

Oregon Sea Grant Extension Plan Of Work 2009-2013

PWA 1: WATERSHEDS AND WATER RESOURCES

RATIONALE

Oregon's salmon-bearing watersheds are under the pressure of a growing human population and land use that often results in deteriorated water quality, habitat modifications and water rights issues. Research needs to be targeted on better defining the relationships between climate change, upland and coastal land use, restoration efforts, and other changes and downstream impacts to coastal communities and ecosystems. Engaging the general public and groups such as local governments, outdoor hobbyists, agriculturalists, rural and urban landowners, and woodland managers in solution-focused initiatives may help to sustain watershed health, and conserve water resources.

The public, along with natural resource-dependent industries, are receptive to watershed stewardship and water-resource conservation, but they need scientifically sound, accessible and useable information about watersheds and water resources. Oregon Sea Grant will work to address the growing need for education to help overcome barriers to practices that promote a more-natural hydrologic cycle with healthy waterways that minimize impacts to coastal ecosystems and fresh water resources.

STAKEHOLDER INPUT

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HOW STAKEHOLDER INPUT WAS USED TO CREATE THIS PWA

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The process continued with an Oregon Sea Grant leadership retreat, which focused on distilling the results of our "All Hands" meeting into two cross-cutting goals (informed and engaged society, and sound science) and three strategic goals (improving human health and safety related to ocean and coastal resource use, promoting social progress and economic vitality, and enhancing the sustainability of coastal ecosystems). The Program leadership also identified six key issue areas through which we approach our goals. Integrated staff work groups were then assembled—each with a variety of technical and programmatic expertise—to develop specific implementation strategies that would achieve the greatest benefits in each of the key issue areas. The resulting implementation objectives, methods, anticipated outcomes, and measures of success appear in the *Oregon Sea Grant 2010–2013 Implementation Plan*.

LONG TERM OUTCOMES

- Individuals and groups make informed decisions based on expanded knowledge and perspectives.
- Individuals, watershed councils, academic institutions and related groups take leadership roles in community watershed and water resource education.
- An active network of citizen scientist and students engaged in invasive species prevention, early detection and rapid response.
- Public decision makers incorporate best available science in their decisions governing watershed health and fresh water resources.
- Regional managers are better able to prioritize invasive species management, and prevent and respond to invasions.
- Improved invasive species management tools and prevention protocols.
- Rivers and streams with high levels of contamination will have improved water quality and risk to users is reduced.
- Rural communities have reliable access to clean and safe fresh water.
- Municipalities and small water districts are capable of providing consistent clean water supplies to meet demand.

- Residents and businesses will adapt existing practices to use less water and match our climatic conditions.
- Increased public knowledge, skills and awareness about their role in watershed health and water resource conservation.
- Improved capacity to avoid negative economic effects of aquatic invasive species.
- Individuals, watershed councils, academic institutions and related groups take leadership roles in restoration and preservation efforts.
- Low impact development practices are widely used and contribute to a more-natural hydrologic cycle.
- Riparian planting, revegetation, and restoration skills are easy to obtain and are utilized at priority restoration sites.
- Increased collaboration and capacity to incorporate invasive species prevention, early detection and rapid response protocols into management entities and organizational activities.

INDICATORS OF SUCCESSFUL ACHIEVEMENT OF THIS OUTCOME

- Number of individuals utilizing on-line watershed education material. (150)
- Number of stakeholders partnering with OSG faculty in the delivery of water resource and watershed education. (20)
- Number of individuals participating in Oregon Water Schools. (120)
- Percentage of program participants that demonstrate increased knowledge and awareness through evaluation. (70%, 190 of 270)
- Number of trainers trained. (150)
- Number of graduate degrees affiliated with OSG faculty focused on watershed health. (4)
- Percentage of Oregon coastal communities that utilize OSG watershed health and water resource planning tools. (35%, 12 of 36)
- Number of management and predictive invasive species tools developed. (2)
- Number of peer-reviewed publications or technical documents. (3)
- Number of presentations to managers. (3)
- Number of training workshops. (6)
- Number of new publications and other media pieces developed. (2)
- Number of well-users attending workshops and trainings. (25)
- Percentage of water districts that participate in OSG programs. (20%, 4/20)
- Number of individuals participating in Oregon Water Schools. (120)
- Increase in Oregon Water School participants that demonstrate increased knowledge and awareness through evaluation. (70%, 84/120)
- Percentage of Oregon Water School participants that express an intent to change behavior based on evaluation. (40%, 48/120)

- Number of volunteer hours spent on watershed restoration efforts. (400)
- Number of new "Master Watershed Stewards" certifications.(15)
- Number of previously certified "Master Watershed Stewards" seeking education in advanced topics. (75)
- Percentage of coastal communities that implement low impact development practices. (50%, 18 of 36)
- Number of high priority restoration sites where restoration is initiated. (5)
- Percentage of previously certified "Master Watershed Stewards" seeking education in advanced topics. (75)
- Number of extension programs and hobby groups throughout the region that incorporate invasive species prevention, detection, and/or response activities. (8)
- b. Number of requests to develop new protocols for invasive species management tools and protocol development. (4)

RATIONALE

Demand for ocean space and pressure on ocean resources are rapidly increasing. New uses of ocean space, such as alternative energy development and marine reserves, have provoked ocean and coastal stakeholders to become more involved in planning and decisions related to allocation of ocean space. These conditions create a culture of competition, and highlight the critical need for knowledge and understanding about how current ocean uses affect each other and how they cumulatively affect the environment. Oregon Sea Grant will focus effort on filling critical gaps in knowledge through interdisciplinary research that seeks to understand social, economic, and ecological factors of multiple uses of ocean space. We will serve the state and region as a trusted broker by working in partnership with government, industry, and NGOs to develop processes for engaging diverse interests in solution-oriented planning for use of ocean space.

STAKEHOLDER INPUT

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LONG TERM OUTCOMES

- Improved access to, and utilization of spatial planning and multiple use information, especially with regards to ocean energy.
- Improved functioning of existing community groups and development of new groups.
- Stakeholders are engaged in decision making processes related to allocation and use of ocean space.
- Increase in the number of research proposals that address multiple uses and spatial planning through multidisciplinary and collaborative approaches.
- Improved ability of decision-makers to consider ecosystem services in decision making.
- Fishermen and researchers are able to continue ocean use with no unnecessary safety risks.
- New ocean users such as the ocean energy industry are not exposed to unnecessary safety risk.
- Current knowledge about spatial planning and balancing multiple ocean uses is synthesized and social and economic research priorities are identified and used by ocean users communities and decision makers.
- Community leaders are significantly involved in spatial planning.
- Stakeholders have access to and utilize maps of ocean uses and economic activity to make decisions.
- Spatial planning reduces (rather than exacerbates) ocean use conflicts.
- Spatial planning improves the sustainability of coastal and ocean uses.

INDICATORS OF SUCCESSFUL ACHIEVEMENT OF THIS OUTCOME

- Number of people participating in workshops and educational events. (300)
- Number of new community/user groups formed and engaged in spatial planning. (3)
- Percentage coastal counties with community/user groups involved in spatial planning. (60%, 4 of 7)
- Increase in research proposals submitted that address multiple uses and spatial planning challenges (50%; 4 to 6).
- Number of publications, and presentations. (5)
- Number of new safety risks posed by the wave energy industry, and number of wave energy related injuries or deaths. (0)
- Percentage of ocean energy facility plans that include user safety precautions. (100%, ~3)
- Increase number of economists and social scientist involved in state spatial planning processes advisors and employees. (400% from 0 to 4)
- Percentage coastal counties with community/user groups involved in spatial planning and or mapping. (60%, 4 of 7)
- Number of scientific experts and experienced ocean users in Oregon who use the science for improved management. (8)

RATIONALE

Oregon's coastal history, culture, and economy are shaped by our productive fisheries. Oregon Sea Grant addresses fisheries challenges by integrating the tools of extension, education, and research to facilitate improved fisheries understanding, management, and harvest practices. Our programs are cooperative and interdisciplinary, incorporating experiential knowledge of fishermen and the fishing community to enhance understanding and management of commercially valuable fish stocks and ecosystems that support them. Our research focus is on understanding the relationships between habitat, physical forcing, and fish production. Oregon Sea Grant plays a critical role in building partnerships and helping businesses and communities self organize, thereby increasing the efficacy of citizen engagement in fisheries-related decision making and management. In addition, we educate our constituents about historical and current fisheries practices and management, to advance the understanding of fisheries throughout the state.

Oregon Sea Grant addresses seafood challenges and works to maximize locally realized benefits of Oregon seafood by integrating extension, education, and research to enhance the understanding and management of fisheries and seafood product development, food safety and handling and other programs that advance consumer knowledge.

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LONG TERM OUTCOMES

- Mutual respect between groups and increased accurate understanding of fisheries and seafood issues.
- Visitors and residents will have and improved understanding of the fishing industries.
- State and regional fisheries managers including the Pacific fisheries management council have access to more information when making management and allocation decisions.
- Increased knowledgeable on how to avoid risk at sea and are practiced at survival techniques.
- Consumers are more knowledgeable and make choices to maximize health benefits and minimize risks.
- Improved fisheries management that matches market demand for sustainability.
- Increased availability of safe local sustainable seafood in urban markets
- Increased demand, value and profits for Oregon caught and cultured seafood

- products.
- Increased utilization of best health practices within the ornamental fish industry.
 - Improved health/quality and increased survival and decreased disease among ornamental fish imported into Oregon.
 - Increased opportunities to market high quality ornamental fish in Oregon.
 - Aquaculture hatchery facilities are better able to avoid and mitigate risk to seed stock.
 - The potential for successful restoration of Olympia oysters is enhanced.
 - Fisheries managers are capable of selective management techniques that minimize impacts on stocks of critical concern.
 - Increased protection of weak stocks
 - Improved sustainability of harvested species.

INDICATORS OF SUCCESSFUL ACHIEVEMENT OF THIS OUTCOME

1. Number of fishing groups that effectively communicate and collaborate with non-fishing groups. (5)
2. Increase in number of locations that provide OSG produced materials about fishing industries. (50%, from 4 to 6)
3. Number of peer reviewed publications and technical documents produced and provided to fisheries managers. (5)
4. Number of presentations given to managers and/or fishermen. (5)
5. Number of sea safety training students that successfully complete the course. (150)
6. Number of new marketing tools tested. (2)
7. Increase in economists and other social scientist working to improve regional fisheries management. (50%, from 10 to 15)
8. Number of new distribution points for Oregon fish. (12)
9. Number of new Oregon seafood products in markets. (3)
10. Number of facilities that initiate use of best health practices within the ornamental fish industry. (50)
11. Reduced morbidity and mortality among ornamental fish imported into Oregon (evaluation of participating facilities). (10%, total unknown)
12. Number of new or improved sources that provide healthy, sustainably produced/collected ornamental fish. (8)
13. Number of publication and technical documents. (2)
14. Number of presentations or trainings with the aquaculture industry. (3)
15. Percentage of fishermen in fleet trained in at sea genetic stock identification techniques. (50%, 50 of 100)
16. Number of management techniques adapted to utilize new knowledge. (2)

PWA 4: COMMUNITY RESILIENCE TO COASTAL HAZARDS AND CLIMATE CHANGE

RATIONALE

The coastal areas of Oregon in recent decades have experienced considerable population and development pressure, which is expected to continue. During the same period, coastal Oregon has seen an increase in the frequency and intensity of winter storms, which have brought record storm damage, flooding, shoreline erosion, and bluff failures. Now, climate change has the potential to increase the risks associated with erosion, flooding, compromised water quality, invasive species, and other effects on aquatic life, including commercial fisheries. Coastal residents and leaders are struggling to understand and respond to the confluence of these trends.

Rural Oregon coastal communities may be more vulnerable and less resilient to climate change than metropolitan areas, because of a lack of overall institutional resources and a greater economic dependence on natural resource systems. Critical needs for addressing local natural hazards include a better understanding of coastal processes, assessment of local vulnerability to current and projected impacts, identification and setting of priorities on adaptation strategies, and ongoing help implementing those strategies. Oregon Sea Grant supports physical and social science research to better understand, predict, and adapt to hazards and climate change. We additionally conduct engagement and education efforts to help local residents and leaders build the capacity to address these issues, which are critical to the economy, health, and safety of coastal residents and visitors.

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LONG TERM OUTCOMES

- Higher level of public discourse on topics of climate change and coastal hazards.
- Residents and visitors have access to more information about hazards.
- Workshop participants establish preparedness groups that organize business, neighborhoods, and organizations that prepare for hazards.
- Coastal residents can describe the potential risk to their own property and can identify ways to reduce that risk.
- Increased knowledge about drivers agencies have access to timely science related to climate change and coastal hazards to improve planning and decision making.
- Agency planning and decisions will address barriers to adaptation.
- Individuals and agencies change behavior and become more resilient in the face of climate change and coastal hazards.
- Most vulnerable individuals and groups understand and respond appropriately to

- hazards and climate change reducing risk.
- Communities are more resilient to the effects of coastal hazards and climate change and experience minimal interruption of economic activity after an event.
 - Managers will be better able to account for the effect of climate change in planning and decision-making.
 - Coastal communities institute policies and procedures to enhance the natural ability of coastal ecosystems to buffer extreme events.

INDICATORS OF SUCCESSFUL ACHIEVEMENT OF THIS OUTCOME

- Percentage of HMSC visitors that express learning behavior at interactive displays through evaluation studies. (60%, 240 or 400)
- Number of new educational publications or multimedia materials produced (4).
- Number of coastal counties with new preparedness groups. (4)
- Number of new local scale documents that present preparedness plans. (8)
- Number of coastal residents that participate in mapping workshops. (60)
- Number of peer-reviewed publication or technical documents. (2)
- Citations of OSG supported research in agency planning or technical documents (3).
- Number of relevant state agencies that incorporate recent research into planning and/or decision-making. (4)
- Percentage of coastal residents know what to do in case of an earthquake and/or tsunami. (10%,)
- Percentage of coastal counties that initiate or expand coastal hazards and/or climate change planning. (40%, 3 of 7)
- Percentage of coastal counties using web-available data. (40%, 3 of 7)
- Percentage of invitations extended to most vulnerable groups. (30%, 240 of 800)
- Percentage of coastal counties that implement plans to adapt to hazards (70%, 5 of 7)
- Percentage of coastal counties that initiate use of hazard resilience practices (40%, 3 of 7)
- Number of peer reviewed publications, technical documents, and articles published. (3)
- Percentage of coastal communities that adopt new policies (40%, 3 of 7)

PWA 5: OCEANS AND HUMAN HEALTH

RATIONALE

Human health and safety are undeniably linked to the health of our ocean and coastal ecosystems, which provide benefits such as clean water, seafood, marine pharmaceuticals, and recreational opportunities. Safety is also important particularly for recreational users and commercial fishermen. Conversely, threats to ocean and coastal health such as harmful algal blooms, pollution, aquatic invasive species, and fish disease can increase risks to humans who use and rely on coastal and ocean resources. Oregon Sea Grant will support research that seeks to assess and understand human health risks and to move beyond understanding to forecast threatening conditions, with an emphasis on developing applications that provide early warning systems and reduce overall risks. We will use our communications and outreach capabilities to increase public knowledge about human health benefits, and about risks related to ocean and coastal use. Through extension efforts we will work with coastal and coastal-dependent communities to identify and monitor ocean conditions that pose a risk to human health and safety. We will respond to these issues by leading the development of warning systems, risk mitigation, improved biosecurity, and other strategies.

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LONG TERM OUTCOMES

- Beaches with high levels of contamination will have improved water quality.
- Increased knowledge of biophysical forces that drive risk conditions and increased capacity to forecast risks.
- Increased knowledge about sources of contamination and ability to prioritize mitigation or regulatory actions.
- Increased knowledge of deep-sea vent organisms, bioactive compounds, pharmacology molecular tools, and cell biology.
- Discovery of beneficial compounds and new drug leads.
- The public is exposed to fewer risks related to ocean and coastal resource use.
- Coastal residents and visitors are aware of risks and know how to respond in a way that reduces their personal risk.
- Citizens enjoy coastal resources and drinking water without risk of illness from

- bacterial contamination.
- Ornamental fish industry and managers are better able to reduce risk of zoonotic disease transmission.
 - Reduced unnecessary beach closures.
 - Residents and visitors can enjoy beach recreation without health concerns.
 - Coastal ecosystems have improved water quality.
 - Decision makers utilize recommendations and institute policies or regulations that improve water quality.

INDICATORS OF SUCCESSFUL ACHIEVEMENT OF THIS OUTCOME

- Percentage of water quality samples that show reduced bacterial contamination entering waterways from know sources. (15%, 30 of 200)
- Number of peer reviewed publications and development of models that forecast risk conditions or events. (2)
- Number of publications highlighting new knowledge (2)
- Number of presentations and trainings (4)
- Number of peer reviewed publications and presentations. (3)
- Number of patents. (1, may take longer than 4 years)
- Percentage of coastal communities that implement notification systems. (40%, 14 of 36)
- Percentage of coastal communities in which risk response education occurs. (40%, 14 of 36)
- Percentage of beach counties that adopt new practices that reduce contamination. (40%, 3 of 7)
- Number of new publications or technical documents. (5)
- Number of domestic and international organizations that seek biosecurity information from OSG. (6)
- Number of ornamental trade facilities that initiate disease screening. (8)
- Percent reduction of beach closures. (15%, from 25 to 21)

PWA 6: COASTAL LEARNING AND DECISION MAKING

RATIONALE

Public and private organizations make substantial investments in “ocean education” programs that provide various learning opportunities for students, adult audiences, and ocean-management and -policy decision makers. Ocean education efforts often operate under the assumption that learning is a simple, linear process, moving from awareness to knowledge to behavior change, and that increased knowledge leads to decisions that favor stewardship and preservation of our ocean and coastal resources. However, the links between learning, knowledge, and behavior change are neither simple nor direct, as decades of research in the cognitive, decision, communication, and learning sciences attest.

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

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- Increased K-12 student knowledge about marine sciences and careers.
- Improved in-school science education.
- Teachers are more capable of meeting science education standards.
- Youth and adults are more ocean-literate.
- Young professionals in marine science, policy, education, outreach and engagement are better equipped to become leaders in the field.
- OSG programs are refocused and effectively reach more diverse audiences.
- Increased knowledge on how to create and deliver education programs that effectively change behavior.
- Improved impact of museums, aquaria, and coastal interpretive centers.

- Increased knowledge on how to communicate science to non-specialists that effectively influences their behavioral choices.
- A publication that reviews the state of knowledge and recommends priority research.
- Residents reduce their exposure to health and safety hazards related to ocean and coastal resource use.
- Communities and individuals overcome barriers and are capable of adapting to the effects of climate change.
- Stakeholders are engaged and influence planning, decision making and policy changes.
- Individuals participating in education and outreach programs can identify how their behaviors influence the environment and alter their behavior to enhance sustainability of the coastal ecosystems they are part of.

INDICATORS OF SUCCESSFUL ACHIEVEMENT OF THIS OUTCOME

- Number of students participating in OSG K-12 education programs. (35,000)
- Percentage of trained teachers that use new science education tools. (50%, 220 of 240)
- Increase annual number of visitors to the HMSC Visitors Center. (10%, from 140,000 to 154,000)
- Increase in number of OSG scholars active in a year. (20% from 30 to 36)
- Number of peer-reviewed publications, technical documents, or presentations completed by OSG Scholars. (60)
- Percentage of OSG scholars working using interdisciplinary approaches that include outreach and engagement. (60%, 80 of 133)
- Number of new audience groups participating in OSG programs such as home schools, tribal communities, Spanish speakers, and others. (3)
- Number of graduate students affiliated with OSG faculty, fellowships, research grants or scholarships that focus their research on learning science and evaluation. (24)
- Number undergraduates affiliated with OSG faculty, fellowships, research grants or scholarships that complete a learning science or evaluation project. (12)
- Number of peer-reviewed and technical publications authored by faculty affiliated with OSG researchers or supported students. (20)
- Number of new materials in our Public Science Communication series (6).
- Number of Sea Grant faculty and graduate students who participate in science communication seminars (20).
- Number of seminars (3).

- Number of copies distributed. (100)
- Percentage of participants in OSG health and safety education programs that can identify risk reduction strategies and report specific intended risk reduction behavior. (70%, 105 of 150)
- Percentage of coastal counties that can identify adaptation strategies. (60%, 4 of 7)
- Number of coastal communities who report successful engagement in decision-making processes. (12 of 36)
- Number program participants who report anticipated or actual behavior change through evaluation. (40%, 200 of 500)