate change than metropolitan areas, because of a lack of overall institutional resources and a greater economic dependence on natural resource systems.

Critical needs for addressing local natural hazards include a better understanding of coastal processes, assessment of local vulnerability to current and projected impacts, identification and setting of priorities on adaptation strategies, and ongoing help implementing those strategies. It is also important to identify the social and economic barriers to hazards and climate change preparation.

Oregon Sea Grant supports physical and social science research to better understand, predict, and adapt to hazards and climate change. Additionally, Oregon Sea Grant will help local residents and leaders build understanding and capacity to plan for and implement hazard response and adaptation strategies, which is critical to the economy, health, and safety of coastal residents and visitors.

SEA GRANT-FUNDED PROJECTS, 2010–2012:

Coastal Effects of Tsunamis (*R/CNH-20*)

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Accurate tsunami evacuation maps are crucial for tsunami preparation. The maps are the basis for evacuation planning, land-use management, and assessment of buildings and infrastructure, and are also used for education and tsunami-hazard awareness. Accurate evacuation maps must be made by physics-based inundation models capable of predicting tsunami effects accurately. A recent NOAA memorandum implies that the current state of inundation modeling is far from satisfactory. Dr. Yeh's project will address this problem by exploring the fundamental mechanisms of local anomalies and tsunami amplifications that arise from the effects of complex local bathymetry (submerged landforms) and river outflows, and will advance predictability of current inundation models. This project will gain a better understanding of tsunami hydrodynamics, thereby advancing inundation-modeling predictability, which will lead to significant improvements in tsunami evacuation maps. Outcomes from this research project have the potential to save lives and reduce damage from tsunami disasters.



Steven Roberts



H. Tuba Ozkan-Haller

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As waves propagate from the open ocean over the continental shelf toward shore, they are affected by the underwater landscape (bathymetry) of the shelf. The U.S. west coast shelf is characterized by complicated bathymetry, with numerous canyons and large banks. Such features can, at places, focus wave energy, and at other places divert waves away. Such local variations affect boat traffic safety, and knowledge of local high-wave heights can aid in navigational planning. Furthermore, knowledge of the alongshore variations can help in the identification of preferred sites for wave energy extraction. Also, forecasts of local beach conditions, including storm surge and flood predictions needed by emergency responders and planners, hinges on accurate nearshore wave forecasts. Finally, access to accurate nearshore wave forecasts will be well received by a variety of recreational user groups of our state's coastline.

Dr. Ozkan-Haller's project proposes to build a numerical wave-modeling system that can predict wave conditions along the entire Oregon coast in the nearshore ocean (to a shallow, 10-meter water depth). Such a prediction system already exists for the coastline of California and is now being used extensively by coastal scientists and planners, and commercial and recreational users, for a variety of applications (online information is accessed 20,000 times per day for unique 30-minute visits). This volume of use suggests a large demand for nearshore wave information on the U.S. west coast. The results should be immediately useful for coastal vulnerability assessments along the PNW, for the quantification of engineering and management needs (such as storm-induced dune or cliff erosion, setback distances, or long-term changes in shoreline position), for navigational planning purposes, for surfing forecasts, and for the selection of sites for wave energy sites.

Fisheries and Seafood

Oregon's coastal history, culture, and economy are shaped by our productive fisheries. Oregon Sea Grant addresses fisheries challenges by integrating the tools of extension, education, and research to improve understanding and management of fishing and aquaculture practices.

Our programs are cooperative and interdisciplinary, incorporating experiential knowledge of the fishing community to enhance understanding and science-informed management of sustainable, commercially valuable fish stocks and ecosystems that support them. Our research focus is on understanding the relationships between habitat, physical forces (for example, climate change and currents), food webs (including invasive species and disease), and fish production to enhance sustainability of coastal ecosystems.

Oregon Sea Grant plays a critical role in building partnerships and helping businesses and communities self-organize, thereby increasing the efficacy of citizen engagement in fisheries-related decision making and management. In addition, we educate our constituents about historical and current fisheries practices and management, to advance the understanding of fisheries throughout the state. Oregon Sea Grant also works to maximize locally realized benefits of Oregon seafood by enhancing seafood product development, food safety and handling, and other programs that advance consumer awareness and ability to make healthy choices related to seafood consumption.



SEA GRANT-FUNDED PROJECTS, 2010–2012:

Drivers of Ecosystem Resilience: Toward a Predictive Understanding of Hypoxia's Impacts on Nearshore Fisheries and Ecological Communities (R/ECO-24)



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Hypoxic zones (aka “dead zones”) are an issue of significant scientific and management concern for the world’s coastal oceans. In the Pacific Northwest, hypoxic (and anoxic) events have recently become more frequent, upsetting productive ecosystems on the continental shelf. Current understanding suggests that the emergence of shelf hypoxia/anoxia reflects long-term declines in the oxygen of interior ocean water, and that the problem is likely to worsen with climate change. But the ecological and fishery impacts of such changes, while critical to our ability to predict ecosystem and fishery resilience, remain poorly understood.

Francis Chan’s team will exploit the severity of shelf hypoxia to examine the response of reef-associated fish and macro-benthic invertebrate communities during declining oxygen concentration, as well as their ability to recover from such events. Along with data on species-specific thresholds, one important outcome will be the ability to identify the kinds of communities likely to be most affected by the expansion and intensification of hypoxia. This information will help inform management decisions in areas such as the selection and design of marine reserves. The researchers anticipate outreach efforts to develop mechanisms for transferring accurate and up-to-date information about hypoxia and its effects on fisheries to the fishing community and other coastal stakeholders.

A Cooperative Effort to Track the Humboldt Squid Invasion in Oregon (R/RCF-29)



© Jim Folts

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Jumbo squid have begun appearing in dramatic numbers off the Oregon coast. Understanding the invasion and its potential role in ecosystem dynamics is a top priority for scientists, managers, and fishermen on our coast. This project will provide important

information that can be combined with a growing body of research from California and Mexico. The species is also expanding southward into the upwelling systems of Chile, so this work has far-reaching benefits. By working with local fishermen, we also encourage a spirit of collaboration and information exchange while working toward a common goal.

Dr. Heppell's project will map the distribution of catches of jumbo squid off the Oregon coast, identify correlations between squid catch and oceanographic variables, and determine what the squid are eating as they pass through Oregon's offshore waters—particularly whether they're dining on fished species such as hake and salmon. This project will contribute to our understanding of why the squid are expanding their range and how that will affect local fisheries. The project will also promote conservation, education, and stewardship of fisheries through collaborative research, and increase public awareness of changes affecting our ocean ecosystems.

Modeling Myxozoan Disease in Pacific Salmon: How Will Climate Change Affect Parasite Distribution and Salmon Survival? (R/BT-47)

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Concerns about the effects of climate change on the fitness of salmon in the Pacific Northwest have been clearly voiced. There is much discussion about monitoring and predicting climate change effects on salmon populations in this region, with consideration to water temperature, flow, sedimentation, and snowpack. However, the implications of climate change on diseases have had little attention, despite the role that pathogens play in regulating fish populations. In studies where disease has been considered, it is acknowledged that higher temperatures may play a critical role in increasing disease transmission and development. For salmon, temperatures above the threshold of approximately 17–18°C could result in increased loss associated with disease and parasites.

Dr. Bartholomew's previously funded Oregon Sea Grant research on the Klamath River and *Ceratomyxa shasta* provides a unique opportunity to address the challenges of predicting the effects of climate change on disease. This project is one of the first studies attempting to assess how disease and climate change might interact in wild salmon populations. The research will have broad application to the field of fish health and will directly contribute to the development of a predictive disease model to inform fishery managers in the Klamath River, as well as other systems where these pathogens exist.



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In 2007 and 2008, high concentrations of a highly pathogenic species of bacteria, *Vibrio tubiashii*, were reported

in Oregon's coastal waters. Production of oyster larvae and seed by oyster hatcheries was dramatically reduced. Normally, west coast oyster farmers produce oysters with an annual dock-side value of about \$85 million. At present, we do not know what other species of shellfish are affected by *V. tubiashii*.

This project will address this very serious problem facing the oyster industry and possibly populations of wild shellfish species on the west coast. Dr. Langdon will determine the pathogenicity of *V. tubiashii* and study the response of the Pacific oyster (*Crassostrea gigas*), Olympia oyster (*Ostrea conchaphila*), and mussel (*Mytilus trossulus*) to *V. tubiashii*. Results will benefit extensive efforts on the west coast to restore populations of the Olympia oyster as well as contribute to a better understanding of the effect of *V. tubiashii* on recruitment and population dynamics of wild mussel populations. Langdon hopes to apply the study's results to improve management of oyster and mussel populations in hatcheries and in the field.

CONTINUING PROJECT:

Effects of Hypoxia on Ichthyoplankton and Micronekton Communities off the Oregon Coast (R/ECO-23)



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This project aims to understand how hypoxia affects fish in early life stages. Dr. Ciannelli's team is investigating the effects of coastal hypoxia on fish distribution, feeding, growth, and reaction behavior. The study will observe larvae and juveniles of common species in three fish communities: plankton, pelagic, and benthic. For each, the team will investigate patterns in vertical and horizontal distribution through the water, diet, feeding level and body condition, and escape response, in relation to oxygen concentration as well as such other environmental variables as depth, temperature, salinity, and sediment type.

This is the first study to explicitly address the impact of nearshore hypoxia on larval and juvenile fish off the U.S. west coast. Ciannelli hopes the study will increase our understanding of how hypoxic events affect coastal fisheries resources, which in turn could lead to more informed decision making by resource managers, government agencies, and coastal communities.

Public and private organizations make substantial investments in “ocean education” programs that provide various learning opportunities for students, adult audiences, and ocean-management and -policy decision makers. These efforts to improve ocean literacy often operate under the assumption that learning is a simple, linear process, moving from awareness to knowledge to behavior change, and that increased knowledge leads to decisions that favor stewardship and preservation of our ocean and coastal resources.

However, the links between learning, knowledge, and behavior change are neither simple nor direct, as decades of research in the cognitive, decision, communication, and learning sciences attest.

Oregon Sea Grant works to advance ocean literacy through research that seeks to identify and understand the links between learning and behavior change. We use the results of our investigations to create easily adaptable strategies that organizations can use to more effectively link learning to decision making and behavior change. In addition, we make special efforts to identify and reach out to under-served audiences.

We use this research to update and improve our ability to help Sea Grant be of greater relevance and benefit to society. Advancing the sci-



ence and application of free-choice learning and decision making should lead to reductions in risk behaviors related to hazards, climate change, coastal development and land use, fishing and seafood, and coastal recreation. It also should result in improvement in public understanding of the ocean's influence on people and our influence on the ocean and provide people with the tools to incorporate stewardship into their daily lives.

SEA GRANT-FUNDED PROJECT, 2010–2012:

Sea Grant Professorship in Free-Choice Learning (E/UEd-03)



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Oregon Sea Grant has dedicated special funding over a five-year period to establish a Sea Grant professorship at Oregon State University. Shared jointly by Lynn Dierking and John Falk, the professorship uses the theme of ocean and coastal science to focus on research and pedagogy in free-choice learning, research, and teaching in such free-choice learning. This professorship augments that effort. Most of what we know we learn outside the classroom, and we continue to learn throughout our lives by free choice. As a nation, we have made and continue to make a substantial investment in providing learning opportunities for the public in a wide variety of venues such as museums, aquaria, and interpretive centers. At the same time, an enormous quantity of printed material, videos, films, and other media is produced and distributed annually for the purpose of public education. Yet there is relatively little effort underway to advance the art and science of public education through research and teaching in such free-choice learning. One notable outcome of this effort: the first cohort of eight FCL students are enrolled in the OSU's newly established FCL Master's program.

PROGRAM DEVELOPMENT GRANTS

Oregon Sea Grant also provides program development grants—small grants for timely and promising research opportunities that arise between our two-year funding cycles.

RESEARCH PROJECTS FUNDED

Development of value-added applications of β -chitosan from Humboldt squid (*Dosidicus gigas*) pens (R/SF-34)—**Yanyun Zhao**, Oregon State University (OSU)

Entanglement Incidence of Steller sea lions in Oregon (R/HBT-13)—**Markus Horning**, OSU

Aptamer-based Biosensors for Bacterial Detection (R/SAQ-17)—**Anna Cavinato**, Eastern Oregon University

The Pacific Fisheries History Project: A Public History Project that Seeks to Explore the Development of Oregon Coastal Fisheries (R/RCF-28)—**Mary Finley**, OSU

Investigation of Deep-Vent Organisms for Bioactive Secondary Metabolites (R/BT-46-PD)—**Mark Zabriskie**, OSU Pharmacy

Toxicity of Purified *Vibrio tubiashii* Protease to *Crassostrea gigas* Larvae (R/SAQ-14)—**Claudia Hase**, OSU Veterinary Medicine

Science and Knowledge Informing Policy and People: The Human Dimensions of Wave Energy Generation in Oregon (A/CC-11)—**Flaxen Conway**, Oregon Sea Grant Extension

Content-Based Ocean Science and Math Education Transfer for Adult Learners (E/IED-12)—**Marta Torres**, OSU College of Oceanic and Atmospheric Sciences

Bridging the Inner Shelf and Nearshore Regions (R/CNH-18)—**Tuba Ozkan-Haller**, OSU College of Oceanic and Atmospheric Sciences

A Test of Combined Near-Infrared Spectroscopy and DNA Analysis to Estimate Prey Composition in Scat of Steller and California Sea Lions from the Columbia River, OR (R/RCF-23)—**Deborah Duffield**, Portland State University Biology Department

Interface Habitats and Connectivity: Examining the Role of Watershed-Scale Protection in Buffering Intertidal and Subtidal Habitats (R/ECO-21)—**Elise Granek**, Portland State University Environmental Sciences & Resources

OUTREACH AND EDUCATION PROJECTS FUNDED

Community Engagement and Learning Initiative Project (A/CC-13)—**Lynn Dierking**, OSU

Institutionalizing Broader Impact and Outreach: A Case Study for Organizational Change (A/ESG-09)—**Shawn Rowe**, OSU

PICES Rapid Assessment Survey (A/NIS-21)—**John Chapman**, OSU

Extension

The primary role of Oregon Sea Grant Extension is to be a trusted broker that provides the interface among scientists, managers, and the public, including stakeholders. Extension faculty are highly engaged and formal participants at local, county, state, and regional levels. They emphasize educational programming, stakeholder engagement (two way), and group consensus-building to address the challenges facing the coastlines of Oregon, the Pacific Northwest, and the nation.

Extension operates to

- bring stakeholder parties together face-to-face, to foster trust and mutual understanding
- translate the information, to ensure that it makes sense to everyone involved
- facilitate collaboration, to foster transparent dialogue and effective working relationships
- provide input into Sea Grant priorities and research so that stakeholder needs for science are better met
- mediate, to ensure that everyone's interests are fairly represented

For up-to-date information about individual agents, specialists, and educators and their projects and fields of expertise, see <http://seagrant.oregonstate.edu/extension.html>.

Extension Agents, Specialists, and Educators

Extension faculty are located in county Extension offices in Astoria, Tillamook, Newport, Coos Bay, Gold Beach, and Salem; on the main university campus at Corvallis; and at the Hatfield Marine Science Center in Newport.

Oregon Sea Grant Extension is primarily staffed by OSU Extension agents and specialists; they are university faculty who hold academic rank and are housed in OSU offices throughout the state. Nearly all agents have formal academic homes at OSU and are distributed across eight colleges. About half the agents are directly supervised by the Sea Grant Extension leader; the rest are directly supervised by an academic department chair or by the county lead.

Field-based agents have responsibilities relative to their areas of expertise and specific coastal geographic areas. This system allows field staff to develop specialized knowledge, which is shared with a broad array of audiences and encourages teamwork within the Sea Grant program. The education, outreach, and engagement activities of field-based agents and specialists vary according to the needs of the state and specific regions, and currently focus on alternative ocean energy development, reducing user-group conflict, spatial planning, coastal hazards resilience, climate change adaptation, seafood marketing and safety, fisheries management, working waterfronts, watersheds, community decision making, free-choice learning, aquatic animal health, marine resource economics, community development, aquatic invasive species, and a variety of other issues as they emerge.

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Communications

The purpose of Sea Grant Communications is to get research-based information about the ocean and coast to people who can use it. The professionals in Communications use every tool at their disposal—from print to audio and video to the Internet—to reach many different users with information about important issues and scientific developments that concern ocean and coastal resources and the creatures and people who depend on them. The Communications staff also supports researchers, Sea Grant Extension faculty, the HMSC Visitor Center, and the rest of the program in meeting Sea Grant’s mission. In addition, we cooperate on projects with our communication colleagues at the university, in the national Sea Grant network, and in the National Oceanic and Atmospheric Administration.

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HMSC Visitor Center

People of all ages have a chance to learn more about the ocean and coastal environment when they spend time at the Visitor Center at the Oregon State University Hatfield Marine Science Center. The exhibits and programs at the center explain how scientific research, much of it based at the HMSC's own laboratories, enhances our ability to interpret the natural patterns that shape our world and enables us to better appreciate, manage, and sustain coastal and marine resources. Among the activities offered are classes, nature walks, lectures, seminars, and summer programs for the entire family.

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Advisory Council

Oregon Sea Grant's Advisory Council helps ensure that research and outreach programs address the real needs of Oregon and its coastal communities, businesses, and policymakers. Appointed to three-year terms, council members meet periodically to help set program priorities, offer advice on specific plans and research proposals, and counsel the program's administrative staff.

Brian Allee

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Xanthippe Augerot

Consultant, Pangaea Environmental LLC

Kirk Beiningen

Retired, Oregon Department of Fish and Wildlife

Anne Berblinger

Retired, Economic Development Administration, U.S. Department of Commerce; small-farm owner

Ralph Brown

Former Curry County Commissioner; commercial fisher; former member, Pacific Fishery Management Council

Ellie Dumdi

Former Lane County Commissioner

CM (Mike) Helfrich

Retired, VP and District Manager, US Bank; current member of Port of Coos Bay's Charleston Advisory Committee; current member of Southwestern Oregon Community College Budget Committee

John (JR) Herbst

Environmental Specialist, Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians; president of Coos Watershed Association

Peter Huhtala

Executive Director of Columbia River Business Alliance; current County Commissioner

Nancy Leonard

Waldport City Manager; former member, Oregon Land Conservation and Development Commission; former member, Oregon Water Resources Commission

Allan Rumbaugh

Former General Manager, International Port of Coos Bay

William Schreiber

Owner, FV *Captain Ryan*; current member of ODFW Developmental Fisheries Board, Port Authority

Merritt Tuttle

Retired, National Marine Fisheries Service



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