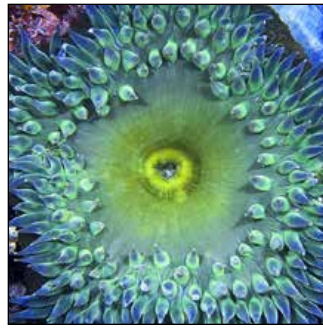




Washington Sea Grant Briefing Book

National Site Visit May 12 – 13, 2015



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I INTRODUCTION

Washington Sea Grant (WSG) operates within a uniquely diverse and productive ocean and coastal environment that strongly influences the state's demographics, culture, and economy. Almost 80 percent of Washington's seven million residents live within its 15 coastal counties. The population of its most urbanized portion, the Puget Sound Basin, is projected to grow from about 4.3 million today to more than 5.2 million in 2025. Twenty-nine federally recognized Indian tribes or nations hold treaty lands and serve as co-managers for coastal and marine resources.

Maritime industries are an engine of Washington's economic prosperity and growth.¹ In 2012, the state maritime cluster directly employed more than 57,000 people, generating \$15.2 billion in gross business income. The fish and shellfish sector, both wild-caught and farm-raised, makes up 60 percent of those revenues and is the third largest maritime employer. Washington aquaculture produces more oysters and other bivalves, and more highly prized ones, than any other state. Even the Alaska fishing fleet, harvesting what are widely considered the nation's best-managed and most sustainable fisheries, is largely based in Seattle.

Shipping, logistics, transportation, and boatbuilding constitute the remaining sectors of Washington's maritime core. The neighboring ports of Seattle and Tacoma together form America's second-largest container port and Washington is the most trade-dependent of all 50 states. Maritime commerce is not only important but vividly present: Seattle's busy docks lie closer to a major city center than those of any other U.S. port, subjecting them to traffic and competition from sports stadiums, retail development, and other urban uses.

Intense shoreside activity and coastal development have inevitably affected the state's marine waters. Heavy industries — pulp and lumber, smelting and oil refining, shipbuilding and aircraft manufacture — have spilled creosote, lead, PCBs, and other toxins. Logging, farming, and urban growth have damaged sensitive watersheds, smothering salmon redds and oyster beds in runoff sediment. Hydroelectric dams choked off salmon runs so vast they once seemed indestructible.

Today, half those runs are listed as threatened or endangered. The Salish Sea's southern resident killer whales, which depend on declining salmon and are burdened with some of the highest PCB levels recorded in any animal, are now endangered. The native Olympia oyster, an early economic mainstay, has been severely depleted by overharvesting, degraded water quality, and the invasion of non-native species.

Still, temperate weather, spectacular vistas, and recreational opportunities make Washington's coasts a magnet for new residents and visitors alike and fuel a \$16 billion tourism industry. State and local governments have tried to mitigate the impacts, but often it is a struggle just to keep up with continued growth, let alone correct existing problems. For example, the Puget Sound Partnership (PSP) and other agencies are working to discourage shoreline construction of unnecessary bulkheads and other hard armoring, which can block essential ecosystem functions and eventually lead to erosion and habitat loss. But such armoring already encloses more than a quarter of Puget Sound's shores, and another one to two miles gets installed each year, largely on private residential property.

In contrast, hardened shorelines, toxic pollutants, and other consequences of population growth are not concerns for much of Washington's thinly settled Pacific coast. Small fishing towns, tribal lands, and wilderness areas characterize the 500 miles of tidal shoreline of Washington's outer coast and Olympic Peninsula. It is a region of low population densities and natural resource-based economies with limited infrastructure and access to services. Much of the area is under federal management through the Olympic Coast National Marine Sanctuary, Olympic National Park, and Olympic National Forest.

These outer coast resources, habitats, and communities face their own unique challenges, some systemic and others newly emergent. Pacific coastal waters support commercial and recreational fisheries for shellfish and groundfish, shipping operations, and wildlife-viewing and other tourist opportunities. But, many traditional sustainable uses such as fishing have been curtailed in recent years as a result of reallocation and drastic declines in fish stocks. In addition, the region is the stormiest in the lower 48 states, periodically battered by hurricane-force winds and exposed to tsunamis, which have struck with devastating force before and may do so again at any time.

Throughout coastal Washington, resilience to coastal hazards and adaptation to climate change have become increasingly important to the public and government at all levels. Sea-level rise exacerbates other coastal threats, further threatening estuarine habitats and human habitation; some vulnerable Olympic tribal communities are already working to relocate upland. The warming climate, compounded by cyclical phenomena such as El Niño and the Pacific Decadal Oscillation, has increased seasonal flooding and drought, stressing anadromous fish runs. Rising ocean temperatures are causing northward shifts in whiting and some other offshore fisheries and, together with overfishing and changing ecosystem conditions, are disrupting once-rich fisheries such as rockfish and abalone.

¹ Community Attributes Inc. 2013. Washington State Maritime Cluster Economic Impact Study. 86 pp.

Finally, Washington is on the front line of another carbon-driven threat: ocean acidification, whose effects have only become apparent in the past decade. Offshore upwelling of deep, cold, low-pH seawater, aided by changing wind patterns, brings high concentrations of more acidic bottom waters to shore. Nutrients from sewage effluent, agricultural runoff, and other human-generated sources stimulate plankton blooms that die and decay, injecting more carbon dioxide. These corrosive waters have disrupted operations at some Northwest oyster hatcheries and have the potential to affect key components of the marine food web.

Since its inception, WSG has served Washington, the Pacific Northwest, and the nation by funding marine research and working with communities, managers, businesses, and the public to strengthen understanding and sustainable use of the region's unique ocean and coastal resources. WSG-supported researchers are at the scientific forefront on topics of vital regional concern, from salmon genetics and climate impacts on fish populations to the effects of ocean acidification on cultured oysters and planktonic crustaceans. WSG research is working to develop better ecosystem models for shellfish aquaculture impacts, predict harmful algal blooms, prepare communities for tsunamis, and track the response of blockaded fish runs to the largest dam removals in U.S. history.

But such research remains an academic enterprise if the findings are not communicated for use by the ocean research community, marine industry, natural resource managers, coastal residents, and the public. WSG's wide-ranging outreach services work to bridge the knowledge gap, developing practical tools for managing and sustainably using ocean and coastal resources. WSG constituents expect WSG staff to be familiar with ongoing and emerging marine resource and management issues and to work toward solutions to scientific and resource problems.



II PROGRAM MANAGEMENT AND ORGANIZATION

Leadership and Organization

WSG maintains a high-quality, broad-based program, housed at the University of Washington (UW), that combines research, education, advisory services, and communications, and requires an efficient and flexible management system. The role of WSG leadership is to establish and implement an effective operations framework, provide program management and coordination, oversee allocation of resources, and assure quality control and accountability. The leadership team seeks ways to maximize program benefits and set objectives consistent with the WSG strategic plan, as well as state, regional, and NOAA strategic plans and priorities. The team promotes relationships within the UW and with other educational institutions; tribal, local, state, and federal agencies; business and industry; marine-oriented interest groups; and the public. One high priority is the identification of emerging issues and opportunities for strategic investment of Sea Grant staff time and fiscal resources. WSG is committed to supplying needed administrative, technical, and financial tools to staff, students, and investigators to ensure effective use of their combined capabilities. These objectives have provided the foundation for WSG's success for the past 45 years and will ensure continued success for decades to come as a high impact program at university, state, regional, and national levels.

Before 2012, the WSG organizational structure had been unchanged for decades, with very low turnover in most management positions. However, trends in the program at both national and university levels raised questions about whether staffing and operational changes were needed to continue WSG's long record of success. In addition, impending retirements and budget limitations made assessment of how best to organize the program a timely action for future planning.

In September 2012, the UW Organizational Efficiency Initiative (OEI) agreed to partner with WSG leadership to guide them through an examination of program organization and skill requirements to ensure that resources were optimized, particularly limited human resources. With OEI guidance, WSG has worked over the past two years to complete and implement the assessment, developing a plan to improve administrative effectiveness and efficiency. The partners examined core business functions and adjustments to meet evolving program needs; management roles and responsibilities, including changes necessary to ensure the program's current and future success; and overall organization, human resources capacity, and the needed skill mix for the leadership team.

As a result, WSG has been able to prepare for both planned and some unexpected changes in our leadership structure. Communications manager Dan Williams retired in 2013 and Marine Advisory Services program leader Pete Granger retired from

his position to become a part-time field agent in 2014. During the OEI process, assistant director Raechel Waters, administrator Karen Mooseker, and senior program coordinator Michelle Wainstein also made decisions to leave WSG and the university to pursue other career directions and opportunities.

As revised leadership roles were developed, positions were filled through open, competitive hiring processes that relied on search teams comprising WSG, university, and WSG Advisory Committee members. From 2013 to 2014, during the transition, the outgoing and incoming members of the WSG management team worked together to phase in the recommendations of the OEI assessment and minimize disruption. While the process is still ongoing, many of the recommended changes are reflected in the leadership and staff organization as outlined here.

Today, a five-member management team leads WSG, meeting weekly to discuss program needs and maintain integrated leadership across program components. The team brings together a wide range of expertise; responsibilities and backgrounds are summarized below:

Director Penelope D. Dalton is responsible for overall leadership and direction, management, and administration of WSG; collaboration and integration at the university, state, regional, and national levels; and final oversight of all staff. She also serves as affiliate associate professor in the School of Marine and Environmental Affairs. Previously, Dalton was vice president at the Consortium for Oceanographic Research and Education, where she managed program and external relations staff. From 1999 to 2001, she was NOAA's assistant administrator for fisheries and head of the National Marine Fisheries Service. Dalton also served on the staff of the U.S. Senate Committee on Commerce, Science, and Transportation for 13 years, directing Democratic subcommittee staff on ocean and science issues. She has a master's degree in marine-environmental-estuarine sciences from the University of Maryland.

Associate Director Brian Kirk joined WSG in 2014 and is senior program manager, providing programmatic leadership, support, and guidance to outreach staff and implementing processes and initiatives to enhance operational effectiveness. Prior to WSG, Kirk was a project manager at the UW Surgical Outcomes Research Center. He completed a 20-year career as a Navy officer, serving in a variety of at-sea, shore-based, and overseas roles, including shipboard chief engineer and current operations director for a carrier strike group. Kirk has an undergraduate degree from the Maine Maritime Academy and a masters of science in operations research from the Naval Postgraduate School. He is a certified program manager and a graduate of the U.S. Naval War College.

Assistant Director for Programs Kate Litle is responsible for program planning and reporting; oversees WSG competitive processes, including research and program development grants; and coordinates integration of WSG program components. A citizen science specialist who works to connect volunteer efforts with regional research, monitoring, and management needs, Litle serves as vice-chair of the Puget Sound Ecosystem Monitoring Program steering committee. Before joining WSG in 2009, she managed a number of UW research programs, including the Coastal Observation and Seabird Survey Team (COASST). Litle holds an undergraduate degree in biology and environmental policy from Colby College and a master's degree in marine affairs from the UW.

Assistant Director for Communications MaryAnn Wagner is responsible for WSG's diverse communications program, conducting planning and supervising an expert team. Activities range from website and publication production to media relations and placements to support for scientists, staff, and the public. Wagner joined WSG in late 2014, after more than 15 years as communications director for non-profit education organizations. She developed the first communications department for Seattle's classical KING FM public radio station and coordinated expansion of UW's Burke Museum website and media coverage. She enjoyed similar successes at the Frye Art Museum and the Museum of History and Industry. Wagner is a UW graduate with a degree in journalism and communications and a certificate in technical editing.

Administrator Gwyn Hinton serves as WSG's fiscal officer, providing leadership and management for all business and operational activities, including human resources, grant administration, fiscal compliance and control, and facilities. She prepares budgets and financial analyses, tracks spending and expenditures, verifies and documents cost share, and makes sure that WSG staff have what they need to do their jobs. Hinton joined WSG in June 2013 with more than 20 years experience at the UW. She has developed her administrative acumen at departments across campus including the College of Education and the Evans School of Public Affairs. Another UW graduate, Hinton holds a degree in business.

Looking across the organization, the WSG staff currently comprises 30 professionals including 23 outreach staff who fill about 20 full-time equivalent positions. Staff members are distinguished by a wide range of backgrounds, expertise, and educations that reflect the diversity of marine issues in Washington — from an experienced commercial fisherman with a business degree to a coastal hazards specialist with a recent doctorate in ocean sciences. While turnover across the organization has been less extensive than in the leadership, the changes in the past four years have been substantial (Figure 1). Recent staff recruitments bring new energy and an increase in educational breadth to WSG, while seasoned staff provide anchors of experience and encyclopedic institutional memories.

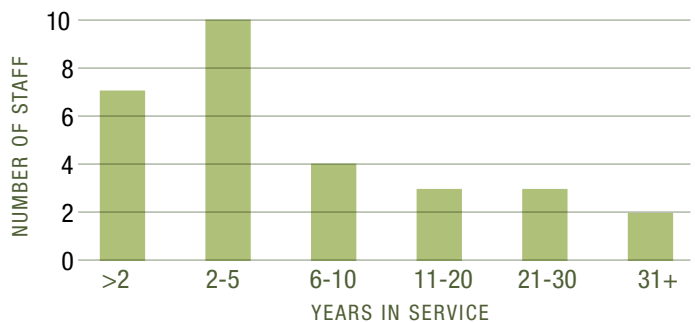


FIGURE 1. YEARS OF STAFF SERVICE IN UW COLLEGE OF THE ENVIRONMENT AND PREDECESSOR.

The OEI assessment prompted several additional changes in WSG staff administration and structure to improve communications, increase collaboration, and support professional development:

- In 2013, the university approved a new environmental outreach specialist classification system that addresses a long-standing WSG personnel issue: the need for a clear career ladder for professional outreach staff and more senior career opportunities.
- Within the 2014-2018 omnibus, advisory services, education, and communications programs were merged into a single project, reflecting the increased integration among these WSG program elements and allowing greater administrative efficiency.
- The 17 WSG advisory services members were organized into three core advisory services teams — aquaculture and water quality, coastal communities, fisheries and marine operations — and interested staff applied for team lead positions. Team leads were selected in the fall of 2014, attended UW strategic leadership training, implemented monthly core team meetings, and now meet regularly with the WSG director and associate director. Eight months after launch the teams report improved communication and collaboration, addressing two long-standing institutional challenges.
- In conjunction with release of the 2015 request for proposals, WSG held a workshop with prospective investigators and our communications, advisory services, and education staff to develop ideas for stronger integration of outreach into WSG-supported research.

Advisory Committee

The WSG Advisory Committee was initiated in 2006 to bring together state leaders who can provide a variety of perspectives to guide program direction, priorities and resource investments. The Committee has grown over the years, evolving into a 15-member group that currently includes representation from tribal, federal, and state agencies; academic institutions; conservation and education organizations; and key industry stakeholders, such as a crab fisherman, and maritime publishing executive. The UW College of the Environment (CoEnv) dean and WSG director serve in an ex-officio capacity.

Committee members serve for four-year terms, but are encouraged and are often willing to extend their membership for additional periods of time. The committee usually meets twice a year and meetings are timed to coincide with major WSG program deadlines for strategic planning, omnibus development and research project priority setting and selection. Over the years, members have provided extraordinarily thoughtful advice on all parts of the program.

In addition to their participation in standing committee meetings, members often contribute in program areas where they have particular expertise or interest. For example, several members have participated on selection panels for Marc Hershman Marine Policy Fellowships; in fact, former Clallam County Commissioner Mike Doherty has been involved in the selection process each year since the fellowship was created. Other committee members have served on biennial WSG preliminary proposal review panels and on WSG hiring committees or participated in Congressional briefings and been key advisors in shaping new WSG initiatives, such as this year's Washington maritime workforce development project initiative. By combining their personal expertise with an understanding of WSG approaches and capabilities, committee members have proven that they are in a unique position to identify opportunities and provide guidance to the program.

Current Advisory Committee Members

Dale Beasley, *President*, Coalition of Coastal Fisheries and Columbia River Crab Fishermen's Association

Tracy Collier, *Environmental Toxicologist (retired)*, NOAA Northwest Fisheries Science Center

Betsy Davis, *Executive Director*, Northwest School of Wooden Boatbuilding

Mike Doherty, *Commissioner (retired)*, Clallam County

Paul Dye, *Director of Marine Conservation*, The Nature Conservancy/Washington

Ed Johnstone, *Fisheries Policy Spokesperson*, Quinault Indian Nation

Jim Kropf, *Natural Resources Program Director*, Washington State University Extension

Brian Lynn, *Manager*, Coastal and Shorelands Section, Washington Department of Ecology

Anne Murphy, *Marine Science Practitioner*, Jefferson County Marine Resource Committee

Peter Philips, *President*, Philips Publishing Group

Bradley Smith, *Commissioner*, Washington Fish and Wildlife Commission

John Stein, *Science and Research Director*, NOAA Northwest Fisheries Science Center

Dan Swecker, *Executive Director*, Washington Fish Growers Association

Margaret Tudor, *Executive Director*, Pacific Education Institute

Jacques White, *Executive Director*, Long Live the Kings

Ex-Officio members:

Penelope Dalton, *Director*, Washington Sea Grant

Lisa Graumlich, *Dean*, College of the Environment, University of Washington

Program Setting and Support

As the marine research and graduate education institution of higher education designated in state law, the UW is the Sea Grant College in Washington. WSG was established in 1968 and in 1971 the university became one of the first four programs to be named in the national Sea Grant network. Today, WSG is housed in the CoEnv and responsibility for the program is delegated to the WSG director who serves as principal investigator. The director reports to the CoEnv dean and has university-wide responsibilities for marine research and outreach (Figure 2). WSG also works with a number of other UW colleges, campuses and units. Over the years, UW has remained a supportive home and strong advocate for WSG.

WSG also engages other state educational institutions with compatible research and education missions. Over the past three years, research and fellowship programs have supported scientists and students at Western Washington University, Washington State University, and the Evergreen State College. In addition, advisory services staff members share offices, expertise, and sometimes teaching responsibilities with colleagues at Grays Harbor and Peninsula Colleges, WSU Kitsap Extension, and the Puget Sound Institute at the Center for Urban Waters.

In 2010, before WSG became part of CoEnv, the then-UW president and provost made a commitment to the new college to ensure continued availability of funds to meet WSG's federal requirement for matching funds. For all parts of WSG's four-year omnibus proposal, except on-campus research, a 26 percent off-campus indirect rate has been applied, permitting waived indirect costs generated by the arrangement to be counted as cost share. In addition, CoEnv continues to contribute to the general

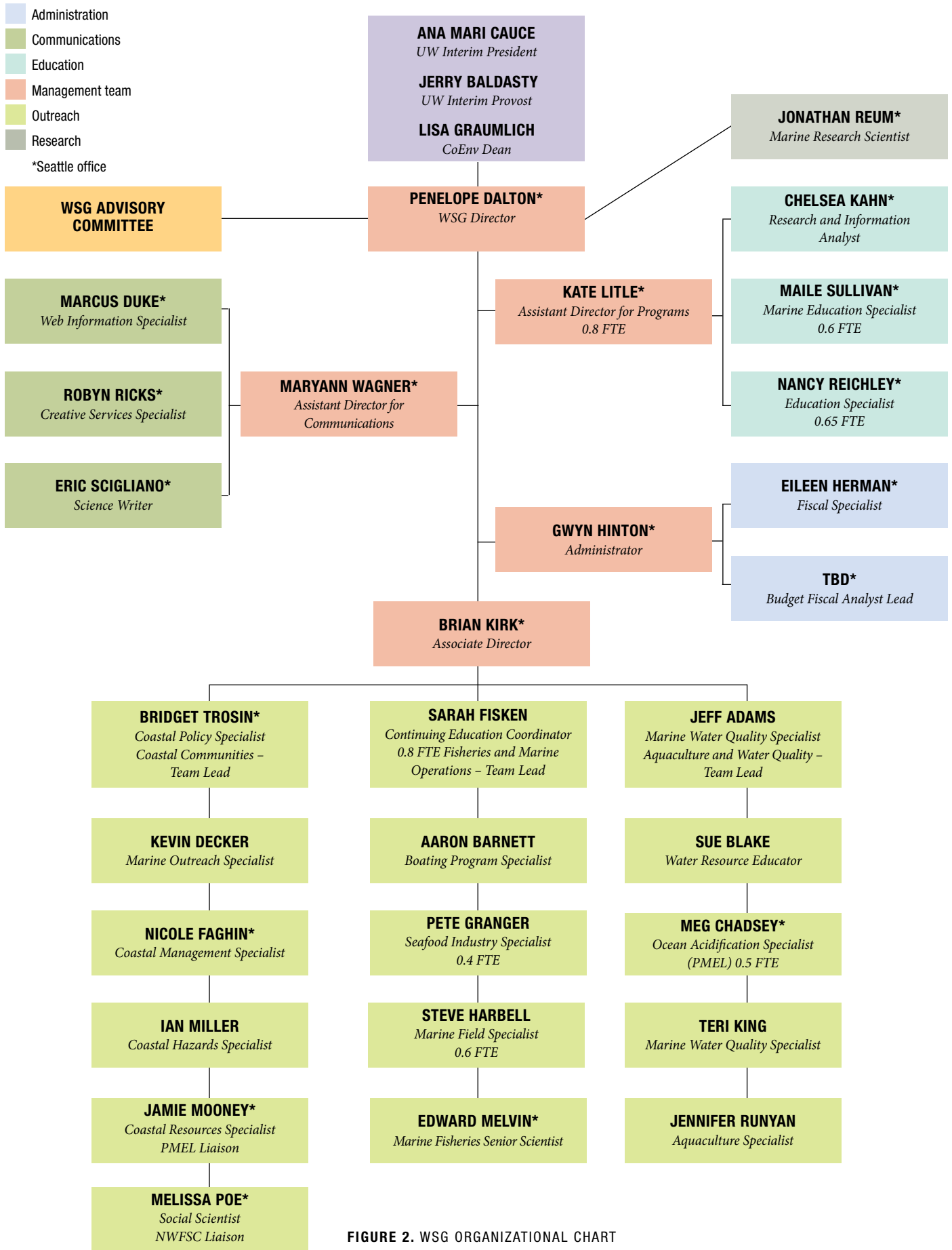


FIGURE 2. WSG ORGANIZATIONAL CHART

operating budget and the vice provost for research provides funds centrally. This shared contribution of resources has worked well in maintaining stable university support.

In addition to university and federal resources, WSG has worked over the past four years to diversify and augment its traditional funding — and those efforts slowly appear to be producing results. Figure 3 shows WSG sources of income between 2011 and 2014. Excluding research cost share, which is reported by but not paid to WSG, total revenues have grown by almost 30 percent. Much of the increase comes from the national program through additional social sciences funding, support for NOAA liaisons, and success in national competitions. In addition, WSG has effectively leveraged omnibus grant funds, garnering almost a million dollars in the past year, primarily from state agencies, to support projects that range from fellowships and marine spatial planning to improved boater use of vessel pumpout facilities. Staff have played an important role in seeking out these new and less traditional sources of support. Finally, the PSP, charged with restoration of the Sound, agreed to fund just over a third of five research projects in 2014 that contribute to completion of the Puget Sound Action Agenda. While WSG cannot depend on many of these sources on a continuing basis, the 2014 budget illustrates that exploring diverse funding is a promising approach for ensuring the long-term vibrancy of the program.

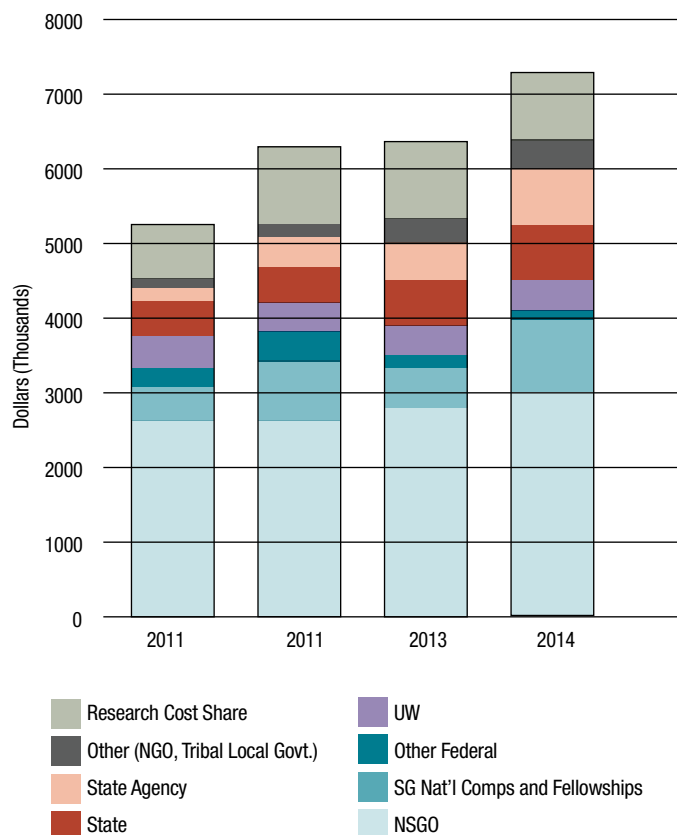


FIGURE 3. SOURCES OF WSG FUNDING

Recruiting Talent through Competitive Proposals

WSG sets priorities for research and other program activities through a strategic planning process that relies heavily on the input provided by the staff, Advisory Committee and constituents. The program priorities and implementation strategies established in the current strategic plan were developed through staff interviews with key constituents, meetings with the research community, and almost 250 responses to an online survey. The Advisory Committee and staff met several times over a nine-month period to contribute to the planning process and make recommendations. All of the information gathered was then structured to align with and contribute to the National Sea Grant College Program's strategic plan. The resulting WSG 2014-2018 plan establishes four interrelated critical program areas that provide primary inputs to the competitive research process:

- **Healthy Coastal Ecosystems:** understanding ocean and coastal environments and stressors and advancing ecosystem-based approaches to manage, protect, and restore natural resources.
- **Sustainable Fisheries and Aquaculture:** facilitating sustainable use of living marine resources through science-based management and environmentally and economically responsible approaches.
- **Resilient Communities and Economies:** building capacity for coastal communities that are economically vibrant, environmentally healthy, and resilient to hazards and climate change.
- **Ocean Literacy and Workforce Development:** educating students of all ages and strengthening workforce capacity.

WSG requests for proposals (RFPs) also encourage investigators to align their projects with research priorities identified by state, regional, tribal, and national research organizations such as the PSP Biennial Science Work Plan, recommendations of the Washington State Blue Ribbon Panel on Ocean Acidification, and the NOAA Next Generation Strategic Plan. In some years, the RFP has provided direction to increase program investments in specific program areas. In 2011, for example, WSG called for funding at least six projects in the area of changing oceans and coastal communities and focusing on community resilience, coastal hazards and climate change. By contrast, this year's RFP invited proposals for pilot projects to support the Washington maritime workforce initiative through defining career pathways, developing curricula and programs, and using innovative approaches for recruitment and training.

In 2011 and 2013, in addition to WSG's biennial RFP, the four West Coast Sea Grant programs conducted joint regional competitions for social science projects involving at least two state programs. Each of the programs committed a small portion of their state funding and divided up the administrative responsibilities for the grant review process. While the regional scope, limited funding and interstate participation requirements were chal-

lenging and complicated for investigators, the competition did increase Sea Grant visibility within the social science community and provided support for some really excellent projects.

In its **review process**, WSG applies the same five criteria — weighted differently and with some differences in emphasis at each stage — to project evaluation at the preliminary and full-proposal stages. These criteria are: project contribution; technical and scientific merit; engagement plan; qualifications of applicants; and project costs. A multi-step application and review process (Table 1) is used to select competitive projects:

1. The RFP is widely distributed within the state and submitted applications are screened to ensure that eligibility criteria are met. WSG convenes a review panel to evaluate preliminary proposals and recommend the most promising projects for development of a full proposal.
2. At least three external reviewers provide written evaluations for each submitted and complete full proposal and investigators are given the opportunity to respond to reviewer comments.
3. WSG convenes a technical review panel comprised of out-of-state experts covering, to the extent possible, the range of disciplines proposed in the full proposals. Panel members are provided with copies of the proposal, external reviews, and investigator responses to those reviews. The panel discusses each proposal and develops funding recommendations.
4. Blinded summaries of proposals that are recommended for funding are provided to members of the Advisory Committee who assess projects based on their regional importance and priority for funding.

5. WSG reviews available information and makes final decisions on projects for inclusion in the omnibus grant funding cycle. Selected proposals may be returned to applicants for revisions prior to submission to the National Sea Grant Office.

Program development projects are funded to allow relatively rapid response to unique issues and opportunities as they arise. Such projects have relatively modest budgets, and although they are not competitively awarded, are fully reviewed before they are funded. WSG has funded 11 program development projects totaling more than \$145,000 since 2011. Recent examples include the following:

- A Western Washington University researcher is teaming with research groups and volunteer monitors along the Pacific coast to document wasting syndrome in sea stars, collect and analyze tissue samples from both sick and healthy sea stars, and track the progress of the disease.
- Using historical sample collections of Chinook salmon, Washington State University scientists are investigating the genetic response of this iconic Northwest species to known high-impact events, such as dam construction and increases in fishing activity. The researchers' goal is to understand factors driving a decrease over time in genetic variability.
- The North Olympic Peninsula Skills Center is partnering with WSG and several local marine organizations in this very rural region to pilot an internship program that will engage students and help recruit them into marine-related jobs and careers. The goal of the project is to establish a program approach that can be sustained by the local community.

TABLE 1. COMPETITIVE RESEARCH RESULTS — PROJECTS, INSTITUTIONS AND INVESTIGATORS

	2011 Regional	2011 RFP	2013 Regional	2013 RFP
Preliminary Proposals				
Number of preliminary proposals	18	66	16	64
Number of institutions (for PIs and Co-PIs)	39	41	27	44
Full Proposals				
Number of full proposals	8	32	7	35
Number of institutions (for PIs and Co-PIs)	22	27	20	33
Number of reviews received (Number of reviewers contacted)	28	65 (171)	21	115 (275)
New and Continuing Projects and Recruitment of PIs				
New projects	2	10	2	13
Continuing projects	0	2	0	4
Number of PIs and Co-PIs funded	8	26	2	43
Number of new PIs and Co-PIs funded	7	15	1	26
Number of institutions (for PIs and Co-PIs)	5	7	6	29

III

STAKEHOLDER ENGAGEMENT

Leadership by Staff on Boards and Committees

WSG staff members participate and play leadership roles in a broad range of community and government organizations.

Jeff Adams, *Marine Water Quality Specialist*

Western Regional Panel on Aquatic Nuisance Species, Coastal Committee; West Sound Watersheds Council; Harbor WildWatch Science Advisory Committee

Aaron Barnett, *Boating Program Specialist*

Clean Marina Steering Committee; Washington Boating Alliance Moderator; Washington Department of Ecology No Discharge Zone Advisory Committee; Pacific Oil Spill Education Team

Sue Blake, *Water Resource Educator*

Whatcom Marine Resources Committee; Whatcom Watershed Information Network Steering Committee; Lake Whatcom Education Team; Combined Review Team Salmon Recovery; Coordinator, PSP Whatcom ECO Net

Meg Chadsey, *Ocean Acidification Specialist*

Pacific Marine Environmental Laboratory Liaison for Ocean Acidification; Washington Marine Resources Advisory Council Subcommittee on Education and Outreach; NOAA Sharing Ocean Acidification Resources for Communicators and Educators (SOARCE) Webinar Planning Committee

Penny Dalton, *Director*

Sea Grant Association External Relations Committee; Sea Grant 50th Anniversary Committee; UW CoEnv Executive Committee; Washington Coastal Marine Advisory Council; Washington Maritime Advisory Committee; Salish Sea Marine Survival Project Coordinating Committee; Washington Shellfish Initiative Core Group

Nicole Faghin, *Coastal Management Specialist*

National Sea Grant Legal Network; National Working Waterfront Network Executive Committee; Coastal Training Program Advisory Committee; Washington State Chapter American Planning Association; Shoreline and Coastal Planners Group; Green Shores for Homes BC Advisory Committee; UW Urban Planning Professionals Council

Sarah Fiskén, *Continuing Education Coordinator*

Jefferson County Marine Resources Committee

Pete Granger, *Seafood Industry Specialist*

Pacific Shellfish Institute Board of Directors; Whatcom Commercial Fishermen's Association Board of Directors; Whatcom County Marine Resources Committee; Whatcom Working Waterfront Coalition Advisory Committee

Steve Harbell, *Marine Field Agent*

Western Regional Aquaculture Center Board of Directors; Western Regional Aquaculture Center Board of Directors Technical Committee; Editor, Western Regional Aquaculture Center Board Publications Committee; Alaska Marine Safety Education Association

Teri King, *Marine Water Quality Specialist*

PSP Ecosystem Coordination Board; Education Director, Cranberry Lake Research and Education Board; Chair, Skookum OysterFest Board; Treasurer, Pacific Rim Shellfish Sanitation Association Board; Washington Shellfish Initiative Core Group; Hood Canal Coordinating Council; Washington State Department of Health Recreational Shellfish Program Advisory Committee; Washington State Department of Health *Vibrio* Committee; Oakland Bay Clean Water District; California Current Ocean Acidification Network Steering Committee; Lower Hood Canal Watershed Coalition

Brian Kirk, *Associate Director*

Assembly of Sea Grant Extension Program Leaders

Kate Litle, *Assistant Director for Programs*

Vice-chair, Puget Sound Ecosystem Monitoring Program Steering Committee; Coastal Observation and Seabird Survey Team (COASST) Advisory Board

Ed Melvin, *Marine Fisheries Scientist*

Pacific Fishery Management Council Endangered Species Working Group; Short-Tailed Albatross Endangered Species Act Recovery Team; CCSBT Seabird Mitigation Measures Working Group; Agreement for the Conservation of Albatrosses and Petrels (ACAP) Seabird Bycatch Working Group; KOBE III Bycatch Working Group; World Wildlife Fund Smart Gear Competition Review Panel

Ian Miller, *Coastal Hazards Specialist*

Feiro Marine Life Center Board of Directors; Chair, Feiro Marine Life Center Education and Research Committee; Strait Ecosystem Recovery Network; Strait Ecosystem Recovery Network Technical Committee; North Olympic Peninsula Lead Entity Technical Review Group; West Coast Governors Alliance Hazard Map Technical Committee; North Pacific Coast Marine Resources Committee

Jamie Mooney, *Coastal Resources Specialist*

Pacific Marine Environmental Laboratory Liaison for Tsunamis; HUD National Disaster Resilience Competition Proposal Development Team; Coastal Hazards Resilience Network Management and Planning Team; King Tides Organizers Group

Melissa Poe, *Social Science Specialist*

Northwest Fisheries Science Center Liaison; PSP Social Science Advisory Committee; City Fruit Board of Directors

Nancy Reichley, *Education Specialist*

Co-chair, Ocean Awareness and Literacy Action Coordination Team, West Coast Governors Alliance

Maile Sullivan, *Education Specialist*

Secretary and WA Co-chair, Northwest Aquatic and Marine Educators Board of Directors; Regional Coordinator, National Ocean Sciences Bowl; Seattle Math, Engineering, Science Achievement Saturday Academic Planning Committee; UW College of the Environment Diversity Committee

Bridget Trosin, *Coastal Policy Specialist*

Washington State Ocean Caucus

MaryAnn Wagner, *Assistant Director for Communications*

UW Marketing Roundtable; Sea Grant Communicators' Network; UW Professional Staff Organization

Partners and Stakeholders

WSG works with its partners and stakeholders to expand awareness of our oceans and coasts, enhance enjoyment of marine resources, and encourage sustainable coastal living. Each year WSG holds numerous workshops, classes, and activities, enlisting thousands of local residents in activities ranging from beach walks on Hood Canal to workshops on seafood safety. More than 10,000 people, including 1,500 students, attend annual events like the Allyn Geoduck Festival, Mason County Oyster-Fest, ShellFest, Whatcom Water Weeks, and the Kitsap Water Festival. In addition, WSG directs intensive summer science camps for middle and high school students and a popular state-wide ocean sciences bowl that together introduce more than 200 students each year to marine-related careers. Since 2011, WSG has supported an average of 70 undergraduate students and 50 graduate students each year through fellowships, student employment, internships, and research funding.

The dialog with stakeholders and partners is ongoing and continuous. For example, the recently completed WSG website redesign focused on constituent interests, and the site structure has been organized to meet the needs of 12 identified user personas. Throughout the development process, WSG communications conducted usability testing and in-depth interviews with key interest groups to ensure that the site was responsive to their changing needs.

WSG has a long history of, and reputation for, effectively connecting with communities and stakeholders. This reputation has been a primary contributor to WSG success in forging new partnerships and continuing to expand its programs throughout the state and region. Building on both seasoned and new partnerships, WSG is able to increase the number of stakeholders it can engage and more effectively address user community interests. Over the past four years, WSG has focused on strengthening partnerships with tribes and state agencies. It also has continued to prioritize students and training the next generation of marine science and policy professionals. WSG has expanded stakeholder engagement through citizen science programs, and maintains its tradition of responsiveness to industry needs.

Strengthening State Agency Partnerships

- As part of the state agency team tasked with developing the **marine spatial plan for Washington's Pacific coast**, WSG has organized workshops, given presentations, and engaged hundreds of elected officials, fishermen, coastal residents, and industry personnel. In 2013, WSG created a committee of scientific experts to provide advice on plan development and began development of social and economic indicators. WSG currently participates in a Rhode Island Sea Grant project to develop case studies of the process nationally.
- WSG works with Washington State Parks to manage and conduct the **Pumpout Washington campaign**. In 2013, the campaign engaged about 5,000 boaters and reached an estimated 10,000 individuals through advertisements, news articles, and public events. WSG distributed more than 4,000 hands-free adapter kits to boaters to make pumpouts easier and safer. In addition to outreach, Pumpout Washington visited 65 marinas to discuss ways to improve sewage handling.
- WSG collaborates with PSP on projects to **restore Puget Sound** that range from citizen science recommendations to technical assistance models for shoreline homeowners. WSG staff members serve on the PSP Ecosystem Coordination Board and as vice-chair of the Puget Sound Ecosystem Monitoring Program steering committee. In 2014, WSG and PSP funded the Puget Sound Research Collaboration to support high priority research.
- Partnering with the Washington Department of Ecology, WSG has developed a statewide **Coastal Hazards Resilience Network** to connect researchers, agencies, planners, and communities. The project supports regional coordination of coastal hazard planning, response, and recovery by maintaining a network listserv and website, encouraging community awareness and use of lessons learned, and facilitating mitigation and response planning.

Training the Next Generation of Marine Professionals

- Each year, 20 Washington high school teams and more than 100 students converge on the UW for **Orca Bowl**, Washington's regional National Ocean Sciences Bowl competition. WSG partners with CoEnv and the Seattle Aquarium to offer the program, involving nearly 100 graduate students, faculty, and ocean professionals as volunteers who introduce student participants to a variety of ocean-related careers.
- In 2008, WSG instituted the **Marc Hershman Marine Policy Fellowship**, a state program modeled after the Knauss Fellowship. Since 2011, the program has successfully placed 15 graduate students with state and other partner agencies, including the Washington State Departments of Health, Ecology and Natural Resources; PSP; the Nature Conservancy; and the Makah Tribe.

Partnering with Washington Tribes

- Training and technical assistance for aquaculture, fishing, and seafood processing and marketing for the Lummi, Nisqually, Quileute, Quinault, and other tribes.
- Research funding for sensor installation on crab pots to monitor seasonal hypoxia in Quinault reservation waters.
- Mentors for a UW Program on Environment student project with the Jamestown S’Klallam Tribe to reduce residential shoreline armoring.
- Program development funds for Northwest Indian College student testing of marine biotoxins in shellfish.
- Placement of a Marc Hershman Marine Policy Fellow with the Makah Tribe.
- Research team member for Jamestown S’Klallam Tribe climate change vulnerability assessment.
- Sponsorships for the First Stewards symposiums on climate change and a Lower Elwha Klallam Tribe youth native art program.



“We don’t want to overharvest anything or have any kind of effects that will harm the future of our kids. Because that’s the most important thing — what we do and what happens on down the line.”
Quileute tribal member Lonnie Foster aboard the CJ Todd.

- WSG partners with the **Washington NASA Space Grant Consortium** to support undergraduate scholarships and summer research opportunities for students pursuing degrees in the marine sciences. To date, WSG has jointly sponsored 15 Scholars and Summer Undergraduate Research Program interns.
- WSG specialists serve as mentors for undergraduate Capstone students from the UW **Program on the Environment**. In addition, WSG provides dedicated funding and teaching support for the program’s graduate-level Keystone program to address environmental management issues that align with WSG priorities.

Engaging Volunteers Through Citizen Science

- **SoundToxins**, a volunteer monitoring program initiated by NOAA’s Northwest Fisheries Science Center, is co-directed by WSG, and is relied upon by state public health and fisheries managers. The program provides warnings of harmful algal blooms to proactively manage seafood threats, minimize human health risks, and reduce economic losses. It has grown from four sampling locations in 2006 to 23 today, including several tribes and involving hundreds of Puget Sound residents.
- In response to calls from volunteer groups and local jurisdictions, WSG has teamed with PSP to develop a **Shoreline Monitoring Toolbox**. The toolbox provides standardized approaches to monitoring shorelines in Puget Sound and includes protocols for more than 15 parameters such as beach profiles, wrack invertebrates, birds, and fish. It is currently being used by local organizations to develop volunteer monitoring plans at a variety of restoration sites.
- In 2013, partnering with the Bainbridge Island Land Trust and the Powel family, WSG completed its management of **the Powel project**, the largest residential bulkhead removal project in Puget Sound. The project removed 1,544 feet of bulkhead and invasive plants from nearly 33,000 square feet of uplands and planted 2,650 native trees and other plants. Today, WSG continues to recruit and train enthusiastic volunteers to collect data for tracking ecosystem changes and documenting the impacts of the historic restoration.

Responding to Marine and Coastal Industry Needs

- WSG partners with the Washington State Department of Licensing and Northwest Marine Trade Association to provide **quarterly and yearly data on in-state boat sales** that are unbiased and accessible. The information helps boat dealers monitor sales trends and aids them in making better-informed business decisions, so they can direct market strategies and boost overall sales. State officials also use the information to locate new pumpout stations for boat waste, target oil-spill prevention outreach, and verify demand for in-water moorage and dry-stack storage.
- In 2014, WSG reached a milestone, its 100th port-based, **Coast Guard-certified safety training** course. For more than 20 years, the courses have helped Washington fishermen reduce risks by teaching emergency preparedness, fire response, cold-water rescue, first aid, and other safety measures, using the latest equipment and procedures. Overall, thousands of fishermen have been trained and the effort has reduced losses in Puget Sound, Washington’s outer coast, and Columbia River fisheries.
- WSG-brokered **marine transportation charts** make West Coast sea-lanes safer and more efficient, reducing conflicts and saving crab fishermen and towboat companies about \$2 million each year. Now available in electronic format, the charts establish voluntary towlanes to prevent crab gear from

being lost or fouling vessels in transit between coastal ports. Annual facilitated discussions with the two industries also have resulted in improved marine weather forecast products and coastal-bar closure policies.

- In 2011, the NOAA Administrator and then-Governor Gregoire announced the **Washington Shellfish Initiative** to restore and expand the state's shellfish resources and support sustainable aquaculture businesses. WSG made a substantial contribution including research, public engagement programs, an annual conference for shellfish growers, and support for a high level panel on ocean acidification. The culminating event was the WSG-organized and hosted Shellfish and the Environment Symposium attended by more than 300 growers, scientists, managers, and residents last December. WSG currently is part of the Governor's core group that is planning for launch of a second initiative this summer.

Key Partnership and Stakeholder Organizations

WSG maintains a large and widely distributed portfolio of partners and stakeholder organizations with which it works. Figure 4 indicates how those partnerships are distributed across government, academic, and nongovernmental sectors and is followed by examples for each sector.

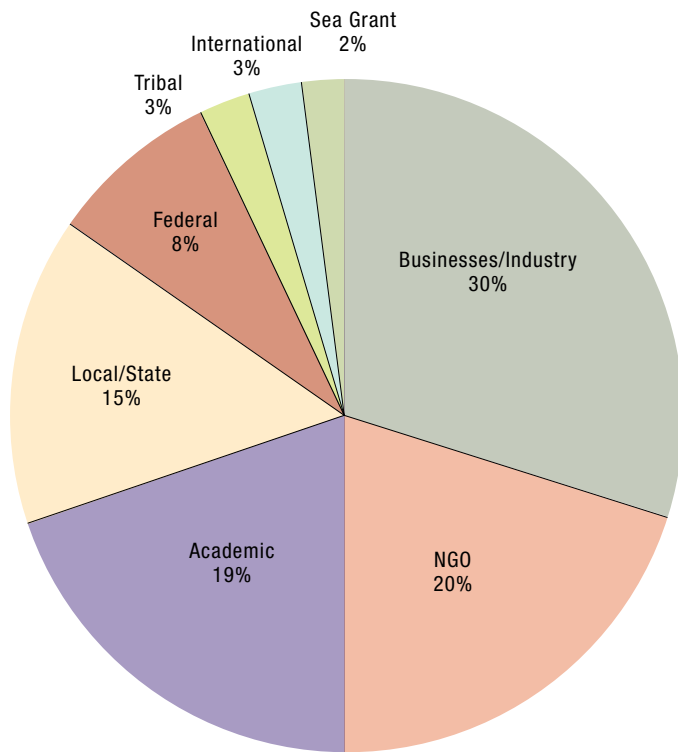


FIGURE 4. PARTNERSHIP DISTRIBUTION BY SECTOR.
N=APPROXIMATELY 1,300



Academic Institutions

Centers for Ocean Science Education Excellence: COSEE-Ocean Learning Communities
Climate Impacts Group
Joint Institute for the Study of the Atmosphere and Ocean
National Disaster Preparedness Training Center, University of Hawai'i
Northwest Indian College
Oregon State University: Hatfield Marine Science Center
The Evergreen State College
University of Washington, Tacoma
Washington Community Colleges: Everett, Grays Harbor, Highline, Peninsula, Skagit Valley, South Seattle
Washington Public High Schools
Washington State University and WSU Extension
Western Washington University

Businesses and Industry Groups

Alderbrook Resort and Spa
Archipelago Marine Research, Ltd.
At-Sea Processors Association
Bornstein Seafoods
Chelsea Farms
City of Des Moines, Hood Canal, Rosario, and Stimson Marinas
Co-X Entertainment
Coast Seafoods Company
Columbia River Crab Fishermen's Association
Englund Marine
Fishing Vessel Owners Association
Hama Hama Oyster Company
Lark Restaurant
Northwest Marine Trade Association
Numerous marinas
Pacific Coast Shellfish Growers Association
Philips Publishing
Taylor Shellfish
Terry and Sons
Washington Trollers Association

Federal Agencies

Environmental Protection Agency
Federal Emergency Management Agency
National Ocean Service: Olympic National Marine Sanctuary, Pacific Service Center, Padilla Bay National Estuarine Research Reserve
NOAA Fisheries: Alaska and Northwest Fisheries Science Centers, Northwest Regional Office
NOAA Pacific Marine Environmental Laboratory
NOAA Western Region
U.S. Department of Agriculture and Western Regional Aquaculture Center
U.S. Fish and Wildlife Service
U.S. Geological Survey
International Organizations
American Bird Conservancy
BirdLife International
International Pacific Halibut Commission
Korea Maritime Institute
South African Department of Environmental Affairs and Tourism, Marine and Coastal Management, Pelagic and High Sea Fishery Management Division
Stewardship Centre of British Columbia

Local and State Governments

City of Seattle and many other coastal cities in Washington
Coastal Counties: Clallam, Grays Harbor, Jefferson, Kitsap, Mason, Pacific, San Juan, Snohomish
Coastal Marine Resource Committees
Northwest Straits Commission and County Marine Resources Committees
Port of Seattle, Fishermen's Terminal
Port of Tacoma
Puget Sound Partnership
Shellfish Aquaculture Regulatory Committee
Washington State Departments of Ecology, Health, Fish and Wildlife, Natural Resources
Washington State Legislature
Washington State Parks and Recreation Commission
Washington State Ocean Caucus

Nongovernmental Conservation and Education Organizations

Bainbridge Island Land Trust
Clean Marina Partnership
Consortium for Ocean Leadership
Long Live the Kings
Northwest Maritime Center
Northwest Straits Foundation
Pacific Shellfish Institute
Port Townsend Marine Science Center
Puget Soundkeeper Alliance
Seattle Aquarium
The David and Lucille Packard Foundation
The Nature Conservancy, Washington Program

Tribes and Intertribal Commissions

Columbia River Intertribal Fish Commission
Jamestown S'Klallam Tribe
Lower Elwha Klallam Tribe
Lummi Nation
Makah Tribe
Nisqually Indian Tribe
Northwest Indian Fisheries Commission
Quinault Indian Nation
Suquamish Tribe
Swinomish Tribe
Tulalip Tribes

Sea Grant Programs

Alaska, California, Maine, Michigan, MIT, Oregon, Southern California, Virginia



IV

SEA GRANT NETWORK AND NOAA COLLABORATIONS

Joint and Regional Sea Grant Projects

WSG actively pursues regional and federal partnerships and is a frequent collaborator with other Sea Grant programs and NOAA. In recent years, the four West Coast Sea Grant programs have worked on a series of coast-wide projects including the regional research and information needs report, establishment of a fellowship program to support the West Coast Governors Alliance, two regional social science research competitions, and three projects conducted jointly with NOAA West. The West Coast programs also have worked together to develop a coherent response to emerging regional environmental issues such as marine debris associated with the 2011 Tōhoku earthquake, monitoring for ocean acidification, and sea star wasting disease.

In 2013, WSG took the lead in convening the 3rd National Working Waterfront and Waterways Symposium in Tacoma, Washington. The National Sea Grant Office and 21 state Sea Grant programs sponsored the event, along with NOAA, the West Coast Governors Alliance, and at least 20 other organizations, ranging from ports and maritime industries to the Nature Conservancy. Over the course of four days, more than 300 policymakers, tribes, port operators, fishermen, planners, and others interested in coastal access issues from around the country shared challenges and brainstormed solutions. They considered the future of working waterfronts, including the potential impacts of changing uses and climate, and ways to sustain commercially viable waterfront industries.

In 2014, the West Coast Sea Grant programs completed their four-year collaboration, led by Oregon, to evaluate and develop tools for addressing multiple aquatic invasive species pathways. In addition to the other Sea Grant programs, WSG worked with UW scientists, state agencies, and other local partners to characterize the educational pathway for non-native crayfish and freshwater species invasions. The project team designed toolkits and a curriculum and worked with teachers to strengthen invasive species prevention and enhance safe use of live organisms in the classroom.

NOAA Partnerships

The Seattle region has the highest concentration of NOAA programs and employees outside the headquarters in Silver Spring, Maryland, and offers rich collaborative opportunities:

- WSG is partnering with the national office and local NOAA centers to establish **liaison positions on ocean acidification, tsunamis, and the human dimensions of marine resource issues**. Pacific Marine Environmental Laboratory is sponsoring two half-time liaison positions focused on ocean acidification and tsunamis that were created in 2012. Each of the liaisons is making progress in building a joint program in her respective area. In addition, WSG and the Northwest Fisheries Science Center established a liaison position in 2013 to build social science capacity supporting regional marine resource management. Activities to date include participation in development of social wellbeing indicators for marine management, authorship of a paper on cultural connections to coastal ecosystems, and evaluation of subsistence harvesting among West Coast commercial fishermen.
- One of WSG's longest and most successful partnerships is with NOAA Fisheries, focused on the **reduction of seabird bycatch in fisheries**. Hundreds of thousands of seabirds, including endangered albatrosses, are trapped and drowned in global fisheries each year. Seabird avoidance measures developed and promoted by WSG have dramatically reduced this avian bycatch in longline fisheries, at the same time reducing bait loss and improving fishing efficiency. The measures, which use strategically deployed bird-repelling streamer lines, have been adopted by the Pacific Fisheries Management Councils, NOAA Fisheries, and by tuna fisheries worldwide. Currently, NOAA, WSG and its Oregon and California partners are working to refine prevention measures for West Coast fisheries.
- Working with local NOAA Fisheries and university partners, WSG initiated a joint research project to develop **social wellbeing indicators for marine management (SWIMM)**. The purpose of the indicators is to identify social and economic measures that can be used to monitor human dimensions of marine ecosystems and for use in the California Current integrated ecosystem assessment. Together the team and working group have defined domains of wellbeing like resource access and economic security, identified almost 3,000 candidate indicators, and implemented a protocol for indicator screening and validation. The approach is also being adapted to develop indicators for marine spatial planning.

- From 2012 through 2013, WSG led development of a **climate change vulnerability assessment for the Olympic Coast National Marine Sanctuary (OCNMS)**. The OCNMS climate change assessment was the third produced for the National Marine Sanctuaries network and the most thorough undertaken to date for the Northwest coast. OCNMS will use the assessment to incorporate climate change into its master plan, and the report serves as a benchmark for future observations and adaptation. The final report incorporated 28 contributions from 13 agencies, with input from state, federal, tribal, and private experts.

Success in Sea Grant National Competitions

WSG has a record of success in Sea Grant national competitions (Table 2). One top priority over the years has been to encourage and support students in securing competitive fellowships. In the 35-year history of the Knauss Fellowship, for example, WSG has produced 77 fellows — more than any other program in the Sea Grant network. In addition, to date WSG has successfully nominated 20 out of a total of 95 Sea Grant/NOAA Fisheries Fellows. Over half of the program graduates now are working in fisheries management, while others are working in their fields in consulting firms, academia, and for non-profits.

Other national competitions play an important role in specific WSG program areas and in funding collaborative activities with other West Coast Sea Grant programs and NOAA West. For example, Washington's role as the nation's top shellfish producer drives strong interest by shellfish growers, academic scientists, and industry experts in national Sea Grant aquaculture competitions. Over the past five years, WSG has received two awards for aquaculture extension and outreach activities and eight for aquaculture research. In addition, WSG has been a member of successful joint program teams funded to work on invasive species and regional marine research. Finally, in 2012 WSG received a special award for support of the 3rd National Working Waterfronts and Waterways Symposium, held in Tacoma, Washington.

NOAA Science Camp

From trying on scuba gear to working with NOAA scientists, students get a dose of real-world science at NOAA Science Camp.

Every summer, NOAA Science Camp connects middle and high school students with NOAA scientists, enriches their ocean literacy, and builds interest in science careers. For 11 years, WSG has run the inquiry-based NOAA Science Camp, which introduces seventh and eighth graders to ocean sciences and science careers. Educators and scientists from nine NOAA offices engage students in five days of hands-on activities that meet state education standards and essential ocean literacy principles. More recently, WSG introduced a Junior Leadership Program to ensure continuity in free-choice learning opportunities for high school students.

In 2013, NOAA and WSG and its many partners expanded Science Camp's reach to Alaska by making it possible to host two students from St. Paul Island, Alaska, the largest, northernmost Pribilof Island. In 2012 and 2013, Junior Leadership Program teens designed and presented their own research projects on aerial mapping using balloons and Lake Washington water quality measurements.



TABLE 2. SUCCESS IN NATIONAL COMPETITIONS

National Competition Awards	2010	2011	2012	2013	2014
Knauss Fellows	4	3	3	0	4
Sea Grant/NOAA Fisheries Fellows	0	0	2	1	3
Aquaculture Research	2	*	4	*	2
Aquaculture Extension	1	*	*	1	*
Special Projects	*	*	1	*	*

* not applicable

V PROGRAM CHANGES RESULTING FROM 2011 REVIEW

2011 Site Review Team Recommendation

Washington Sea Grant Response

UW should use WSG expertise in developing CoEnv's outreach and engagement component and appoint WSG to lead its coastal and marine division.

CoEnv outreach and engagement investments have occurred primarily within the Dean's office. A WSG staff member served on a 2012 science communications task force.

2011 Site Review Team Suggestion

Washington Sea Grant Response

WSG is urged to develop an appropriate faculty career ladder for Sea Grant extension staff.

While faculty status was not feasible, the UW has adopted a new environmental outreach specialist three-step professional career series.

WSG should explore funding opportunities with tribal communities.

WSG has received support from the Lummi Nation and Nisqually Indian Tribe for seafood safety and business training; the Jamestown S'Klallam Tribe for a climate vulnerability assessment; and the Makah Tribe for fellowship support.

WSG is urged to continue the succession planning process used with Goodwin/Hoffman for other staff and positions.

While reorganization and budget shortfalls have limited WSG's ability to employ succession planning, it continues to be a goal.

WSG should devote increased attention to pursuing development activities with private sector interests in an effort to diversify its funding base.

Although funding from private sector interests has been limited to Orca Bowl donations, WSG has successfully increased overall funding by almost 30 percent over four years.

Wherever possible, WSG should acknowledge its important role in communications by placing Sea Grant and NOAA Sea Grant logos on WSG products.

WSG has drafted a formal policy for logo use to provide clarity on branding collaborative projects. Both logos are routinely applied to in-house publications.

WSG should expand and diversify its communications portfolio to incorporate other media such as newspaper inserts, social media, podcasts, radio, TV spots.

WSG now has a new website, active Facebook and Twitter accounts, a social media plan, regular radio shows, and a part-time student employee dedicated to social media interactions.

WSG should host events (e.g., symposium) to highlight the variety and quality of its research outcomes and impacts, and facilitate discussions with potential users of information.

WSG has coordinated several research symposia, including the 2014 Shellfish and the Environment Symposium, the Bellingham State of the Bay Symposium, and a researcher-outreach workshop.

WSG should explore partnership opportunities with all Seattle NOAA line offices.

WSG's NOAA Science Camp engages all Seattle NOAA line offices. In addition, WSG has established liaisons with the Pacific Marine Environmental Laboratory and Northwest Fisheries Science Center.

WSG should continue to cultivate and expand its leadership in human dimensions of coastal and ocean issues.

WSG has added a planner, anthropologist, and economist to its staff and supported more than \$1.2 million in social science research.

WSG should work with investigators at non-UW state academic institutions to improve ability to submit competitive WSG proposals.

In 2014 WSG awarded nearly \$700,000 to five research projects headed by investigators outside the UW.

WSG should invite the NOAA Sea Grant program officer to participate in management and staff meetings and to share monthly activity reports.

WSG has explored options for more effective program officer participation and worked to improve communications.




Sea Grant
Washington

wsg.washington.edu