

ORES-U-04-001

# Oregon Sea Grant Program Guide 2004–2006



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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 Program Guide 2004–2006

Oregon Sea Grant  
Corvallis, Oregon

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**T**he mission of Oregon Sea Grant is to develop and support programs that help people understand, rationally use, and conserve marine and coastal resources. For more than three decades, Oregon Sea Grant research, outreach, and communications products have brought the best available science to bear on matters important to coastal communities, people, and the environment. Despite the program's modest size, it has identified needs, founds ways to leverage other resources, and partnered with others to improve the coastal well-being of Oregon, the Pacific Northwest, and the nation.

For more information, see our Web page at <http://seagrant.orst.edu>.



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## ADMINISTRATION

Sea Grant Administration (M/A-1) oversees the entire Oregon Sea Grant program. In addition, it conducts two alternating-year fellowship programs (M/A-16), which provide graduate students with opportunities to develop a working knowledge of coastal and marine issues, management, and policy processes through assignment to either the Oregon legislature or one of the state's natural resource agencies.

Through its program development funds (M/A-2), Sea Grant provides rapid response to unforeseen problems and opportunities. Modest program development grants are available to support research projects that arise outside the program's normal funding cycle or special requests for research-related conference and travel fees.

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## RESEARCH

Sea Grant provides competitive, peer-reviewed grants that allow top ocean and coastal researchers to apply their skills to issues of critical importance to the state, the region, and the nation. Over the years, the program's funding emphasis has changed to meet and anticipate the region's changing needs. Urgent issues—the decline of once-abundant fisheries, the challenges posed by coastal population growth, the heightened awareness of invasive species—help propel Sea Grant's research priorities as the program strives to put limited resources where they can do the most good.

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## Economic Leadership

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### Biotechnology

#### Use of Green Protein (GFP) Fusions to Study Colonization and Tissue-Specificity of Virulence Gene Expression During Infection of Salmonids with *Vibrio anguillarum* (R/BT-37)

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With several species of Pacific Northwest salmonids on the endangered species list, learning how bacterial pathogens infect and kill fish is more than idle curiosity; it could be a key factor in preserving native species. This project is working at the very deepest levels—genetics—to study the molecular nature of the interaction of salmonid fish and bacterial pathogens. The hoped-for results will provide new information on the interactions that lead to disease in fish and aid in the development of tools for the diagnosis of vibriosis caused by *V. anguillarum* and

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related marine vibrios. On the basis of the findings of this study, the researchers will develop monoclonal antibodies (MABs), which recognize the epitope within one of the proteins encoded by the virulence genes. These findings, in turn, will be used in attempts to generate a rapid diagnosis kit for detecting the agent causing vibriosis.

### **Biosynthesis and Regulation of Scytonemin (R/BT-40)**

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Scytonemin is a marine natural product with bright potential as a therapeutic agent. Originally isolated as a pigment from cyanobacteria, it is soon to be an article of commerce for its novel biochemical properties and is a promising lead compound in areas of inflammatory disease (including osteoarthritis, arthritis, and psoriasis), UV-protection, and



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proliferative disorders, including cancer. Before the compound can be developed as a therapeutic compound, it is critical to ensure a steady supply that can meet industrial requirements. In this project, investigators will develop the underpinning technologies needed to ensure that supply. Understanding the process by which UV radiation and other environmental factors enhance scytonemin biosynthesis will provide the tools needed to produce genetically modified strains of marine life with higher yields of the compound.

### **Uptake and Metabolism of Polycyclic Aromatic Hydrocarbons by Tissue Cultures of Marine Seaweeds (R/BET-02)**

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Polycyclic aromatic hydrocarbons (PAHs) are hydrocarbon compounds with multiple benzene rings, typically found in such things as asphalts, fuels, oils, and greases. Contamination of marine waterways with PAHs is a significant environmental issue. This project will study the natural biological capacity of marine seaweeds to take up PAH compounds from seawater and break them down into harmless products. Outcomes of this basic research will support the development of new treatment strategies for removing PAH compounds from marine waters and sediments.

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## **Coastal Community Development**

### **Economic Development and the Need for Foresight in the Incorporation of Immigrant Workers on the Oregon Coast (R/CC-09)**

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The Hispanic population has grown rapidly in Oregon over the last decade, and some of the fastest growth has occurred in coastal communities. Latino immigrant populations on the Oregon coast experience hardship levels that are significantly higher than those of other coastal residents. This project seeks to identify factors that tend to increase the risk of coastal Latinos' becoming marginalized economically and socially. Survey, interview, and focus group methods are used to collect data on risk factors that affect the labor market status of immigrant adults and the academic achievement of children of immigrants. The objective is to generate the high-quality data and analysis needed to design proactive measures that can abate the risk of Latino immigrants' becoming trapped in an isolated "underclass."

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## Commercial Fisheries

### Developing Best Management Practices for Exploited Marine Ecosystems (RCF-10)

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With West Coast groundfish fisheries in crisis, this project seeks to determine the best ways to manage them. Hanna will follow a bottom-up approach to current groundfish regulations over time. The project will identify the current structure and properties of groundfish management on the West Coast, identify the core properties and functions of marine ecosystems, evaluate the efficiency and effectiveness of these

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regulations in meeting ecosystem management objectives, and investigate the spatial dimensions of groundfish ecosystems and the potential for spatially based regulations. The goal is to develop a prototype of best management practices for ecosystems and to have these practices published and disseminated.

**Management of Salmon Mortality Caused by *Ceratomyxa shasta* in the Klamath River System (R/RCF-15)**

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Disease-related mortality is a major factor impeding salmon recovery in the Klamath River. As in many Northwest rivers, *Ceratomyxa shasta* remains a major cause of salmon mortality. This study seeks to answer uncertainties about the life cycle of this parasite that are critical to understanding the host-parasite interaction in heavily managed rivers. Understanding the habitat requirements is critical to prevent further spread of the parasite.

**Larval Dispersal, Design of Marine Protected Areas, and Investigation of Cape Blanco as a Barrier to Gene Flow in Oregon Copper rockfish (*Sebastes caurinus*) (R/RCF-16)**

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Understanding the dispersal of the larvae of relatively sedentary fish is an important factor in designing marine protected areas. Do larvae disperse as a widespread pool or are they limited by local factors and obstacles? The researchers propose to study a specific species of rockfish collected along the Oregon coastline and, using sophisticated genetic analysis, to determine how heterogeneous the population is. The relationship between genetic and geographic distance will indicate how larvae disperse through varying geographic conditions.

**Local Regional Patterns of Dispersal and Exchange in Coastal Fish as Determined with Otolith Microchemistry (R/RCF-17)**

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Shanks and Miller hope to provide new information on larval dispersal and juvenile and adult movement patterns in coastal fish. The researchers will study otoliths from black rockfish, canary rockfish, and lingcod, collected from specific sites along the Oregon coast, and compare them to a group of individual fish based on the elemental signatures of the otoliths.

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## Ecosystems

### Sustainable Harvesting Levels for Intertidal Species of Marine Algae (R/ECO-13)

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Before plans can be made to harvest or protect Oregon's algal resources, it is necessary to know just how big and diverse those resources are. The University of Oregon's Institute of Marine Biology, in partnership with the Oregon Parks and Recreation Department, seeks to determine the current biomass and diversity of the state's intertidal algal resource, examining the level of removal that can be sustained

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without harming the resource. Also, the researchers seek to determine the effect on resource recovery of different harvest timing and techniques.

**Salmonid Use of Restored Estuarine Wetlands: Regional Application of the Salmon River Estuary Study (R/ECO-14)**

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Building on four years of intensive study of a single recovering estuary, Bottom and his team will continue to look at how salmonids use estuarine environments. Their specific objectives this year are to determine the relative effects of wetland habitat conditions and landscape position on marsh habitat use and performance by juvenile salmon; the landscape patterns of sequential habitat use by juvenile salmonids with different life histories; the effect of within-marsh attributes on diversity of behavior and performance of salmon; and the effects of wetland-habitat opportunity on diversity of juvenile salmon life histories among coastal watersheds. They will also synthesize habitat and landscape-scale results and share results and management implications with restoration scientists and practitioners.

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## Seafood Technology

### Use of Small Pelagics for Food Applications through Recovery of Functional Proteins and Fish Oils (R/SF-33)

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Growing stocks of sardines and other pelagic fish in the Northwest have received increased attention as a potential source for fish protein and omega-3 fatty acids. But the vast majority of sardines harvested in Oregon have been used for nonhuman consumption, such as longline tuna bait. Researchers at the OSU Seafood Laboratory are seeking a process for recovering the protein and omega-3 fatty acids as a more responsible way of using a nutritious and abundant raw material. By using a new process, called pH-shift, the project seeks to create an avenue for economic success in the new sardine fishery of the Pacific Northwest.

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## **Sustainable Aquaculture**

### **Development of Artificial Microparticles for Delivery of Nutrients and Therapeutics to Marine Fish Larvae (R/SAQ-07)**

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The researcher is seeking to refine and improve a novel method of encapsulating low-molecular-weight, water-soluble substances for delivery of nutrients and therapeutics to marine fish larvae. The rapid expansion of marine aquaculture and the ornamental fish trade has increased global demand for fish, and culturing marine fish for the ornamental trade could provide an alternative supply to wild stocks, which are rapidly being depleted. But larval culture is a major bottleneck to the operation. The microencapsulation of low-molecular-weight, water-soluble nutrients and therapeutics may lead to a better artificial diet for these larvae and a more effective means of treating diseased fish.



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# Coastal Ecosystem Health and Public Safety

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## Sustainable Development

### Testing Fecal Source Discrimination in Water Using Molecular Markers from *Bacteroides* (R/SD-07)

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Field has developed a new method for measuring fecal pollution that distinguishes between human and animal sources, an important consideration when determining how to clean up contaminated waterways. Her test uses genetic markers in fecal *Bacteroides*. Beyond that, the test has the potential to be able to identify a wide variety of possible sources. To that end, Field will continue to develop the test with specific goals in mind. She plans to determine the length of time *Bacteroides* markers survive in water and their ability to predict the occurrence of bacterial, viral, and protistan fecal pathogens. The researchers will compare this survival rate to that of fecal coliforms, which are the basis of most standard fecal pollution tests, and share the study results with users, regulators, and scientists.

### Applying Best Management Practices to Marine Protected Areas (A/SD-11)

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With the issue of marine protected areas growing in importance, effective implementation of these areas will not happen without a process that successfully involves all coastal economic players in their establishment. Hanna seeks to describe Oregon's coastal economic context, then develop the best management practices for developing marine protected areas. These findings will be disseminated in a best-management-practice operational guide.

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## **Coastal and Natural Hazards**

### **An Experimental Study of Beach Recovery (R/CNH-06)**

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The researchers seek to gain a better understanding of the processes that are at work during beach recovery after a storm season and to validate a modeling scheme that produces estimates of the evolution of waves, currents, and bathymetry in the nearshore region. Beaches are an important natural resource that typically exhibit cyclic behavior of alternating erosion and accretion over the course of a year. By better understanding the processes at work, the researchers hope to better predict the extent of beach recovery after a storm season.

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## Education and Human Resources

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### University Education Resource Management

#### Student-Led Research on Spatial and Temporal Variation in Fish Diversity and Recruitment in Yaquina Bay, Oregon (E/RM-06)

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Coastal and marine management issues are increasingly complex and are unlikely to get easier any time soon. To help pave the way for the next generation of resource managers, this project will provide students with hands-on marine ecology research through student-devised experiments and long-term monitoring of conditions in Yaquina Bay, Oregon. Students will be part of a “Marine Team,” a group problem-solving course offered by the Department of Fisheries and Wildlife at Oregon State University. Requirements for the course include attending weekly seminars, helping with monthly fish and plankton sampling in the bay, designing and executing individual or group side projects, and conducting outreach through public and university seminars and a summer teacher education course on estuarine ecology.

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## EXTENSION

It is the Extension arm of Sea Grant that brings the vast resources of research and higher education to bear on real-world issues facing coastal residents, businesses, and communities. Extension Sea Grant marine agents, based at coastal offices of the OSU Extension Service, deliver advice, assistance, and informal education as local issues and needs arise, in areas ranging from watershed restoration to invasive species. Specialists and educators, based on campus or off, focus on subjects of broader concern: watershed and ecosystem health, marine fisheries, community development, and seafood, for example. Together, they form a team that helps coastal residents, communities, and policymakers look at problems and find the right tools to solve them.

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>.

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## **Extension Agents, Specialists, and Educators**

Extension Sea Grant agents operate out of county offices of the Oregon State University Extension Service and are affiliated with academic departments on the OSU campus. Each agent is responsible for developing and delivering outreach and informal education programs to meet local needs and issues. Agents also serve statewide clientele with their own areas of expertise, ranging from marine vessel safety to watershed restoration. ESG specialists and educators focus on topical issues of statewide or regionwide importance. They provide support to Extension Sea Grant agents, conduct academic research, and develop practical, specialized information for use by the industry, agencies, and the public.

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*Projects and specialties:* coordinating the Coastal Storms Initiative, whose purpose is to lessen the impact of storms on coastal communities through the use of new weather- and storm-related tools and training being developed by NOAA scientists; making sure people in this area benefit from these investments, by connecting the right tool to the right user and connecting interested users to trainings as needed

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*Projects and specialties:* marine economics; change in fishing communities and regions; the economic history of U.S. fisheries; the impact of access limitations



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# COMMUNICATIONS

The purpose of Sea Grant Communications is to get research-based information 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 inform the public, near and far, about important issues and scientific discoveries that affect the oceans, the coast, and the creatures and people who depend on them. The Communications staff also supports researchers, Extension faculty, the HMSC Visitor Center, and the rest of the program in meeting Sea Grant's mission.

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## HMSC VISITOR CENTER

The Visitor Center at the Oregon State University Hatfield Marine Science Center offers visitors of all ages a chance to learn more about the ocean and coastal environment, often through the work of marine researchers based in the HMSC's own laboratories. Through hands-on exhibits to classes for children and teachers, whale-watch programs, nature walks, lectures and seminars, and summer programs for entire families, the Visitor Center provides a window on Oregon's ocean for visitors young and old.

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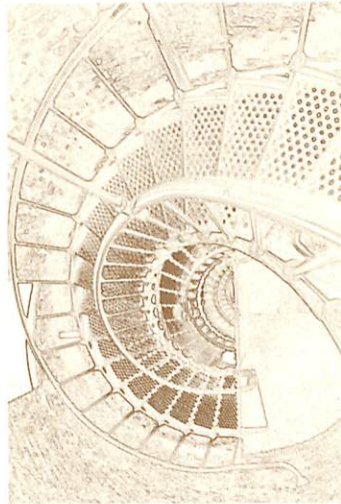
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Marine Lecturers—on contract





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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 give counsel to the program's administrative staff.

**Don Barth**

Lincoln Security Bank Board of Directors;  
Oregon's Salmon Restoration and Production Task Force

**Kirk Beiningen**

Retired, Oregon Department of Fish and Wildlife

**Anne Berblinger**

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**Ralph Brown**

Curry County Commissioner; commercial fisher; member, Pacific  
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**Nancy Leonard**

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