

Sea Star

Citizen Science

Empowering the Public to Explore and Understand Washington's Ocean and Coasts

At a recent workshop at Fort Worden State Park, 150 people of varied ages and interests filled the main meeting room, eager to share their knowledge and learn more about the rapidly evolving role of citizen science in cleaning up, restoring and protecting the marine waters of our state.

Co-sponsored by the Centers for Ocean Sciences Education Excellence (COSEE), Washington Sea Grant, Port Townsend Marine Science Center and Puget Sound Partnership (PSP), the well-attended event sought to build on PSP's Action Agenda — a strategy that, among other items, has identified the need to develop and implement a coordinated citizen science program for Puget Sound.

Many people recognize the value of citizen science for education, outreach and environmental stewardship. However, this populist approach is largely underutilized in managing natural resources and advancing scientific understanding. With natural resource managers and scientists facing increasing demands and shrinking budgets, citizen science has

the potential not only to enhance public stewardship of Puget Sound but also provide credible, cost-effective data collection for management and scientific applications.

“Some of the best projects are built on a solid framework of scientific inquiry, with the inherent rewards from observing and understanding what's going on in our own backyard,” says Kate Litle, WSG's Citizen Science Specialist. Litle is currently helping the Partnership by developing criteria for the effective use of citizen science in future research and management efforts — a process that will help the Partnership achieve its goal of cleaning up, restoring and protecting Puget Sound by 2020.

As this issue of *Sea Star* illustrates, the University of Washington and Washington Sea Grant have been actively engaged in citizen science activities for more than a decade. The three projects highlighted here — SoundCitizen, COASST and the State of the Oyster Study — are key components of the Sound Future initiative, through which Washington Sea Grant and Washington State University Extension are providing opportunities for residents of the Puget Sound basin to roll up their sleeves and collect valuable scientific data for monitoring key natural and cultural indicators of Puget Sound health.

For more information on WSG's role in fostering citizen science, visit the program's Web site, wsg.washington.edu/citizen-science or contact Kate Litle, Citizen Science Specialist, at kalitle@u.washington.edu or 206.616.0151. For more information on Sound Future go to soundfuture.org.



SoundCitizens Help Track Spices' Circuitous "Sink-to-Sound" Path

By Jeff Bowman, Spring 2008 WSG Science Writing Fellow



Water samples give a "sink to Sound" perspective on regional water quality.

What does it take to create a top-notch citizen science program? University of Washington Associate Professor and SoundCitizen founder Rick Keil knows that it takes a team of dedicated staff and volunteers, organization and an idea capable of capturing the public's imagination. Most importantly, it takes partnerships with other agencies and the local community to bring the right expertise to the table. This has allowed Washington Sea Grant to play an important role in developing SoundCitizen as a sustainable program.

Located within the School of Oceanography's Aquatic Organic Geochemistry Lab (AOG), Rick and his team have developed a unique way to demonstrate how human-derived substances can accumulate in Puget Sound and other bodies of water. They do this by measuring the amounts of certain tracers found in cooking spices that have been unintentionally washed into Puget Sound. These tracers — compounds unique to specific spices — are not harmful but are diagnostic in the environment.

The idea, according to oceanographer and AOG senior technician Jaqui Neubauer, is that these harmless compounds mimic the "sink to Sound" path taken by more harmful compounds found in everyday household products such as soap and detergent. "It's easy to write off the trace amount of a harmful chemical as inconsequential," explains Neubauer. "But if the minute quantities of a spice tracer such as vanillin (the compound that provides flavor to natural vanilla) accumulate to measurable amounts in Puget Sound, it says something about the connection between what we wash down the drain and what is out there in the environment."

To take this idea and create a sustainable citizen science program, Rick Keil and his team relied on the expertise of Pete Granger, Program Leader for WSG's Marine Advisory Services. Granger was able to consolidate the group's ideas into a business plan that would appeal to potential financial backers of the project. Through this partnership, WSG was able to strengthen the business side of the emerging initiative, allowing the science team to focus on building the program.

At the base of the project is a growing network of volunteers. These volunteers receive water collection kits in the mail (people interested in becoming volunteers can request a kit from www.soundcitizen.org), and sample water from the Sound or the surrounding watershed. They document the date and location of each sample and mail it back to the AOG for analysis.

Brittany Kimball, Program Coordinator for SoundCitizen, notes that the project is breaking new ground with the "open access" nature of collected data. Volunteers and others interested in following the project can access results through the Web site at any time, allowing real-time involvement in the scientific process.

Analysis is conducted by a dedicated group of undergraduate students, graduate students and staff within the School of Oceanography. Each sample received requires rigorous tracking and quality control measures before the time-intensive analysis can begin. "Streamlining the analytical procedure was a significant step," recalls Keil. "To date, we have given away over 500 kits and have had nearly 250 of them returned. Without a well-thought-out procedure, these sample numbers can quickly become overwhelming, affecting the quality of the final results."

Of course, supporting a team of students, assembling and mailing the kits, maintaining the database, and conducting analysis on hundreds of samples requires financial backing. This is where the partnership with Washington Sea Grant can really pay off. "This project has such a strong local interest, but having a business plan that we can bring to regional partners that says this is who we are, what we want to accomplish, and how we plan to do it can make all the difference between a good idea and a fundable good idea," explains Keil.

At this time, the team is compiling the results of its analysis from the first large-scale kit effort, centered on the Thanksgiving holiday. They will continue mailing kits to volunteers who request them through the Web site, while preparing for new sampling initiatives planned for spring and fall of this year.



COASST Project Mines Data from Beached Birds

By Ben Larson, Winter 2008 WSG Science Writing Fellow

University of Washington seabird expert Julia Parrish depends on birds for information, in particular, from their carcasses. Parrish is the founder and director of the Coastal Observation and Seabird Survey Team (COASST), a citizen science program built on a network of specially trained volunteers who roam the beaches tagging and identifying dead birds. The data are funneled back to the UW, where Parrish uses them to study the human impact on Pacific Northwest aquatic ecosystems.

The program began in the summer of 1997 when Parrish and an intern made a beach on Tatoosh Island the first official COASST site. Observing a colony of common murrelets gave Parrish an intimate knowledge of the population dynamics in that corner of the world, but she was frustrated by the study's geographic limitation. Based on results from Tatoosh, Parrish secured 18 months of funding from the Packard Foundation and established her multi-state project, using volunteers and generating high-quality data.

To date, COASST has attracted more than 500 volunteers. Collectively, they survey about 270 beaches along the Pacific Coast.

Each volunteer (a.k.a. COASSTer) surveys his or her assigned beach in a path designed to maximize spatial coverage. When COASSTers encounter a specimen, they photograph the carcass, then use meticulous measurements of foot, wing, bill and other physical features to identify the bird. This information makes its way every month to COASST headquarters at the UW, where Parrish pools the data and looks for changes in the normal patterns.

But the project serves more than just a scientific purpose. "There's a community benefit," said Parrish. "I didn't know this when I started COASST, but now I'm a fervent believer. Many people in coastal communities feel disenfranchised about science. They read about environmental issues and they want to be part of the solution. COASST helps people understand their local natural resources and provides a basis for getting involved."

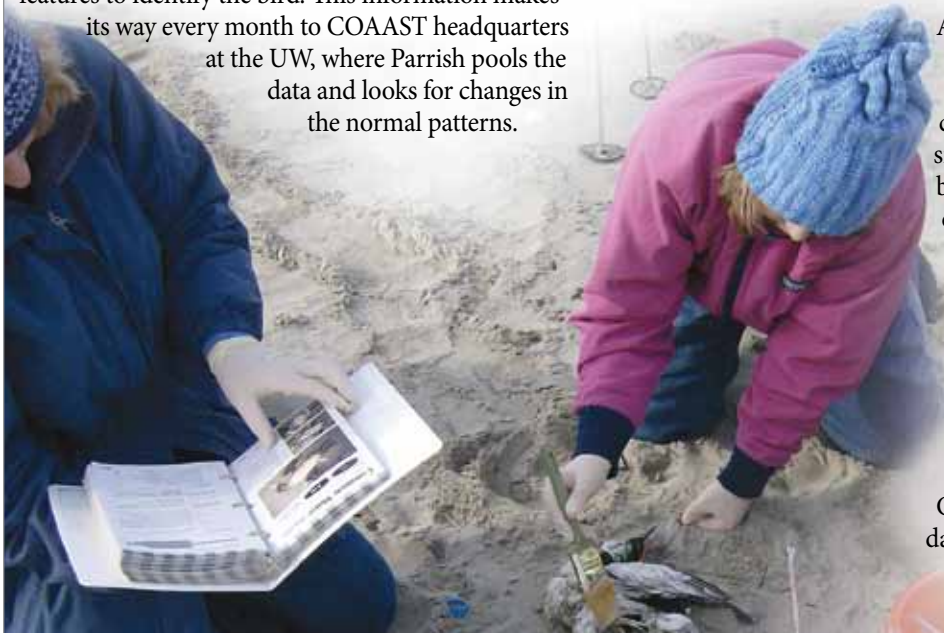
In COASST, information flows both ways. Volunteers provide raw data, and results and findings go back out to volunteers. "We want to get important information back to citizens, who can then present it to the media, to elected officials and to other audiences to promote the health of the ocean and its creatures," Parrish says.

UW environmental science student Penelope Chilton ended up in the COASST office by way of the Farallon National Wildlife Refuge near San Francisco, where she learned of the UW effort from other biologists. One of her main responsibilities is to coordinate data submitted online with photographs sent by mail. But that doesn't keep her from walking a beat.

"I do a survey at Carkeek Park in northwest Seattle. Truthfully speaking, I never find birds," Chilton admits. "But the idea is that we're setting this baseline so when you get a pulse of dead birds, it sends up alarms."

A large presence of dead birds doesn't always spell doom; it can be a good thing, signifying a successful bird population. The declining number of bird carcasses on the shores of Puget Sound in recent years may actually be a symptom of an ecosystem in distress. Only time, and perhaps COASST's extensive data, will tell.

Each beached seabird offers illuminating data about the environment in which they live.





Field Notes

Changes proposed by **Marine Field Agent Steve Harbell** to the crabber/towboat lanes near Cape Flattery have added more than 20 square miles to the area designated for Dungeness crab fishing for tribal and non-tribal fishermen. At the same time, the changes dramatically reduced fishing gear loss in this sensitive area of the ocean. With the new lane designation, tugs and barges can operate without adding significant transit time, saving fuel and reducing damage to vessel propulsion systems, resulting from entanglement with crabbing gear. For more information on this project, contact Steve Harbell at 360.875.9331 or visit the WSG Web site, wsg.washington.edu/masleconcomdev/lanes.html.

Pete Granger, WSG's **Marine Advisory Services Leader**, will be participating in a panel discussion on innovative approaches to entrepreneurial development, as part of the Lummi Nation Economic Summit, May 22-23 at the Silver Reef Resort and Casino in Bellingham. The three-person panel will look at different approaches to developing and growing tribal business models and cultivating successful Native entrepreneurship in the Pacific Northwest and across Indian Country. Granger will be sharing his insights on strategies for revitalizing tribal fisheries. For more information, contact Granger at 206.685.9261 or pgranger@u.washington.edu.

At the Pacific Seabird Group's Annual Meeting in Hokkaido, Japan, **Marine Fisheries Senior Scientist Ed Melvin** presented his work on developing a seabird-scaring line system to prevent seabird mortalities in pelagic tuna fisheries. While in Japan, he also initiated discussions with a scientist at Japan's Fisheries Research Agency on collaborating with him on his work on Japanese vessels fishing in New Zealand and South African waters.

to teachers and solicit their insights via a focus group survey on the content and design of a new marine education resources database, to be hosted on the main WSG Web site. Results were very promising, according to Reichley. The vast majority said they needed and would use such a site and many offered productive suggestions about the type of resources needed.

Marine Water Quality Specialist Jeff Adams recently completed another extremely popular Kitsap Beach Naturalists beach walk, offered in partnership with Washington State University and the nonprofit People for Puget Sound. "We stopped accepting RSVPs at 100, out of concerns for limited parking," Adams reports. "Participation

In February, 30 K-12 teachers attended an all-day meeting at NOAA's Montlake and Sand Point campuses to learn about Washington Sea Grant and NOAA Fisheries' regional marine education programs. **WSG Education's Julie Hahn** and **Nancy Reichley** were on hand to introduce WSG

Citizens Safeguard Shellfish through State

By Nicolás Pinel, Winter 2009 WSG Science Writing Fellow



As summer nears, Washington Sea Grant's State of the Oyster Study (SOS) prepares for another season of citizen-driven science. From May through August, coastal residents from around Puget Sound will team with WSG to monitor the safety of shellfish on their beaches.

"This is a volunteer operation," says Teri King, Washington Sea Grant's Water Quality Specialist in Mason County. For over 12 years, King has coordinated the SOS project, which engages citizens in the collection of oyster and clam tissue samples that are then tested for the presence of potentially harmful bacteria, such as *Vibrio parahaemolyticus*, or for bacterial indicators of fecal contamination.

Since 1987, the project has helped monitor oysters and clams on over 350 beaches. The beaches can include single-family-residence tidelands or, in the case of homeowners association community beaches, represent more than 60 households per beach. SOS offers citizens the opportunity to test oysters from private, non-commercial beaches, which are not tested by state agencies. Participants come mainly

from the Hood Canal and Lower Puget Sound regions, but homeowners from as far as Bellingham have submitted samples to the project.

Hood Canal watershed resident Juddy Likkel conceived the SOS project. Alarmed by signs and newspaper articles announcing the closure of Belfair State Park to recreational shellfishing, she teamed with her neighbors to test their own oysters.

"I gathered what I called the Magnificent Belfair Twelve," says Likkel, speaking of the residents of the original six households. "After we tested our oysters and published our results in the local newspaper, we ended up with 36 households that wanted to participate. The interest and the need were huge."

Likkel transferred the project to WSG in 1996. To this day, she continues to submit samples almost every month in the summer for testing.

Participants of the SOS project receive training in the appropriate protocol for collecting their samples. The sampling procedure teaches them to avoid oysters that may have been exposed during low tide to high temperatures for long periods of time — conditions

likely exceeded the 44 names on the sign-in sheets. The Kitsap Beach Naturalists hope to do six organized walks this summer, with training for the next class scheduled for April and May. Contact Adams at 360.337.4619 or jaws@u.washington.edu for more information.

Three undergraduate students in the University of Washington's Capstone Experience worked with **Water Quality Specialist Teri King** during the UW's Winter Quarter and will finalize their projects this spring. **Lari Seever Delgado** developed an observational survey using citizen scientists to help characterize populations of seabirds inhabiting a pier and dock in Allyn, Washington. The characterization will help others assess the birds'

impact on rising fecal coliform bacteria levels in the bay. **Danielle Larsen** is helping to identify marine plants living in the upper intertidal area. This information will be used by King and others to help identify and explain the role of aquatic vegetation in the marine ecosystem. **Kristin Kofmehl** is conducting a literature review on the filtering rates of various shellfish in Puget Sound, in support of WSG's Bivalves for Clean Water program.

"Water, water everywhere, but will it be where we want?" is the title of the class taught in April by **Water Resource Educator Sue Blake** as part of the new Carbon Masters™ program being launched in Whatcom County. This innovative program will provide individuals,

communities and the environments they live in with trained volunteers to help citizens, business leaders and local officials make informed decisions about the most effective choices concerning their carbon usage, while pointing out key strategies for confronting the impacts of climate change. For information, contact Blake at 360.676.6736 and sgblake@wsu.edu.

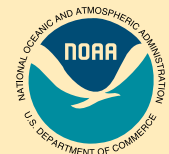
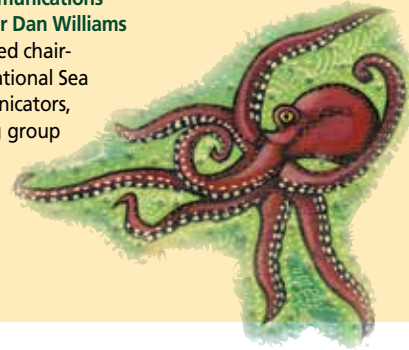
WSG Communications Manager Dan Williams

has been named chair-elect of the National Sea Grant Communicators, a coordinating group

comprised of communications officers from each of the 32 Sea Grant programs. Williams will become chair in 2010. He says his primary goals will be to help local programs work more effectively with the National Sea Grant office in Silver Spring, Maryland, and to help develop strategies for better integrating communications into Sea Grant's core outreach, education and research activities.

Editor, David G. Gordon; Designer, Robyn Ricks; Web Editor, Marcus Duke; Communications Manager, Dan Williams. Photos: page 2, courtesy Rick Keil; page 3, courtesy COASST; page 7, courtesy Angie Fredrickson and Nathalie Hamel; all other photos © Washington Sea Grant, except as noted. ©2009, University of Washington, Board of Regents. WSG-MR 09-02

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...e of the Oyster Study

conducive to the proliferation of *Vibrio* bacteria. "People in the SOS project learn what makes for a safer oyster," King says.

King serves as an intermediary. When homeowners submit their shellfish samples, she coordinates the log-in and proper handling until the samples' timely delivery to AmTest Laboratories in Redmond. Community businesses are an essential element in the program and many, including Belfair QFC, Hunter Farms in the Skokomish Valley and Happy Hollow Store in Southshore, have established collection stations for the shellfish sampling effort. Three of the four stations have been in place since 1987, according to King.

With the test results in hand, King helps property owners interpret the numbers. She works with those people who receive results of high levels of bacteria in their oysters, to identify potential sources of pollution. "Sometimes we've had high levels that we could trace to cracked septic system lines," says King. "It may have been across the road, maybe just a little dribble of sewage." In other occasions, the sources of pollution were traced to pet waste being washed directly onto their beaches.

"I now know so much more about what impacts my beach," says Likkel "and that, I think, is the greatest contribution of the project — public education."

The web of volunteers serves as an early-warning network, allowing King to notify participants and their neighbors of state-enacted beach closures faster than they would learn through the limited news media in the area.

The collection dates for this summer will be May 25, June 21, July 19 and August 16. For more information, and to learn how to participate in the project, contact Teri King at 360.432.3054 or guatemala@u.washington.edu.



At a drop-off site in Belfair, WSG's Teri King (right) accepts samples from a State of the Oyster Study participant.

Whiting Workshops

In 2008, shoreside processors of Pacific whiting in Washington, Oregon and California were subject to new federal catch-reporting requirements. Seasonal observers needed to monitor whiting and bycatch landings — correctly identifying bycatch species, monitoring landing weights and insuring accurate reporting of catch data through new electronic software.

Staff of NOAA's Northwest Marine Fisheries Service's Northwest Regional Office approached Washington Sea Grant as a possible "third-party" coordinator for the training of the cadre of observers. WSG has a history of such training programs and its staff has long-established relationships with whiting processors, in whose plants the observers would be stationed.

The first WSG-NMFS training session was offered in June 2008 in Astoria, Oregon. "It was an extremely valuable experience for the people who participated," says WSG's Marine Advisory Services Program Leader Pete Granger. "It was an equally valuable example of partnership with NMFS and with Oregon Sea Grant, who helped select the training sites."

Additional sessions are scheduled for Astoria and Newport, Oregon, later in 2009. For more information: Pete Granger, 206.685.9261 or pgranger@u.washington.edu.

Sign Up for NOAA Science Camp

Register now for NOAA Science Camp in Seattle this summer. Washington Sea Grant and NOAA are offering seventh and eighth graders two chances to explore NOAA science — July 6-10 and July 13-17. Both sessions will offer an array of activities: setting up sonar devices, learning about sampling methods, practicing whale identification techniques, reading navigational charts and more. The fee for either of the five-day NOAA Science Camps is \$250. Scholarships are available. To register, or for more information, visit www.wsg.washington.edu/education/events/noaa.html or contact Julie Hahn, WSG Education Coordinator, at 206-685-9117 or noaacamp@u.washington.edu.

Mukilteo Beach Kiosk Unveiled

Besides soaking up some sun this summer, beachgoers at a waterfront park in Mukilteo, Washington, can also soak up some information about the purple varnish clam, European green crab and other aquatic invasive species, thanks to a partnership between Washington Sea Grant and Snohomish County Beach Watchers.

The City of Mukilteo provided the Beach Watchers with space on two kiosks at newly developed Lighthouse Park, just south of the Washington State Ferries terminal. Beach Watchers wanted to display educational material relevant to the area but lacked resources and expertise, so they contacted WSG Communications. The result is a four-color poster that will inform park users about how to recognize non-native plants and animals posing threats to native species and habitats. The poster also includes best practices for keeping unwanted plants and animals out of our marine ecosystems.

The poster was written by WSG Science Writer David G. Gordon and Marine Water Quality Specialist Jeff Adams and designed by Creative Services Specialist Robyn Ricks. Future poster displays will address nearshore habitats and harmful algal blooms.

For more information, contact Dan Williams, Communications Manager, at 206.616.6353 or dw7@u.washington.edu.



Honor, Opportunity and Challenge for Marc Hershman Fellows

By Chaitra Sriram, Spring 2009 WSG Science Writing Fellow

Angie Fredrickson and Nathalie Hamel may have different academic backgrounds, yet both have benefited from their year as Marc Hershman Marine Policy Fellows.

Created last year, the Marc Hershman Marine Policy Fellowship offers graduate students hands-on experience in studying and creating marine policy. This past year, the two initial recipients of the WSG-established fellowship are helping to shape policies that will protect marine ecosystems while nurturing coastal economies in the Northwest.

One of the new Fellows, Angie Fredrickson, has a background in policy and recently completed her first year of graduate school at the University of Washington's School of Marine Affairs. "It's a real honor for me personally to have a fellowship named in memory of Hershman, who was a very influential person in my life," she says. Since October of 2008, Fredrickson has been working with the Aquatic Resources Division of the Washington Department of Natural Resources.

The other Fellow, Nathalie Hamel, has a science background and is completing her PhD from the UW's School of Aquatic and Fishery Sciences. During her Fellowship year, she is working with the Washington Department of Ecology's Shorelands and Environmental Assistance Program.

"Making the plunge into policy has been really new and challenging but also very interesting," she says. "During the first few weeks, I had to read a lot about the laws; legal language is structured very differently from science. Now I love the laws — they're beautiful pieces of work."

"It is so fascinating to watch how marine policy is made. It's great to see how the theoretical is applied in a real life setting," Fredrickson says.

Hamel is working on Washington's Coastal Zone Management Program. As part of the federal Coastal Zone Management Program, it gives coastal states power and money to manage and maintain the nation's shorelines.

"The state now has the ability to weigh in on federal activities," says Hamel. "Federal agencies and federal permit applicants that perform activities that could affect the coastline have to comply with state law," she explains.

Fredrickson's work is focused on the climate change adaptation and marine debris issues. "I've been able to participate in a ground-breaking process with tri-state cooperation," she says. "One of the most memorable parts of my Fellowship year has been the opportunity to work on the West Coast Governors' Agreement on Ocean Health. It is unique because it's a regional approach at ocean governance," she adds.

So far, both Fellows are finding their experiences rewarding. "Understanding how I can contribute to the field as a scientist is very exciting. It's kind of cool, because I'm not just looking at Department of Ecology programs; I'm looking at all authorities that the state has to protect the environment," Hamel says.

"The process through which marine policy is made is fascinating to watch," says Fredrickson. "There is no substitute for actual, real-world experience."

For information about the Marc Hershman Marine Policy Fellowship, visit wsg.washington.edu/education/fellowships/hershman.html or contact Nancy Reichley, 206.685.8302 or reichn@u.washington.edu.



Angie Fredrickson



Nathalie Hamel

Hello, Goodbye to WSG Science Writing Fellows

As this issue of *Sea Star* goes to press, we bid adieu to Nicolás Pinel, WSG's Science Writing Fellow for the winter quarter, and welcome Chaitra Sriram, our spring quarter Fellow.

Pinel is a doctoral candidate in the University of Washington's Astrobiology program, with a strong background in microbiology. He became impassioned about science writing while enrolled in a technical communications course offered through the UW's School of Oceanography. During his Fellowship quarter, Pinel wrote several briefing papers on key elements of Puget Sound's nearshore environment, as well as a feature article for *Sea Star* (published here, on pages 4-5).

Sriram is a junior at the UW, working towards degrees in journalism and biology. She has been honing her skills as the science/health/technology beat writer for the on-campus paper, the *Daily*. "Additionally," she says, "my experience in maintaining a technology blog for the *Daily* has taught me how to research story concepts and see them through from start to finish."

Now in its second year, WSG's Science Writing Fellowship program helps students to refine their writing skills in order to prepare themselves for future careers in journalism, outreach, research publications and public policy. To apply for the summer or fall quarter fellowships or for more information on the program, contact David G. Gordon, WSG Science Writer, at 206.685.8191 or davidg@u.washington.edu.

A New Round of Research Proposals in Review

In January, WSG requested preliminary proposals for one- to two-year research projects for its February 1, 2010 – January 31, 2012 funding cycle. In March, the program received 79 preliminary proposals from researchers, requesting over \$14 million — nearly six times the amount dedicated to funding the projects. Determining which projects to fund is a carefully thought-out group process. In April, the preliminary proposals were reviewed by a panel that included representatives from academia, federal and state agencies and constituent groups. Each proposed project received at least three detailed reviews, based on the evaluation criteria provided in the initial request. The panel then met as a group to discuss projects and develop recommendations. It encouraged 37 projects to move forward and submit full proposals, due on May 22 of this year.

The full proposals will receive even more rigorous scrutiny, including review by at least three outside experts, development of funding recommendations by a panel of independent scientists and the Washington Sea Grant Advisory Committee, and final review and approval from the National Sea Grant Office. Contingent on available funding, the projects selected for funding will be initiated in February 2010. Descriptions of these projects will appear on the WSG Web site, wsg.washington.edu, and in future issues of *Sea Star*.

“Our project review panels must make many difficult decisions,” says WSG’s Director, Penny Dalton. “We’re extremely grateful to them and to the many people who share their ideas for suitable projects for funding. Through the many steps in the selection process, we can be assured that WSG-funded research will help us meet our over-arching goal — to enable world-class science that strengthens understanding and sustainable use of our oceans and coasts.”

WSG-funded research can further our understanding of the marine world and the many roles people play in shaping it.



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