

THEMATIC AREA SITUATIONAL STATEMENTS, GOALS, AND OBJECTIVES

Planning Around the NOAA Plan

The Oregon Sea Grant Strategic Plan is organized around the NOAA's Strategic Plan. Readers should keep in mind that Oregon Sea Grant's research, outreach, and education program employs those tools that are most effective, given the particular area of interest; therefore, under the NOAA plan, some elements will have specific Extension or education activities around goals and objectives where we have staff and capacity. In other areas, we primarily use research or communication tools to address NOAA goals.

We will not in this plan detail all the methodologies and tasks for each goal and each objective. We will provide, however, an example of how we meld goals, objectives, tasks, and methodologies, as well as outcomes and impacts. For illustrative purposes, we will focus on the fisheries and seafood area around the goals and objectives of assisting the fishing industry as it continues to evolve. See Appendix B.

OSGE uses a variety of indicators or metrics to document impacts, as outlined in the *Oregon Sea Grant Strategic Plan 2003–2008*. Those elements are listed in detail in Appendix D, but the categories of metrics are as follows:

- Production of new technical capacities or scientific knowledge and understanding
- Development of applications and approaches required for sustainable management of coastal resources
- Economic enhancement and product development
- Enhanced public awareness to improve decision making on coastal issues
- Capacity building in coastal science and education.

As noted earlier, Oregon Sea Grant will provide training to faculty and staff on the assessment and evaluation of programs delivered. We are aided in this by our new faculty capacity in understanding how people learn in informal settings.

Aquaculture

The state of Oregon has not encouraged most forms of commercial aquaculture in its coastal zone. For that reason and until public attitudes and state policies change, sustainable aquaculture is unlikely to flourish in Oregon. Consequently, aquaculture is not among the highest priorities for Oregon Sea Grant. On the other hand, we acknowledge the national importance of aquaculture. We also recognize OSU's exceptional research strength and record of achievement in aquaculture, and we plan to build on that strength in specific areas of the aquaculture theme.

In 2004, we conducted an assessment of aquaculture extension needs. Although we found many, particularly in the Northwest, the small size of Oregon's industry does not warrant major investment by Oregon Sea Grant at this time, especially without a regionally based position with Washington Sea Grant.

We have, however, entered one new area of aquaculture: ornamental fish health. Our stakeholders in the theme area of marine ornamentals include hobbyists, retailers, wholesalers, manufacturers, shippers, and the managers of large public aquaria. Our

subgoals and objectives include refining the essential elements of husbandry. They also include development of new tools and approaches and training highly skilled specialists capable of designing and maintaining large aquaria. Finally, we are particularly interested in developing and refining the art and science behind the use of aquaria in public education and in classroom settings. Our goal under this aspect of aquaculture is fully fleshed out in this document's science literacy section.

Biotechnology

Marine biotechnology is an area of research focus and strength for Oregon Sea Grant. We recognize that relatively long-term investments are often necessary to realize significant impacts in biotechnology. However, we expect funded projects to have specific objectives and to show sustained progress toward their goals. We also require researchers to specifically describe how they intend to connect their work to potential users, and we judge the quality of the projects' outcomes in part on the basis of how effectively the researchers interact with industry and other stakeholders. We do not have a dedicated extension presence in this area.

Coastal Communities and Economies

The topic of coastal communities and economies has received particular attention from Oregon Sea Grant since the mid 1990s, when the program identified and recruited talented and interested researchers to collaborate with OSGE faculty. As a result, a subprogram called Adapting to Change was launched in 1994 and completed in 2000. The effort was so successful that it left, as a lasting legacy, the recognition among stakeholders that the social and economic issues faced by coastal communities are important and amenable to well-conceived and well-executed programs of research and outreach.

Oregon Sea Grant's watershed management, ecosystems and habitat, and coastal community development elements are closely linked. Our goal "to address the ecological and environmental dimensions of sustainable coastal development, particularly coastal management policy, multiple uses of resources, wastewater management, and drinking water availability" is developed under the Ecosystem and Habitat section.

Coastal Natural Hazards

Oregon Sea Grant research and outreach has for many years addressed issues relating to coastal natural hazards. Particular attention has been given to regional issues such as earthquakes, subsidence, chronic and acute erosion, and tsunami inundation. That work has led to a better understanding of the past and potential impacts of chronic and catastrophic natural processes and to a greater public awareness of the issues. However, coastal development continues to exacerbate the problems created by coastal hazards, and the need for additional work remains.

Applied research and outreach efforts over more than a decade by Jim Good, OSGE specialist, contributed substantially to better coastal hazards management in Oregon in

the 1990s. In 1991, Good, also the director of OSU's Marine Resource Management Program, organized a group of scientists and agency officials into a coastal hazards policy working group that developed numerous recommendations for improving hazards research, information, and emergency preparedness. The recommendations resulted in new state laws.

Although its efforts focused on the potential for large-scale disaster, the working policy group did not neglect more common coastal hazards, such as beach erosion and landslides. At the group's recommendation, the state has consolidated its shore protection permit authority, once split between two agencies. Sea Grant also helped develop a computer-based information system that beach-management agencies use to determine hazards associated with particular properties.

This foundation of effective outreach helped identify Oregon Sea Grant as the appropriate outreach leader in a new hazards program with NOAA and Washington Sea Grant. The goal of the NOAA/Sea Grant Coastal Storms Initiative is to reduce the loss of life and negative impacts on coastal property and the environment caused by severe coastal storms. OSGE specialist Patrick Corcoran is the initiative's outreach and education coordinator, working with NOAA project teams to ensure that local people know about the new tools and understand how to use them. The new investments include a hydrodynamic model of the Columbia River, a nearshore wave prediction model, and a state-of-the-art buoy and other weather observation instruments.

Oregon Sea Grant also has had a long and evolving history with vessel and at-sea safety. Fishing is a dangerous occupation. The risks are well known and have been exhaustively documented. Losses are often sudden and catastrophic. Oregon Sea Grant has made vessel safety programming an important component of its education and outreach efforts for 30 years. But more needs to be done. Since the Commercial Fishing Vessel Safety Act of 1988 (CFVSA) went into effect, there has been some improvement in fishing vessel safety on the national level, with a 33 percent decrease in deaths and a 37 percent decrease in vessels lost. While many feel that the downward trend is probably more dramatic in those few regions where strong safety training and education programs are in place, to date the Coast Guard has not undertaken any studies to substantiate this conclusion. Losses in the 13th Coast Guard District (Oregon, Washington) have declined from a high of 11 in 1993 to a low of two in 1999. In 2000, there were three deaths in the 13th District. Only one of those involved an Oregon fishing vessel.

Training and education have long been important to Oregon's fishing fleet preparations for work at sea and many credit Oregon Sea Grant's training program with making the difference. The Coast Guard now recognizes that while the CFVSA went a long way in addressing vessel safety needs, there remains a need for more safety training and education nationally. The Coast Guard is now considering training as a requirement for at least one person on every commercial fishing vessel. Oregon Sea Grant saw this need long ago and has been diligently working toward offering more effective safety training and education programs for Oregon's fleet.

A stronger Sea Grant safety presence is needed for researchers and students who go to sea. This will be an area of emphasis under this plan. There is also a need to begin offering refresher courses for earlier course graduates and short courses, especially for those crew who are highly mobile and do not stay with a particular vessel for very long. With Oregon Sea Grant's established leadership in this area, these courses can be

developed and offered through other organizations. Should additional training become necessary, leadership and organization will be needed to help other coastal states develop sea safety training programs. Oregon, Washington, and Alaska Sea Grant can provide this leadership for other Sea Grant programs.

Oregon Sea Grant Extension Focus—Coastal Natural Hazards

For this planning period, our focus will be on the relationship of coastal storms to coastal natural hazards, tsunami and earthquake preparedness by local communities and agencies, storm-proofing local communities, and at-sea safety training for researchers, students, and others. We will not be as involved as we have been in natural processes of coastal dunes and shore lands and in at-sea safety for commercial and recreational fishers.

Goal

Increase the ability of coastal residents, public officials, and agency staff to understand and use new hazards information and tools that help protect human life, safeguard property and infrastructure, and minimize impacts on natural resources.

Objectives

Provide information, tools, and training that improve the ability of coastal residents and policymakers to predict, prepare for, and mitigate the damage of severe coastal storms and natural hazards. (PC)

Provide vessel safety and related training to the fishing industry and to new managers, researchers, and students involved in collaborative fisheries research. (KH)

Goal

Increase collaboration and partnerships among researchers, agency staff, and other partners to apply research, models, and tools that monitor and mitigate the impacts of coastal natural hazards.

Objectives

Engage researchers, agencies, and other users of observing systems data in new ways of collecting and sharing ocean observations and data (e.g., NANOOS). (PC)

Engage researchers, agencies, and others in finding new ways of managing dredge spoils that increase vessel safety in an environmentally sound manner. (KH)

Goal

Create a culture of awareness among coastal residents, businesses, and visitors about earthquakes, tsunamis, and other hazards, their local extent and impact, and the actions individuals can take to protect their lives, families, and property.

Objectives

Engage residents, businesses, officials, and community leaders in creating a culture of awareness regarding tsunami and beach safety. (PC)

Provide information and training on tsunami safety, rip currents, and other beach dangers through educational workshops, media, and low power radio. (PC)

Partner with local state and federal agencies to assess public awareness and understanding about earthquakes and tsunamis. (PC)

Methodology

Methods are tailored to the objectives, the audiences, the special needs, and the resources available. These methods are reviewed and revised annually as more details of an individual's work are developed and shared. The following are examples of methods for this topic area: workshops; training and certification for at-sea participants; publications; and participation by faculty in local, state, or national activities related to the subject matter.

Faculty and Staff Resources

- Lead: Patrick Corcoran, coastal storms and hazards extension specialist, headquartered at the Clatsop County Extension Office, Astoria, Oregon ; associate professor, Department of Political Science, College of Liberal Arts, OSU.
- Lead (safety at sea): Kaety Hildenbrand, marine extension agent, headquartered at the Lincoln County Extension Office in Newport, Oregon; instructor, academic home to be determined.

Anticipated Outcomes (for example)

- Demonstrable greater knowledge related to coastal storms and hazards and greater resultant preparedness by local coastal governments, residents, visitors, and others.
- Evidence that lives and property have been better protected than previously.

Digital Ocean

This theme area has elements in several other areas, but we particularly want to highlight our interest in digital imagery and education. Our goal, "to develop effective tools and approaches to using digital imagery to assist decision makers and to enhance public education," has been the subject of work by Oregon Sea Grant Communications and our Visitor Center programming at the HMSC.

Ecosystems and Habitats

Since 1998, our interests in coastal ecosystems have largely revolved around essential fish habitat, ecosystem restoration, and aquatic nuisance species. Although considerable progress has been made, those issues continue to be important and remain among our

highest priorities. We plan to maintain outreach efforts in watershed restoration and aquatic nuisance species. Our research goals and objectives in this theme area will, however, be more focused, with a special emphasis on estuaries and estuarine restoration. We recognize that several million dollars are invested annually by various agencies on research relating to Pacific Northwest watersheds and that a similar though smaller investment is made in studies of estuaries. For that reason, we will place our emphasis on forming partnerships and on supporting research on key topics that would otherwise be missed.

OSGE faculty members have been at the heart of an intense multi-agency effort to understand and reverse the decline of salmon runs in the Pacific Northwest. Participating groups aim to restore the endangered species to ecological health and sustainable harvest levels by fostering restoration of the fish's natural habitat. Extension agents and specialists in Sea Grant, forestry, and agriculture combine their expertise in diverse subject areas such as stream hydrology, riparian area management, water quality monitoring, forest road management, group processes, and conflict resolution to solve problems in their communities. They provide technical assistance, help create model on-the-ground restoration projects, and deliver watershed education to technical specialist, agency and university researchers, farmers, teachers, and youth.

For example, OSGE has been actively involved at a high level in the state's dominant natural resource management program, the Oregon Plan for Salmon and Watersheds. Watersheds are the primary focus of the Oregon Plan, and public understanding and involvement are keys to its success. Sea Grant has led the way through direct involvement with members of local watershed councils and through close collaboration with local, state, and federal agencies and university colleagues. Sea Grant has neither the mandate nor the resources to carry out habitat rehabilitation directly. Instead, we show people how to do it in their own communities. The effort has been remarkably successful.

OSGE faculty members have provided a wealth of information, training, and consultation for the watershed councils that are the backbone of the Oregon Plan. OSGE agents provide a local connection between on-the-ground habitat restoration work and university resources. Oregon Sea Grant and the Extension Service created the Watershed Stewardship Education Program, now called OSU Watershed Extension, which helps local citizens and watershed groups implement the Oregon Plan. This educational program has been adopted and supported by the state of Oregon as the official watershed educational program for watershed councils. Watershed Extension's core program, called the Master Watershed Steward (MWS) Program, employs a learning guide that was developed in collaboration with OSU Extension forestry and agriculture staff. The guide helps local councils form effective partnerships, understand their watersheds, and create strategies for enhancing or restoring them. After completing the program, participants apply what they have learned by working on actual projects, and their efforts are tracked by OSGE.

In addition to watershed council members, MWS Program participants include teachers, farmers, foresters, urban planners, and others interested in aiding the local environment. Over the past five years, 960 people have participated in the MWS Program, donating 13,120 volunteer hours, valued at \$225,000, to restoration projects throughout Oregon. In addition, the MWS Program has inspired the implementation of

watershed stewardship education in Texas, Louisiana, Nevada, Oklahoma, India, Pakistan, and Mexico.

There are other examples of recent impacts of Watershed Extension agents and specialists. In Curry County, Extension agent Frank Burris demonstrated that the riparian tree planting he did in 1995 had reduced summer stream temperatures by as much as 10 degrees Fahrenheit. This decrease means the stream now meets state water quality standards and is no longer water quality limited. And fisheries specialist Guillermo Giannico has contributed to a chapter on stream assessment and habitat restoration in the USDA Natural Resources Conservation Service's technical field guide, which will be adapted nationwide.

The proposed ESG educational programming in this arena will be directed at a variety of audiences. These include public and private property owners in coastal watersheds, public agencies, commodity and conservation groups, community and business leaders, school teachers and students, and watershed councils. Our educational efforts will seek long-term solutions to salmonid stock declines through coastal watershed habitat restoration, protection, and management. These efforts will build public awareness of the value of healthy watersheds for sustaining coastal economic, social, and environmental systems.

Coastal waters of the U.S. are being invaded by a host of nonnative aquatic nuisance species (ANS), including zebra mussels, European green crabs, smooth cordgrass (*Spartina*), and Chinese mitten crabs. These invasions pose the threat of major, permanent damage—both to native wildlife and coastal economies—and have focused unprecedented national attention on the problem. An important part of any effort to address the problem is education—increasing the awareness of the public and enlisting them as spotters and reporters of invasive species. Oregon Sea Grant is one of four permanent members of Oregon's Invasive Species Council and is well positioned to lend its capabilities to the state's ANS programs, particularly in the area of public education and awareness.

Oregon Sea Grant Extension employs a variety of mechanisms in developing a plan of work around watershed extension, including a continuing needs assessment conducted by the Watershed Extension Team during their two-three meetings each year; active input from our major collaborators, such as the Oregon Watershed Enhancement Board (OWEB) and through our Master Watershed Stewards program; intensive, close interactions with and surveys of the state's local watershed councils; annual conversations with the program leader, department head, and staff chair; participation of staff in local or thematic advisory councils (including county extension groups and the state's Invasive Species Council, of which OSG is a statutory member); discussions with Oregon Sea Grant's Advisory Council; participation in national Sea Grant theme teams around ecosystem health and habitats and invasive species; interactions with the marine education team at HMSC, with its knowledge of public needs and interests; and the value this program places on an engaged faculty.

Oregon Sea Grant Extension Focus—Ecosystems and Habitats

Although a newer area for OSGE, watersheds and aquatic invasive species has become one of the program's major focus areas, changing as needs and resources change. For

this planning period, we will focus on the following:

- Continuing, improving, and adjusting a very successful Master Watershed Stewards (MWS) Program
- Preparing the program for new challenges and opportunities and focusing on new, targeted audiences such as natural resource law enforcement
- Rainstorming and other programs around land-use planning
- Nonpoint source prevention
- Smart growth related to watershed management
- Aquatic nuisance species through work with the Oregon Invasive Species Council, schools, ornamental fish hobbyists and retailers, watershed councils, and the public.

We will likely reduce the number of MWS programs available throughout the state and instead focus on specific audiences.

Goal

To educate decision-makers, professionals, and the public about the importance of coastal and coastal-influenced watersheds and stimulate adoption of habitat restoration and enhancement practices leading to protection, maintenance and restoration of watersheds.

Objectives

Develop, coordinate, conduct and evaluate educational programs for watershed council members, educators, watershed-affiliated agencies, landowners, watershed recreationists, and other interested groups or individuals through leadership development, community involvement, science-based watershed management, and restoration project development, monitoring, and assessment. (DG, TN, FB, EC, GG, PH, SC, FC, Tillamook TBD)

Reduce peak run-off flows, nonpoint source pollution, and nutrient loading of streams by adoption of stream-friendly and habitat restoration and enhancement actions for local governments, businesses, and homeowners. (DG, TN, FB, EC, GG, PH, SC, Tillamook TBD)

Create opportunities for youth to develop a sense of stewardship and enhance their understanding of watershed processes, management, and sustainable local communities of place and interest. . (DG, TN, FB, EC, GG, PH, SC, Tillamook TBD)

Goal

To address the economic, social, and environmental dimensions of sustainable coastal development, particularly coastal development and management policy, multiple uses of resources, wastewater and storm water management, and drinking water availability.

Objectives

Provide local decision makers, planners, developers, consumers, and other audiences with information, programs, and tools that encourage sustainable community development and an enhanced quality of life, as well as providing significant natural resource protection. . (DG, TN, FB, EC, GG, PH, SC, Tillamook TBD)

Goal

Enhance public understanding of issues and provide objective, research-based knowledge surrounding aquatic nuisance species and the role of the public, target groups, and other audiences in preventing introduction or reducing the impacts of introduced nuisance species (this is based on the goal from the OSG 05–08 Strategic Plan).

Objectives

Serve on and support statewide programs of the Oregon Invasive Species Council. The ANS Task Group of the Pacific States Marine Fisheries Commission and the PSMFC 100th Meridian ANS Task Group to enhance our ability to meet the goal stated above. (SC)

Develop and provide information and programming to the ornamental fish industry, watershed councils, schools, watershed management agencies, and other target audiences to help prevent or reduce the impacts of nonindigenous aquatic nuisance species. (SC)

Methodology

Methodologies are tailored to the objectives, the audiences, the special needs, and the resources available. These methods are reviewed and revised annually as more details of an individual's work are developed and shared. The following are examples of methods for this topic area: workshops; exhibitry at the HMSC and other venues; tool kits for audiences such as watershed councils; training and certification of master watershed stewards; publications; and participation by faculty in local, state, or national activities related to the subject matter.

Faculty and Staff Resources

- Lead (aquatic nuisance species and watershed health): Sam Chan, assistant professor, headquartered at Clackamas County Extension office (Portland metro region) in Oregon City, Oregon; academic home in the Department of Fish and Wildlife, College of Agricultural Sciences.
- Lead: Derek Godwin, watershed resources and management specialist, headquartered at the Marion County Extension office in Salem, Oregon (mid-Willamette Valley); associate professor, Department of Bioresources, College of Agricultural Science.
- Lead (and MWS coordinator): Tara Nierenberg, senior instructor, on the OSU campus in Corvallis, Oregon; academic home in the Department of Forest Resources, College of Forestry.
- Lead: Guillermo Giannico, fisheries and watershed specialist, headquartered on

- the campus in Corvallis, Oregon; assistant professor with an academic home in the Department of Fisheries and Wildlife, College of Agricultural Sciences.
- Lead: Frank Burris, watershed extension agent, headquartered on the south coast at the Curry County Extension office, Gold Beach, Oregon; assistant professor with an academic home in the Department of Fisheries and Wildlife, College of Agricultural Sciences.
 - Lead: Paul Heikkila, marine agent housed at the Coos County Extension office in Myrtle Point, Oregon; academic home in the Department of Fisheries and Wildlife, College of Agricultural Sciences.
 - Lead: vacant position, north coast, headquartered at the Tillamook County Extension office, Tillamook, Oregon.
 - Lead: Emily Cosci, instructor, mid-Willamette Valley program delivery, headquartered at Marion County Extension office, Salem, Oregon; academic home in the Department of Fisheries and Wildlife, College of Agricultural Sciences.
 - Support: Flaxen Conway, community development specialist on the OSU campus in Corvallis, Oregon; academic home in the Department of Sociology, College of Liberal Arts.
 - Support: numerous faculty with the Extension program areas of forestry and agriculture and with the Wildlife Stewards Program of the 4-H program area.

Define expected long-term economic, environmental or social changes (impacts) that are planned to result from this program work area. Impacts should be realized within a 5-year timeframe.

1. Communities will adopt socially acceptable and ecologically and economically sustainable practices for protecting and managing watersheds and the values they provide.
2. Communities will adopt socially acceptable and ecologically and economically sustainable practices for managing storm runoff and non-point source pollution
3. Introductions and impacts of invasive species will be reduced
4. Youths become catalysts for watershed stewardship

What indicators will be used to document these changes (impacts)?

1. Officials and residents will support programs and policies that lead to: a) more effective watershed management, b) stormwater and non-point source pollution mitigation, c) enhancement of local basins, d) sustainability of fish and wildlife populations and the ecosystems they reside in and e) awareness, prevention and control of aquatic invasive species.
2. Adoption of watershed-friendly management practices by individuals, watershed councils, governments and non-governmental organizations.
3. Quantified involvement of youth in educational programs leading to change in behavior and application of appropriate practices.
4. Decrease in the number of new invasive species established in Oregon.
5. Data from the Invasive Species Council will be used to assess the effectiveness of programming in increasing awareness, preventing, controlling and eliminating invasive species.

*It has been established in the scientific literature that these practices and interventions lead to improvement in watershed health, enhanced sustainability of wildlife and ecosystems, and reductions in invasive species.

What measurements will be taken to assure change has occurred in these indicators?

1. Change in programs and policies within communities leading to improvement in watershed health, invasive species management, or enhancement in local basins. This will be accomplished through close interaction with local agencies and organizations and through implementation of appropriate survey methods.
2. Surveys will be used to document the change to watershed-friendly practices employed by individuals, watershed councils, governments and NGOs and the influence that OSU programs had on decisions to apply these practices.
3. The number of youth participating in educational programming and watershed friendly projects will be monitored and follow-up surveys will be used to determine degree of application of knowledge leading to improvement in watershed health, invasive species management and ecosystem health.
4. Increased reporting on sightings of possible invasive species.
5. Reductions in the number of new invasive species established in Oregon.

Fisheries

Our work in this area integrates research and outreach and makes use of partnerships with industry, agencies, and others to address major problems. Our programmatic emphasis will be on research and outreach that address the major unknowns and uncertainties in our understanding of the life histories and habitat needs of groundfish and salmonids. Our priorities also include research on innovative approaches to fishery management and on outreach that improves communications among fishery stakeholders and assists the fishing community.

Change, it is said, is a constant in the world of fishing and the sea. Never has this been truer than during the past decade in Oregon and the Pacific Northwest. Changes in ocean productivity, in resource regulation, in economics and consumer demand, perhaps even in the natural cycles on which ocean life depends—all have combined to pose repeated challenges to coastal communities, residents, and businesses. Even as the region began to rebound from the Northwest salmon crisis of the 1990s, the Pacific groundfish industry was staggered by significant harvest reductions and other rapid management changes that brought yet more economic loss and required new approaches to economic and resource sustainability.

Since the mid-1990s, Oregon Sea Grant has focused its fisheries and seafood research and outreach on finding new and creative ways to respond to change, integrating concern for the long-term health of the resource with concern for the economic and social well-being of coastal communities and people. Building from a groundbreaking research and outreach collaboration that helped fishing families adapt to changes brought on by the salmon crisis, Sea Grant has developed strong working relationships with fishers, seafood processors, and their communities of place and interest. The goals: to bolster the fishing

and seafood processing industries through times of scarce resources; to increase understanding and cooperation among fishers, scientists, and fisheries managers; to improve both the ecological and economic environments; and to foster stewardship and conservation through the wise, efficient use of marine resources from habitat protection and harvest through processing and sale.

Sea Grant partners in this effort include the OSU Seafood Lab in Astoria, one of the premier seafood research facilities in the U.S., and the OSU Food Innovation Center in Portland, which provides expertise in product development and marketing. Additional university, industry, and agency partners, along with regional partners such as the Alaska and California Sea Grant programs, strengthen our ability to address this critical theme area, giving Oregon Sea Grant the expertise to look toward the long-term future and the flexibility to respond to immediate needs.

Building on relationships nurtured over the past decade, the Groundfish Disaster Outreach Program (GDOP) is a peer outreach program to help fishers access the support, resources, and training they need to transition into other living-wage jobs, and to help community resource providers identify and work with those who need support. The program—the first truly collaborative effort of its kind in Oregon—has attracted \$3.95 million to help launch a needs-based payment system to bolster worker retraining programs. Over five years, the GDOP has worked with more than 1,500 people, connecting 300 of them with reemployment training and more than 350 with assistance toward food, housing, mental health, and financial counseling. In every Oregon port, more than half the groundfish fleet has used the GDOP to access services; in some, the figure is as high as 74 percent.

In 2002, OSU's College of Oceanic and Atmospheric Science (COAS) was planning a major research cruise in an area heavily harvested by crabbers—right in the middle of the crab season. Learning of the crabbers' concerns, veteran OSGE agent Ginny Goblirsch brought them together with COAS researchers, who learned that they were about to tow sensitive, expensive research equipment right through the middle of as many as 10,000 crab pots, posing a risk not only to the crabbers' livelihood, but to the research project itself. Out of those meetings grew the Scientists and Fishermen's Exchange (SAFE), a model of frank discussion and mutual information-sharing that continues to build and strengthen science-industry relationships. "The college is committed to work with the fishing community to make oceanographic research as unobtrusive as possible," said Mark Abbott, dean of COAS.

The following year, having heard about SAFE, NOAA Fisheries' Northwest Fisheries Science Center (NWFSC) asked Goblirsch and Flaxen Conway, OSGE community resource specialist, to design and implement a project that would bring the knowledge and expertise of West Coast fishers to bear on an even wider range of marine research projects. The resulting Port Liaison Project enlists fishing industry liaisons in ports from Washington to central California to help identify and recruit commercial fishing cooperators willing to work with marine research projects. The database of willing fishers has grown into the hundreds, representing more than 2,000 combined years of experience in many gears and fisheries. In 2005, participants are helping with project design consultation and data collection on more than 25 research projects. Initially launched with a \$342,000 grant from NWFSC, the program's success has attracted an additional investment of \$100,000 to the region.

Several other recent efforts and outcomes were around working with fishers to protect sensitive species from bycatch through the adoption of new gear technologies. Partnering with the Oregon Department of Fisheries and Wildlife and the Oregon Trawl Commission, Extension's Paul Heikkila and Steve Theberge have held workshops up and down the coast to introduce shrimpers and flatfish trawlers to new nets and excluders intended to reduce the unintended bycatch of at-risk species such as canary rockfish. The workshops have led large segments of the Oregon trawl fleet to adopt the new gear in time to meet new regulatory requirements for the 2005 pink shrimp season.

Sea Grant Communications, meanwhile, seeks to bridge the knowledge gap between fisheries and the public with a new series of short, illustrated handouts that not only allow coastal visitors to identify different types of fishing vessels on sight, but explain a bit about different gear types, how they work, and how the fisheries are managed. And Communications' 2002 video, *Coming Home Was Easy*, uses interviews to create an oral history of Pacific Northwest salmon trollers.

Oregon Sea Grant Extension Focus—Fisheries

Fisheries remain one of Oregon Sea Grant's Extension's major focus areas, albeit with often-changing programming to meet the needs of a dynamic coastal sector. For this planning period, our focus will be on continuing, improving, and adjusting a very successful programming around SAFE, Ports Liaison Project, and other programs; increased efforts related to reducing bycatch and other harvest impacts; marine reserve, essential fish habitat, and nearshore fisheries resource planning and management; improving communications and trust; improving and sharing scientific and local knowledge about habitats; taking an ecosystem approach to understanding and managing fisheries; studying how gear and other technological changes relate to habitat and fisheries; examining the human dimensions of fisheries research; exploring policy and management; and building relationships.

Goal

Enhance the effectiveness of the commercial and recreational fishing industries, management, and dependent communities in benefiting from gear and other technology changes to fisheries, habitat, and an ecosystem approach to fisheries.

Objectives

Improve gear technology and its use to reduce the mortality of bycatch, impacts on critical habitats, and other harvest effects of commercial and recreational fisheries. (ST, PH)

Collect, analyze, and share fishers' ecological knowledge for use in designing fish behavior and habitat research projects and in implementing spatial and ecosystem management. (ST, PH)

Inform the fishing industry on ecosystem management topics such as essential and critical habitat, spatial management, climate and regime shifts, and other factors influencing fishery management and sustainability. (ST, PH, KH, JM, GG)

Goal

Increase the ability of fishing communities, scientists, resource managers, and the public to understand the economic, ecological, conservation, safety, human dimensions, and management issues relating to sustainable marine fisheries.

Objectives

Develop, implement, and assess mechanisms to improve cooperation, information-sharing, and collaboration between scientists, fishers, managers, and others. (ST, KH, FC, MT)

Analyze and share fishery socioeconomic dimensions of ocean management issues. (FC, SH)

Develop, implement, and evaluate programs for improved cooperative and collaborative fisheries research and for student training. (FC, KH, ST, MT, JM, PH)

Methodology

Methodologies are tailored to the objectives, the audiences, the special needs, and the resources available. These methods are reviewed and revised annually as more details of an individual's work are developed and shared. The following are examples of methods for this topic area: workshops; exhibitry at the HMSC and other venues; training publications; participation by faculty in local, state, and national activities related to the subject matter.

Faculty and Staff Resources

- Lead: Stephen Theberge, assistant professor and marine fisheries agent located at the Clatsop County Extension office in Astoria, Oregon; academic home in the Department of Fisheries and Wildlife, College of Agricultural Sciences.
- Lead: Kaety Hildenbrand, marine extension agent, headquartered at the Lincoln County Extension Office in Newport, Oregon; instructor, academic home to be determined.
- Lead: Flaxen Conway, community development specialist at the Corvallis, Oregon, campus; academic home in the Department of Sociology, College of Liberal Arts.
- Lead: Paul Heikkila, marine agent out of the Coos County Extension office in Myrtle Point, Oregon; associate professor in the Department of Fisheries and Wildlife, College of Agricultural Sciences.
- Lead: Susan Hanna, fisheries economics specialist, Corvallis, Oregon campus; professor in the Department of Agricultural and Resource Economics, College of Agricultural Sciences.

- Lead: Michael Thompson, seafood marketing specialist, assistant professor; housed at the OSU Seafood Laboratory, Astoria, Oregon; no academic appointment to date with this recent fisheries Extension enhancement position
- Lead: Jim Waldvogel, marine advisory, California Sea Grant, housed at the University of California Extension Service Office in Del Norte County, Crescent City, California.
- Support: Guillermo Giannico, fisheries and watershed specialist, headquartered on the campus in Corvallis, Oregon; assistant professor with an academic home in the Department of Fisheries and Wildlife, College of Agricultural Sciences.
- Lead: Seafood products specialist, TBD.

Anticipated Outcomes (examples)

- Members of the fishing industry will be more actively and effectively involved in the management of fisheries for the betterment of the resource and their businesses, and fishery managers will reflect in their management decision making an increased awareness of and use for social and economic information regarding fishers, families, and communities.
- Fishing families and communities will use information resources effectively to strengthen their personal and social well-being.
- Fishing businesses will have increased economic opportunities and greater diversification through participation in scientific research and monitoring activities.
- Fishers' knowledge of gear performance will be used increasingly to address legal mandates including bycatch and habitat protection.
- Communications between fishery managers, fishers, and communities will be improved.
- Fishery managers will be more aware of the economic properties of alternative management tools and their applications.
- Fishery managers and industry will develop a strong understanding of the interconnections between the productivity of natural systems, the economic benefits they provide, and the need for stewardship.

Marine and Aquatic Science Literacy

Enhancing marine and aquatic science literacy through varied programs of marine education is one of Oregon Sea Grant's highest-priority thematic goals. In fact, each of the marine and coastal issues that this program addresses has the potential to be the focus of programs to improve science literacy in various audiences. In that sense, science literacy is a component of all of our other high-priority programmatic themes, and it is therefore listed below among the crosscutting themes. In addition, Oregon Sea Grant plans to conduct and support activities that specifically target this important theme area and that contribute specifically to the art and science of marine education.

The Visitor Center of the OSU HMSC includes exhibits, aquaria, and other displays that are seen by about 150,000 visitors annually. The youth marine education program annually serves nearly 12,000 K–12 students from all over the Northwest, including Montana and northern California. Oregon Sea Grant is responsible for operating and

managing the center, which allows us to use the center as a kind of teaching and research laboratory in which to carry out studies that will improve the art and science of lifelong learning.

All elements of Sea Grant—research, extension, and communications—play a role in public education. In addition, Oregon Sea Grant has a long investment and a diverse portfolio of activities in both formal and informal marine education. Outcomes of work in these areas are often associated with programming that has been in place over a number of years. The extraordinary dividend of the Whale Watch Program, which Sea Grant began in 1978 and still participates in, is an example. Over the 18 years that numbers have been tracked, more than 557,000 people from throughout the world have received whale-watching information directly from volunteers on-site along coastal headland overlooks. During these same years there have been 72,160 reported whale sightings. Investments made since the PAT of 2000 are also beginning to show significant results and promise important dividends for the future.

The OSU HMSC in Newport is the venue for much of Sea Grant's formal and informal marine education. Sea Grant has conducted education programming there since the 1970s, but a major increase in effort occurred when Sea Grant assumed the responsibility for managing the HMSC Visitor Center in 1997. We have hired and supported a public education staff to run this facility and develop programming. Visitors to the coast as well as coastal residents come to the Visitor Center seeking information about the ocean and marine environment. Since the opening of the HMSC, more than 10 million people have visited; annual visitation since 2000 is 150,000. Admission to this public facility is free, although donations are solicited.

In recent years, Sea Grant has sought and found new ways to draw visitors to the facility and provide marine education to the broad public. One way is through special events. In June 2002, Oregon Sea Grant established SeaFest, an open house at the HMSC that offers tours, demonstrations, lectures, and displays by OSU and other agency and community participants. Over 12,000 visitors attended SeaFest in its first three years. Now a two-day event, it is currently coordinated by the HMSC director. Another special event, the annual one-day Fossil Fest, has grown to attract more than 1,250 people annually and over 7,750 total since it began in 1997.

Last year marked the fourth summer of presenting near real-time research through Ocean Quest. This program combines exhibits, artifacts, and live auditorium presentations to communicate ongoing research at sea. An evaluation of Ocean Quest found significant short-term cognitive gain and demonstrated how programs such as these can positively affect public opinion while increasing scientific literacy. Additional support has come from NOAA and the OSU College of Oceanic and Atmospheric Sciences.

In another strategy to broaden awareness and use of the Visitor Center and its educational resources, Jon Luke, education programming coordinator, and Joe Cone, of Sea Grant Communications, worked together to establish an informal Network of Oregon Science and Nature Centers. In 2003, Communications launched a Web portal by which visitors to any of the Web sites of the seven participating institutions would have immediate access to the Web sites—and thus the visitation and educational information—of the others. The standard basic measure of Web use—hits—shows that considerable traffic is coming to each of the sites via the portal.

Far more than just a public aquarium or a tourist destination, the Visitor Center, under Sea Grant's leadership, has been reconceived as a laboratory in which to study how people learn in informal settings. This new direction resulted from a review of our educational programming conducted in 2002 by a national Topical Assessment Team (TAT). The TAT process examined our unique assets and potential, and one of its recommendations was for Sea Grant to devote more attention to the art and science of free-choice learning, which is the kind of learning that takes place at facilities like the Visitor Center, where visitors have freely chosen to spend time. Very little has been known about how people learn in settings outside of school, and a better understanding of this different, but important, learning process could lead to the improvement not only of aquaria, museums, and science centers, but also other informal learning opportunities, such as public outreach by government agencies, public television, and the World Wide Web. We have acted on the TAT recommendation to focus on free-choice learning by taking several important steps. We formed a partnership in 2003 with a leading national organization, the Institute for Learning Innovation of Annapolis, Maryland, to establish a strategy and program in free-choice learning. In 2004, we hired Shawn Rowe as OSGE's marine education and learning specialist to lead our free-choice research and education. And we are currently establishing a new tenure-track Sea Grant professor position, devoted to free-choice learning, in the OSU College of Science.

Although it is too early in the evolution of our free-choice program to present major outcomes, one key element merits mention. Under the guidance of Rowe, the notion of the Visitor Center as a learning laboratory is taking on new depth as evaluations of exhibits and programming are being more systematically and professionally conducted, before, during, and after development.

Oregon Sea Grant is also very involved in formal education in a number of ways, including developing opportunities for new audiences. Although marine science is not well represented in the national or state education standards, it is an appealing, interdisciplinary subject by which to engage, retain, and promote science and marine science literacy. During the past five years, our K-12 formal education program reached over 45,000 students and teachers with approximately 90,000 hours of instruction. School groups come from throughout Oregon, notably rural eastern Oregon, and even occasionally from Washington, California, and Idaho. This program teaches basic biology concepts for the marine environment and builds a stewardship ethic in young students.

Family education is recognized as a powerful and effective means for increasing science literacy, and we have reached out to the relatively new audience of home schoolers, bringing in almost 100 of them for the most recent event at the HMSC.

We also teach the teachers. Our graduate program has made a significant contribution to the field by providing teachers with up to 30 credits of graduate marine science courses that can be applied to their master of science degree. Since 2000, 12 teachers have graduated from this program with an in-depth background in marine sciences. Teachers from eight U.S. states and six nations have participated in the program.

Another recent innovation has been in the area of professional development for community college adult education instructors through the Ocean Sciences and Math Collaborative.

Sixteen adult education instructors from 10 community colleges attended three Adult Education Instructors Institutes in a yearlong professional development project. The instructors received background information from researchers and marine science educators and adapted curriculum materials to link ocean sciences, math, technology, critical thinking, and communication skills. To our knowledge, this project is the first of its kind in linking adult educational instruction and free-choice learning centers, such as the HMSC, and will benefit both groups. Informal learning centers will learn how to adapt their programs for adult education learners, and adult education instructors will gain new learning perspective and experiences. In the context of formal education, it should be said that Oregon Sea Grant is committed to supporting the next generation of marine scientists, educators, and policymakers and, for many years, we have supported undergraduate and graduate students. These students not only gain valuable education and professional development experiences but also contribute in crucial ways to the programs and projects that make Sea Grant a success.

We also support community college students through the participation of Tim Miller-Morgan, OSGE's ornamental fish health specialist, in the new Oregon Coast Community College's aquarium science degree program. This two-year professional training program is designed to educate and prepare people to work in a wide variety of posts in the ornamental fish industry. The first class of 18 students started at the HMSC in September 2003.

Space does not permit a full accounting, of course, of every significant activity in the broad, diverse, and very active education program of Oregon Sea Grant. But the preceding highlights are intended to illustrate the new approaches, new audiences, and continued benefit to students, teachers, and the public that the program has created.

Describe Processes Used to Acquire Stakeholder Input:

Oregon Sea Grant uses a variety of ways to seek stakeholder input for all its programming. OSG has sought formal community and stakeholder input on education issues. In 2002, Oregon Sea Grant requested input from a national SG Topical Advisory Team that studied the area of marine education and the SG Hatfield Marine Science Center programs. One of the most important elements and recommendations was to imagine the Sea Grant education as a learning organization and focus our involvement with the Visitor Center and education at the Hatfield Marine Science Center as an opportunity to better understand how people learn and to help that in the scholarship of learning throughout informal education. A critical connection between Oregon Sea Grant's leaders and the program's stakeholders is an actively engaged Advisory Council, made up of 10 to 12 members from outside the university that include retired federal and state agency people, elected officials, and citizens. The council is strictly advisory, but it plays an important role in every major management decision.

Describe Processes Used to Acquire Stakeholder Input (ornamental fish health):

Oregon Sea Grant Extension employs a variety of mechanisms in developing a plan of work around ornamental fish health. These include working with national ornamental fish businesses, national and state hobby groups and other teaching institutions, which keeps staff abreast of emerging and unaddressed issues where Sea Grant Extension can

make a difference; the Sea Grant Marine Education Team provides constant feedback from curators and aquarists; a continuing assessment relationship with the Oregon Coast Community College's Aquarium Science Program and with the Oregon Coast Aquarium; and an actively engaged Advisory Council, made up of 10 to 12 members from outside the university, including retired federal and state agency people, elected officials, and citizens.

Oregon Sea Grant Extension Focus—Marine and Aquatic Science Literacy

For this planning period, our focus will be on the following:

- Understanding better the art and science of informal education and sharing that knowledge not only with our own informal program deliverers but with museums, aquariums, and other venues
- Promoting distinct and high-quality programming for youth audiences; re-examining opportunities for engaging adult education audiences using the charismatic subject matter found in marine sciences; providing outstanding programming and open access to visitors at the HMSC Visitor Center
- Optimizing opportunities to meet the needs of ornamental fish hobbyists, retailers, and importers, as well as the education and the training needs of the aquarists. Because of a number of changes of emphasis, it is unlikely that we will revive our once long-standing programming for teachers of science and math.

Goal

Enhance science literacy and understanding of the natural environment by professionals, teachers, students and the general public.

Objectives

Include stakeholders in the planning, development, and evaluation of exhibits and public programs at the HMSC Visitor Center. (BH)

Develop, enhance, and assess educational programming targeted at increasing marine science literacy among adult and youth audiences. Seek new ways to draw visitors to the Visitor Center. (BH, MARINE EDUCATORS)

Conduct research on informal, free-choice learning related to how people approach, understand, and use digital visualization and other tools of marine-based research. (SR)

Introduce informal science, adult, and extension-based educators to techniques and tools for improving communication with and learning by youth, families, and adult audiences. (SR)

Display marine and aquatic sciences exhibits at appropriate venues to reach targeted youth, family and adult audiences in collaboration with other agencies and organizations. (BH, SR)

Broadly speaking, the expected impact is improved public understanding of marine and aquatic research for youth, adult, and family audiences, improved understanding of marine and aquatic sciences among professional groups, regional institutions and educator, improved understanding of free-choice learning in informal science education settings for formal and informal educators through interactive educational venues, youth, family and adult education, and increased opportunities for professional development and professional collaborations.

Goal

Improve the rearing, husbandry, and health care of ornamental fish and invertebrates in the aquarium and pond environments.

Objectives

Develop and apply outreach methodologies tailored to the needs of the hobby and in collaboration with key hobbyist groups to improve the quality of ornamental fish and invertebrate hobbyists' husbandry and health management knowledge skills. (TMM)

Educate retailers, wholesalers and importers about fish and invertebrate husbandry and health management leading to reduced mortality and morbidity. (TMM)

Provide training opportunities and support for veterinary students at the OSU-CVM and practicing veterinarians to improve the quality of veterinary care available to the aquatic pet industry and aquatic pet owners (TMM)

Develop unique exhibitory and educational outreach programs at the Hatfield Marine Science Visitor Center to educate the public about the ornamental fish and invertebrate industry and hobby and promote responsible aquatic pet keeping. (TMM)

Methodology

Methodologies are tailored to the objectives, the audiences, the special needs, and the resources available. These methods are reviewed and revised annually as more details of an individual's work are developed and shared. Examples of methods for this topic area are workshops; exhibitory at the HMSC and other venues; youth audiences, ornamental fish hobbyist, and retailer workshops; publications; and participation by faculty in local, state, and national activities related to the subject matter.

Faculty and Staff Resources

- Lead: Shawn Rowe, marine education learning specialist, assistant professor, housed at the HMSC in Newport, Oregon; member of the Department of Science and Math, College of Science.

- Lead: Bill Hanshumaker, senior instructor with the Department of Fisheries and Wildlife, College of Agricultural Sciences; public marine education specialist, HMSC, Newport, Oregon.
- Lead: Tim Miller-Morgan, ornamental fish health specialist, assistant professor, based at the HMSC, Newport, Oregon; academic home in the Department of Biomedical Resources, College of Veterinary Medicine.
- Lead: Jesica Haxel, youth education coordinator, instructor, located at the HMSC, Newport, Oregon; no academic home. (Note: Haxel will be leaving in late 2005 for graduate school; we are in the process of reexamining this position and area of work.)
- Support: Jon Luke, professional faculty at the HMSC, Newport, Oregon, with special emphasis on adult literacy and education.
- Support: Melissa Feldberg, professional faculty on the Corvallis, Oregon, campus, with special emphasis on developing our marine educational program.
- Contract educators at the HMSC to deliver programs, primarily for youth.

Broadly speaking, the expected impact is improved public understanding of marine and aquatic research for youth, adult, and family audiences, improved understanding of marine and aquatic sciences among professional groups, regional institutions and educator, improved understanding of free-choice learning in informal science education settings for formal and informal educators through interactive educational venues, youth, family and adult education, and increased opportunities for professional development and professional collaborations.

What indicators will be used to document these changes (impacts)?

Changes in knowledge about and beliefs and attitudes toward marine and aquatic sciences and intent to extend that knowledge into learning or other actions among visitors to HMSC and other Sea Grant Marine Education activities.

Changes in knowledge about and beliefs and attitudes toward marine and aquatic sciences and intent to share that knowledge among professionals in formal, informal, and higher education settings.

Changes in knowledge about and beliefs and attitudes toward free-choice learning among professionals in formal, informal, and higher education.

What measurements will be taken to assure change has occurred in these indicators?

Sub-samples of participants at HMSC and other Sea Grant Marine Education events and activities will be observed, surveyed and/or interviewed about changes in their knowledge, beliefs, attitudes and intents to act with regard to marine and aquatic sciences and conservation.

Participants in professional development activities at HMSC and other Sea Grant sponsored venues will be observed, surveyed and interviewed about changes in their

knowledge, beliefs, attitudes and intents to act with regard to marine and aquatic sciences and conservation.

Observations, surveys and questionnaires will be used to determine educators from formal, informal, and higher education settings have modified activities, exhibits, or learning environments in response to learning about free-choice learning from Sea Grant sponsored events and activities.

Improved health of an ornamental fish resource, or the profitability or environmental sustainability of the ornamental fish industry.

Improve veterinary-based care of captive fish and invertebrates resulting in reduced mortality and morbidity (and associated costs) in these populations.

What indicators will be used to document these changes (impacts)?

Reduced disease and death among aquatic pets at the retailer, wholesaler, and importer levels.

Increased participation and knowledge of veterinary caregivers about the aquatic ornamental side of the pet industry.

What measurements will be taken to assure change has occurred in these indicators?

Importers, wholesalers and retailers will be surveyed to determine change in mortality and morbidity rates.

Surveys of veterinary practitioners indicating change in protocols leading to more effective treatment and prevention of diseases in fishes and invertebrates.

Seafood Science and Technology

Oregon's coastal communities support a seafood industry that faces increasing challenges. But issues of competitive global markets, stricter safety regulations, rising process costs, and a leveling off of landings bring opportunities as well. Developing new and higher-valued products, efficient and clean processes, technologies to detect and maintain high levels of seafood safety, value, and nutrition—all contribute to a sustainable industry and to economically stable communities.

OSU has one of the premier seafood research facilities and research facilities in the U.S. Their remarkable achievements and their capability to address the great number of important problems and opportunities that exist in this theme area have made seafood a major element of Oregon Sea Grant's research and outreach for many years. New regulations, food safety and nutrition issues, escalating process costs, opportunities to market new products—all signal continuing needs in which Oregon Sea Grant can make important contributions toward progress. Therefore, those areas constitute the core of thematic priorities in seafood.

One highly successful marketing outreach effort came in 2003, when Sea Grant conducted a salmon marketing workshop for 90 tribal fishers from the Columbia River Inter-Tribal Fish Commission. As a direct result of the workshop, the Yakima Nation changed the opening day for their fishery to make the fish available for the weekend market, when consumer demand for salmon is highest. Fish buyers offered to provide tribal fishers with ice to improve the quality of the catch, while the fishers agreed to work on their quality-handling procedures. At the end of the season, buyers remarked on the high quality of salmon delivered by native fishers, and tribal groups reported earning \$400,000 more in 2004 than they had the year before, with prices for upper-river bright Chinook holding steady at \$1 per pound all season instead of declining as the season progressed, as they had in past years.

Michael Morrissey, a Sea Grant-funded seafood research and outreach specialist who directs the OSU Seafood Lab, was a leader in organizing the Community Seafood Initiative, an alliance that includes Sea Grant and its Heads Up! Web site (<http://www.headsup.net>), the Seafood Lab and neighboring Duncan Law Seafood Consumer Center in Astoria, the Coastal Oregon Marine Experiment Station in Newport, and ShoreBank Enterprise Pacific, a rural community development financing institution. The initiative supports the efforts of coastal fishing communities to maintain healthy, working waterfronts and sustainable fisheries by developing new approaches to management and harvesting practices, new value-added seafood products, and access to new markets.

The initiative has been instrumental in promoting a new high-pressure processing (HPP) system developed by Morrissey, with Sea Grant National Strategic Investment funding, to produce safer shucked oysters and extend the shelf life of oyster meat. Post-treatment evaluation also gives HPP-processed oysters high scores for quality. The first new oyster-processing method to be introduced in more than 100 years, the HPP system has the potential to expand opportunities in value-added oyster processing around the world. Nisbet Oyster Company in Willapa Bay, Washington, has installed a \$500,000 pressure system and is delivering HPP-treated oysters throughout the West Coast.

In another NSI-funded project, veteran OSGE regional fisheries engineering specialist Ed Kolbe worked with seafood processors and refrigeration manufacturers to study ways to make blast freezers—widely used in the Pacific Northwest seafood industry—more efficient while boosting productivity, cutting energy costs, and reducing greenhouse emissions. Although unable to recruit hoped-for industry partners to fully ground test his findings, Kolbe was able to run successful demonstrations at the Seafood Lab and in a Washington refrigeration plant and has widely disseminated the laboratory findings and recommendations throughout the industry.

Additional seafood research during the period included Jae Park's continued exploration of better methods for producing surimi from Pacific whiting, this time using weak acid solutions to improve surimi texture, and Morrissey's investigation of the use of sardines and other small pelagic fish as potential sources for fish protein and valuable omega-3 fatty acids.

Sea Grant Communications, meanwhile, has been making increased use of the World Wide Web to broaden the distribution of seafood safety publications, with often surprising results. Technical reports on seafood processing safety and quality issues consistently top the list of publications downloaded each month. Once distributed a copy

or two at a time by the specialists who produced them, such titles as *Fish Smoking Procedures for Forced Convection Smokehouses* and *Preparation of Salt Brines for the Fishing Industry* are now being downloaded hundreds and even thousands of times each month. In 2003–2004 alone, visitors to the program’s web site downloaded more than 54,000 copies of Sea Grant publications, with seafood processing titles leading the way.

Oregon Sea Grant Extension Focus—Seafood Science and Technology

As with the closely related focus area of fisheries, seafood processing remains a major focus area for OSGE. Changing issues, needs, and resources are reflected in a change in emphasis for programming in this area. For this planning period, our focus will be on marketing and business development; value-added processing; seafood safety and nutrition for consumers, food services, and industry; and new seafood process and product development. We will not emphasize HACCP, sanitation, seafood engineering, and other more traditional activities.

Goal

Promote viability of the seafood industry by providing educational approaches to business development, technology, marketing, adding value, product safety, resource conservation, and waste reduction.

Objectives

Provide consumers, food services, and industry with information on seafood technology, food safety, nutrition, and related areas. (MT, MM (courtesy), Seafood Specialist TBD)

Demonstrate new and available technologies to maintain quality, pasteurize products, utilize byproducts, and detect and control pathogens for seafood safety. (MM)

Support small business development by demonstrating processes to minimize use of energy and fresh water, minimize wastes, and increase productivity and strategies for marketing and business management. (MM, MT, Seafood Specialist TBD)

Demonstrate strategies for marketing and business development in small and midsized firms, including the interplay of harvesting, seafood processing, and fisheries management. (MT, Seafood Specialist TBD)

Develop and demonstrate processes that add value to sardines, pink shrimp, albacore tuna, groundfish, and other fisheries. (Seafood Specialist TBD)

Methodology

Methodologies are tailored to the objectives, audiences, special needs, and resources available. These methods are reviewed and revised annually as more details of an individual’s work are developed and shared. The following are examples of methods for this topic area: workshops; exhibitry at the HMSC and other venues; training in seafood

technology; publications; and participation by faculty in local, state, and national activities related to the subject matter.

Faculty and Staff Resources

- Lead: Michael Morrissey, based in Astoria, Oregon, at the OSU Seafood Laboratory; affiliated with Oregon Sea Grant; professor, Department of Food Sciences, College of Agriculture. Courtesy.
- Lead: Michael Thompson, seafood marketing specialist, ssistant rofessor; housed at the OSU Seafood Laboratory, Astoria, Oregon. No academic appointment to date with this recent fisheries Extension enhancement positions.
- Lead: TBD. Location to be at the Seafood Consumer Center in Astoria, Oregon

Anticipated Outcomes (examples)

- Seafood industries will have more information to help them optimize the safety and profitability of their products.
- Evidence that new product development and new seafood-marketing initiatives with fisheries management have developed.

Urban Coasts

Portland is a major port city, but it is about 100 miles up the Columbia River and inland from the sea. Most of Oregon's coast is quite rural and, in fact, no Oregon coastal community has a population exceeding 30,000. Oregon Sea Grant has a number of research and outreach goals that are directly applicable to urban environments (for example, coastal hazards, education, and estuarine restoration), but the area of urban coasts is not included among our highest priorities as a stand-alone theme area.