

SEA STAR

WASHINGTON SEA GRANT

College of the Environment
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SEABOTTOM ECHOES

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WHO WILL RESCUE THE RESCUERS?

Washington Sea Grant alerts the Coast Guard's first responders to the critical danger they will face when a tsunami strikes.



Coast Guard airmen and seamen (right) muster to hear Ian Miller share some inconvenient truths about tsunami dangers (above).

It was a crisp, bright autumn morning on the Strait of Juan de Fuca, but the news Ian Miller delivered wasn't so cheery. For years Miller, Washington Sea Grant's Port Angeles-based coastal hazards specialist, has investigated the traces of past tsunamis on the Olympic Peninsula and, together with other WSG staffers, shared the findings with those who live and work on Washington's vulnerable shores. Now he faced about 150 U.S. Coast Guard seamen and airmen mustered outside their headquarters at the tip of Ediz Hook, the three-mile sand spit that curves around Port Angeles's harbor, and delivered an urgent warning.

When a tsunami or other coastal disaster hits, the Coast Guard Air Station/Sector Field Office Port Angeles will have a life-and-death role to play. Its three helicopters provide air rescue for the entire Washington coast; its cutters and smaller boats form the waterborne safety net on the strait.

But as Miller explained, these saviors may be hard-pressed to save themselves. When the next Really Big One—an offshore earthquake along the Cascadia Subduction Zone—strikes, a wall of water could surge over Ediz Hook and other low-lying shores in as little as 45 minutes. The hundreds of people who work on the Hook long assumed they would escape the same way they come to work each morning: by driving out on the Hook's only road. Don't count on it, said Miller, who has a geomorphology background as well as a doctorate in oceanography: "You guys can't assume you will be able to drive off."

Even if that two-lane road doesn't buckle or sink, anyone fleeing must get through the 96-year-old Nippon Paper mill at the spit's base. Its high masonry walls, power lines, and fuel tanks line the roadway like a gauntlet; a metal causeway hangs

The Rescuers • continued on page 2





Above: A U.S. Navy vessel docked at Ediz Hook. The Navy wants to dock more, but leaves the disaster planning to the Coast Guard. Bottom right: The only land escape route, through an imperiled century-old paper mill.

above it; the loose sand and gravel below will turn to something like jelly. “The road off the hook might”—Miller phrased it gently — “be impassable. The way to survive might be a little counterintuitive. It might be going out to deeper water.” Afterward, Lieutenant Kyle Cuttie, the base’s security officer, mused on the implications: “We’re probably one of the worst-exposed sites on the entire West Coast.”

Cuttie gets support in that view from Eric vonBrandenfels, the vice president of the Puget Sound Pilots, 52 elite mariners who guide the big ships that sail in and out of Puget Sound. Their base, three-quarters of a mile from the Coast Guard’s, will suffer the same devastation when a tsunami strikes.

VonBrandenfels got the message when Miller gave a similar talk to the pilots in late 2014. “It rattled everybody a lot,” he says. “I’m just a pilot. When I talk about this stuff, people look at each other and think, ‘Is this guy crazy?’ But when Ian tells them, they listen. He’s got the science, and the science is irrefutable.”

Until Miller’s talk the pilots, like the Coasties, had expected to escape the usual way. “We keep training people to run to higher ground,” says Jamye Wisecup, Clallam County’s emergency management coordinator. “We always expect to evacuate by land.” Miller explained why that was unlikely — and why, if they could just get out to open water 50 fathoms deep, the tsunami swell would pass gently under them. Nudged by vonBrandenfels, the pilots began planning a water escape.

Easier for them than for their Coast Guard neighbors. The pilots’ two 70-foot boats stand ready 24–7 to meet incoming ships, whereas the Coast Guard’s larger cutters would take too long to launch. Even so, when the pilots conducted their first trial, last March, “It took us two hours to get loaded and off,” says vonBrandenfels. “At that point we’d be under 30 feet of water.”

The pilots continued planning and invited the Coast Guard to join in. By September they were ready to undertake their first small-scale joint drill.

Lacking better options, the Coasties and anyone else on the spit would probably look to the pilots for rescue. VonBrandenfels figures the pilots might be able to pack 50 on each boat’s deck and another 25 to 50 below. That falls short of the Coast Guard station’s total staff, about 300, and makes no allowance for the water and food they would need should all shore stores be destroyed — never mind Coast Guard-required lifejackets.

After Miller spoke a small contingent trekked down to the pilots’ dock, boarded, and cast off. They rounded the hook and reached 50 fathoms in 16 minutes — promising, but no assurance that a larger contingent could board and flee fast enough amidst post-earthquake chaos.

The safest solution would be to relocate all the airbase operations that don’t need to be on the water to higher ground near the Port Angeles Airport, nearly 300 feet above sea level. But that would mean conflicts with residents over helicopter noise, says Lieutenant Cuttie. And the Coast Guard may be loath to abandon the historic vintage base, whose buildings date to 1935. “This is the oldest continuously operating air station in the Coast Guard,” says Cuttie. President Abraham Lincoln commissioned the original customs office there.

Far from vacating, the base is slated to grow. The U.S. Navy proposes to build a pier for nine vessels, each up to 250 feet long, to escort its Trident nuclear submarines. Will that mean more boats at the ready, or yet more personnel to evacuate? Miller has submitted comments on the Navy’s proposal explaining the tsunami risk.

Before the drill, Miller told the mustered Coasties he had a personal stake in their fate: “I live in Port Angeles. I want you guys to be safe. More important, I want you to be functional so you can save me and my family.”





CHASING NOISE

Sea Grant-supported acoustical engineers show how seabed terrain affects sound waves — and how marine construction can cost less and still protect marine mammals.

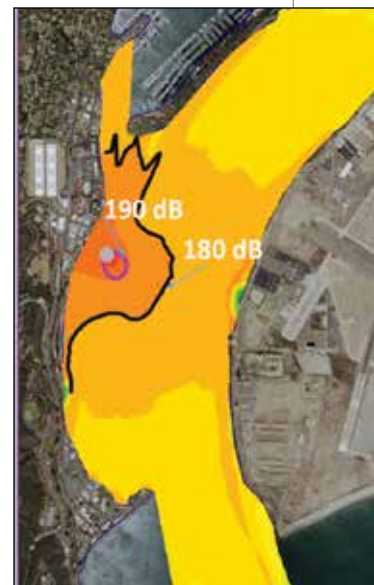
Anyone who's crossed a ridge above a noisy roadway knows that conditions on the ground can affect the way sound travels through the air. We site our houses and erect noise buffers accordingly. Remarkably, however, those who build in the water have long ignored topography and other seabed factors when they calculate the spread of sound.

Underwater noise is a very big deal for operations such as Washington State Ferries and the U.S. Navy, with a lot of piers to build and maintain. And underwater construction — in particular, pile driving — makes a lot of noise. Accounting for that noise is critical, says Mitchell Perdue, a senior biologist with the Naval Facilities Engineering Command Southwest, who monitors the acoustics at a major pier renovation in San Diego Bay: "When you work underwater you deal with two federal agencies and three different statutes" regarding noise and marine life.

These rules require that work cease when dolphins, seals and other protected animals enter "zones of influence" within which noise reaches levels that can harm them. These zones have traditionally been calculated according to a simple "practical spreading model" that considers only distance from the source, not other factors that may further attenuate sound as it travels through shallow bays and estuaries. This can lead to gross inefficiencies: zones drawn too broadly, monitors placed where they aren't needed, work suspended when it needn't be.

Peter Dahl, a senior principal engineer at UW's Applied Physics Laboratory (APL) and professor of mechanical engineering specializing in underwater acoustics, set out to change that by developing a better model for underwater sound propagation, taking into account bathymetry and sediment composition, not simply distance. In 2010 the Washington State Department of Transportation provided funding and a testbed when it sank two test pilings preparatory to renovating its Port Townsend ferry dock. When WSDOT sank more pilings in 2013, Dahl and doctoral student Dara Farrell returned, with support from Washington Sea Grant, to test and refine the model. Their findings, published last year in the *Journal of the Acoustical Society of America*, showed that bathymetric refraction — the deflection offshore of sound waves by seabed terrain — can markedly attenuate noise transmission, particularly when sound travels along a sloping shore.

Meanwhile, the Navy faced a sticky regulatory challenge. It needed to rebuild its hundred-year-old fueling pier in San Diego Bay, a critical facility for the Pacific Fleet. Delays or unnecessary measures prompted by acoustical uncertainties would be costly, explains Perdue: "These are hundred-million-dollar projects. Our goal was to avoid having to attenuate the pile-driving sound with a bubble curtain" — a wall of bubbles generated to muffle



Top: Dara Farrell checks acoustic readings in San Diego Bay. Photo: Mitchell Perdue, U.S. Navy. Above: Pile-driving noise levels predicted by Dahl's model; the red and orange zones represent Class A harassment of marine mammals.

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Farrell and Dahl probe the complexities of sound in shallow water.

vibrations. “That could potentially double the cost of the project.”

The Navy used Dahl’s transmission-loss model to set baseline zones of influence and draft the “incidental harassment authorization” it sought and received from NOAA Fisheries, setting noise limits for its San Diego project. The Navy is also using a hand-held device called the Underwater Sound Level Meter that Dahl developed with initial WSDOT and APL funding. This device rapidly measures and analyzes both ambient and project-generated noise. “It allows us to make real-time acoustic measurements instead of having to stand down and wait for post-recording analysis,” says Perdue — another big savings.

In 2013 and 2014, with support from WSG, Farrell measured actual noise around the pier site. By analyzing their differing frequency contents, she distinguished pile-driving noise from the high ambient noise levels produced by San Diego Bay’s thousands of pleasure boats. And she verified that the actual levels matched what the model predicted within the critical zone of influence. “The farther out we got, after about 1,000 meters, the model was less and less representative of measured levels,” she says. “But by then you’re out in the open ocean.”

Dahl and Farrell aren’t the only ones modeling underwater sound propagation to accommodate construction while protecting wildlife; their German and British counterparts are evaluating such projects as offshore wind farms in the North Sea. But those efforts tend to be in deeper, more open waters. “Where we work, in shallower water closer to shore, is different,” says Dahl.

That’s made him the go-to guy in an esoteric but increasingly important field. “We have scientists from Naval Facilities Engineering Command [on the East Coast] coming here to train,” says Perdue. “They have in-water construction projects coming up, and they’re looking to approach them the same way we have.”

One key to this success, adds Perdue, is Dahl’s credibility: “Peter’s kind of writing the book on pile-driving acoustics. The regulatory agencies trust his results. That’s gold.”

IT’S NOT EA

Crab, that is. Washington Sea Grant launches a concerted monitoring effort to make sure elusive, habitat-wrecking European green crab haven’t penetrated Puget Sound.

By Annie Hillier, WSG Science Communications Fellow

Don’t be fooled by the European green crab’s humble appearance. These small shore crab travel the world, silently invading coastal communities far outside their native range. They disperse easily, riding currents and hitching rides in ships’ ballast water as tiny larvae and hiding in shipments of live shellfish as adults. Voracious, highly adaptable omnivores, they devour marine organisms and vegetation alike, outcompeting native crab populations for food and shelter. They’ve been blamed for losses of eelgrass and soft-shell clams on the East Coast and (though evidence is slight) of Manila clams in California.

Surprisingly, this cosmopolitan species hasn’t been detected in Washington’s inland waters, which offer ideal habitat. Scientists believe green crab reached Washington’s and British Columbia’s outer coasts with the help of El Niño-driven currents in 1997–98; they persist there to this day. The crab entered Willapa Bay and Grays Harbor but did not proliferate; during non-Niño years the prevailing currents sweep their larvae out to sea, leaving only small remnant populations.

Meanwhile, green crab continue to thrive in the muddy lagoons and salt marshes along the outer coast of Vancouver Island, whose deeply cut channels and sloughing banks are strikingly similar to Puget Sound’s. In 2012, a new population was discovered in Sooke Harbour Inlet, near Victoria, B.C. — inside the Strait of Juan de Fuca and one step closer to Puget Sound’s valuable shellfish beds and sensitive ecosystems. Now another El Niño warms Northwest waters, once again favoring green crab reproduction and survival. Uncontrolled, green crab could threaten economically and ecologically significant clams and Dungeness crab.

The Sooke Harbour discovery sounded the alarm. In response, Washington Sea Grant, together with the Washington Department of Fish & Wildlife and other partners, has launched a carefully targeted



Above: WSG Crab Team volunteers rake the muck for crabs at Kala Point Lagoon. Photo: Chris Jones. Next page — Left: Green crabs proliferating. Right: Capstone student Natalie White checks a crab’s ID. Photo: Susan Mador.

ASY SEEING GREEN



monitoring effort to catch infestations before they become problems. Green crab are extremely difficult to control; there are no cases of successful eradication. But detecting them early enough can help minimize their effects. “If we don’t know where they are, then they have a much longer time frame to multiply and spread,” says project lead Jeff Adams, WSG’s marine ecologist.


Last summer, trained volunteers participated in a trial run, setting baited traps at seven Salish Sea sites identified by UW scientists as potential green crab habitat, including Iverson Spit on Camano Island; Penn Cove, Deer Lagoon and Race Lagoon along Whidbey Island; Kala Lagoon at Port Townsend; and Butterball Cove and Kennedy Creek near Olympia. The volunteers assessed their catches and combed the shore for molted green crab shells. This pilot uncovered no green crabs, but Adams wasn’t disappointed: “We would be perfectly happy if we never found a green crab,” he says.

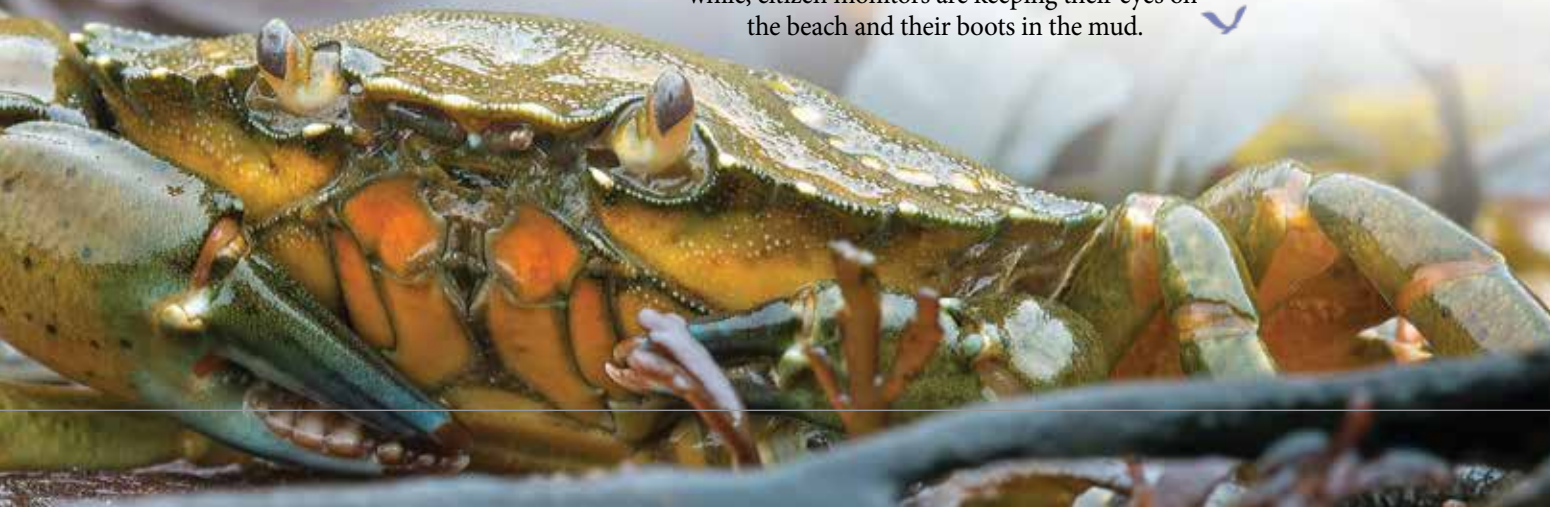
The project will provide not only early detection but a long-term dataset on valuable but understudied habitats. Volunteers record the numbers, sex ratios and sizes of all the organisms trapped, useful data that are scarce even for common species such as shore crab and sculpin. And should green crab show up in the traps, the data will provide critical before- and- after snapshots, showing how infestation affects these habitats.

Since this year’s monitoring kicked off in April, the Crab Team has kept 22 sites under surveillance, with three more sites targeted for monitoring before the summer is out. A UW capstone student helped build an evaluation component into the volunteer training protocol to track its effectiveness and determine how to help volunteers feel successful in their work. If retention is any indication of success, the Crab Team is off to a good start: project coordinator Emily Grason reports that nearly all the volunteers will returned in 2016.

In conjunction with the monitoring, Grason explains that by increasing public awareness, the green crab team will “cast a wider net” around the green crab threat. Its outreach component targets kayakers, boaters and others who frequent areas where green crab may appear.

Last year, for the first time in five years, a survey done annually in Willapa Bay yielded green crab—eight of them. This doesn’t surprise some researchers, considering this year’s strong El Niño and the persistence of low-density populations on the outer Northwest coast for the past 17 years. They wonder whether, together with the Sooke Harbor discovery, it foretells more infestations to come. Still, Grason remains optimistic: “This year could be something of a litmus test. If we still don’t see them after such a strong El Niño, we may not be facing doomsday.”

She hopes the Crab Team will also raise awareness, build support, perhaps even attract more resources and prompt stronger regulations for invasive species prevention. “There is meaning behind this work beyond academic research,” Grason says. “In terms of implementing change in the world, we hope that we can garner political will for management.” Meanwhile, citizen monitors are keeping their eyes on the beach and their boots in the mud. 



SAVING SALMON FROM ROADWAY RUNOFF



Washington Sea Grant helps launch research proving the dire effects of roadway chemicals — and the big benefits of bioretention.

By Annie Hillier, WSG Science Communications Fellow

Rain gardens are popping up everywhere around Puget Sound. They deliver myriad benefits, from reducing pollution and preventing floods to beautifying yards and eliminating the high cost of traditional piping and drainage systems. Now, thanks to research partly funded by Washington Sea Grant at Washington State University's (WSU) Puyallup Research and Extension Center, we can add one more perk to the list: Rain gardens can save salmon.

Lead investigator John Stark, aquatic ecotoxicologist Jen McIntyre and their colleagues studied the impacts of urban stormwater runoff on Puget Sound's declining coho salmon runs. This runoff is a lethal brew. It carries toxics such as heavy metals and petroleum byproducts from highways, parking lots and other impervious surfaces into the creeks where salmon spawn, incubate and rear. Stormwater runoff, the researchers hypothesized, might well explain why more than half the coho returning to urban streams each year die before they can spawn. The researchers sought inexpensive, practical ways to remove these pollutants and reduce their impacts. The salmon would be the ultimate test.

The scientists ran polluted water, including runoff from a busy urban highway in Seattle, through a rain garden-like filtration system — barrels layered with gravel, sand, compost and bark — and found a big improvement. Untreated water killed all the exposed fish within 24 hours, but all the fish that received the soil-filtered runoff survived. The clear evidence from this research showing effectiveness of bioretention systems in protecting salmon has already inspired an increased use of low-impact development methods in local construction projects. Tableau, a Seattle software firm, recently redesigned their new campus to incorporate filtration of runoff from nearby Highway 99, benefiting the entire community.


More recently, Stark, McIntyre and their team set out to test their methods with the Department of Ecology's revised soil recommendations for bioretention systems in Western Washington. These suggest an even simpler 60:40 mix — 60 percent sand and 40 percent compost. Their trials validated the bioretentive effectiveness of the 60:40 mix, leading them to the project's later phases.

Again, the results, published in two recent papers, were compelling. They showed that filtering through the 60:40 mix is also effective at preventing the abnormal swimming patterns and other behaviors that adult coho salmon affected by urban runoff exhibit before dying. Additionally, they found that this mix eliminated the mortality caused by the polycyclic aromatic hydrocarbons in runoff from the coal-tar sealcoat commonly applied to roads.

These studies suggest that simple, inexpensive green stormwater infrastructure, similar to the rain gardens already gaining popularity, can improve water quality and help protect fish populations. If innovations such as this can be incorporated into transportation projects around the urban watershed, wild salmon and humans may have a better chance at coexistence.

Such leaner, greener alternatives are already appearing around Seattle. The city has completed six "natural drainage" projects that have reduced toxic impacts on affected creeks by 74 to 99 percent. Broadview, Capitol Hill and the Loyal Heights area of Ballard are among the local sites currently undertaking similar bioretention projects.

Phase four of the WSU project, scheduled for this spring, will turn to a different biotic sphere. Rather than testing salmon, the scientists will analyze bioretention's effectiveness at protecting invertebrates such as mayflies, an important fish food. But even before the bug collecting began, McIntyre and Stark were heading to Washington, D.C., to share their findings, which have received extensive national media coverage, with Congress.

"There is no question that urban stormwater runoff contributes significantly to the degradation of aquatic habitats," McIntyre said, rehearsing what she would tell congressional members. "Our research shows that simple green infrastructure can go a long way toward protecting these important ecosystems." 



Above: Jen McIntyre with a simple but effective bioretention system. Upper right: Why did the salmon cross the road? Below: Young salmon face a host of perils.



FIELD NOTES



On March 2, Seafood Industry Specialist **Pete Granger** helped host the 13th annual WSG-supported Wild Seafood Exchange in Bellingham. More than 90 entrepreneurially minded fishermen gleaned new tools and connections for marketing their catches directly. They heard from restaurateurs, retailers and fellow fishermen who've succeeded at direct marketing, and learned about new opportunities to sell via the Internet and mobile apps.

On March 7 and 8, Aquaculture and Marine Water Quality Specialist **Teri King** led the 23rd Conference for Shellfish Growers, spotlighting the latest scientific findings and other trends affecting the environment that shellfish depend upon. WSG-supported UW scientists Nick Bond (who's also the state climatologist) and Cheryl Greengrove kicked off the gathering at the Alderbrook Resort with eye-opening updates, respectively, on climate change in Washington and the alarming spread of harmful algal blooms off the coast and in Hood Canal. Afternoon sessions focused on shellfish-suffocating burrowing shrimp in coastal estuaries: their mysterious eruption in recent decades, how sturgeon and gray whales feed on them, the efficacy of various control measures, and how the most potent pesticide, imidacloprid, works. One researcher reported that fresh water also seemed to show some efficacy as a shrimp-killer, but as grower Bill Dewey noted from the floor, there's much less reaching coastal growing areas since the Columbia River got dammed.

Marine Ecologist **Jeff Adams** and Assistant Director for Communications **MaryAnn Wagner** attended the Sea Grant Extension Assembly and Communicator Conference in famously cinematic Mystic, Connecticut. Jeff shares his recollections: "Sadly, I missed Mystic Pizza. Thankfully, I stayed out of the Mystic River. Luckily, I got to spend four days learning about common issues, different environments and interesting projects, and efforts in Connecticut and across the Sea Grant network. No surprise, I learned that our own **Pete Granger** is a treasured member of the community who has touched people and projects nationwide. On the drive back to Providence Airport, I stopped along the coast. Under a rock I found a European green crab descended from those that arrived 200 years ago and related to those we hope never to find in Washington's inland waters."



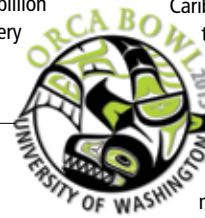
Social Scientist **Melissa Poe** joined other members of the Ocean Modeling Forum's Pacific Herring Working Group gathered for the first meeting, in Seattle. This unusual multidisciplinary project brings together multiple models and information modes, from conventional survey data to traditional, local ecological knowledge, to chart a new approach to assessing fisheries and evaluating their sustainability. Next stops for the group: comparing social-ecological herring systems in two tradition-rich venues, Haida Gwaii, British Columbia, and Sitka, Alaska — the sites of its next two meetings.

On February 27, the 19th annual Orca Bowl brought better costumes and tougher questions than ever to UW's Fishery Sciences Building. Twenty teams competed in the statewide high school ocean-sciences tournament hosted by WSG and the College of the Environment, with the winner going to May's National Ocean Sciences Bowl in North Carolina. Organizer and WSG Education Specialist **Maile Sullivan** was especially pleased to welcome students from the UW's MESA program for disadvantaged high schoolers to a friendly round with bowl contenders. Seattle's Garfield High School Pirates, who got squeezed out of last year's title, won this year in a showdown with Newport High. But the stars were the plucky marine scholars from tiny, land-locked Soap Lake, who came in third and won the bowl's sportsmanship award. Team members say it's inspired them to attend UW or major in oceanography.



In November Philippe Cousteau, Jr., grandson of Jacques, led his EarthEcho International nonprofit on an "Acid Apocalypse" expedition to find out what ocean acidification is doing to Washington waters and what scientists and young people are doing to counter it. Ocean Acidification Specialist Meg Chadsey connected EarthEcho with middle and high school students on the acidification front lines, from the Makah and Suquamish tribes to Seattle and Bainbridge Island, including Bainbridge high schoolers she'd helped train to monitor Puget Sound's changing chemistry. Cousteau and his crew filmed the high school monitors and six precocious middle schoolers. The latter have also successfully sued the state to do more to limit carbon emissions, promoted warning labels for gas pumps, and started an NGO dedicated to "planting 1 billion trees across every country in the world."

A big wet Sea Grant welcome to **Paul Dye**. As WSG's new assistant director for outreach, he'll lead the specialists who assist coastal communities in matters ranging from fisheries to climate change. The position is new, but Paul's a familiar, steady presence at WSG and on the marine scene. Before joining WSG's staff, he served on its advisory committee and as the Nature Conservancy's marine conservation director and Governor Inslee's appointee for conservation on the Marine Resources Advisory Council. During more than 25 years with the Conservancy, Paul started new programs in Florida and the Northwest, Midwest and Caribbean regions — good practice at fitting a program to the needs of a place and its people. He and his spouse, Robin, are self-described "serial remodelers" now at work on their 1916 Suquamish bungalow after fixing up two homes on Bainbridge Island. "I think all of my experience will be applied and tested in my new job," Paul says. "Whether you're delivering conservation solutions or a new training program on seafood handling, it's important to understand people and their needs. Sea Grant does a great job of engaging communities. It recognizes that many issues — environmental, economic and social — are intertwined and need to be tackled together."





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Congratulations, Washington Boaters!

Twenty-fourteen was a record year for the Washington State Parks Clean Vessel Program and Washington Sea Group's Pumpout Washington campaign. They helped boaters and marinas divert nearly 6.1 million gallons of onboard sewage from the state's lakes and straits to safe treatment — 400,000 more than in 2013. The 2015 tally — 8.4 million gallons of raw sewage collected — made 2014 look like a warmup. Now WSG Boating Program Specialist Aaron Barnett and his pumpout partners intend to blow away that record in 2016. At the same time, WSG, the Washington Department of Ecology, and the U.S. Coast Guard have set similar high goals in a parallel campaign to prevent oil spills from small vessels.

Low fuel prices and increased boating activity doubtless contributed to 2015's pumpout surge, but Al Wolslegel, the Clean Vessel Program's manager, sees other reasons as well. "Our educational outreach has increased awareness of the impact on the environment," he says, "and pumping out has become the correct thing to do. Boaters are taking advantage of the increase in the number and reliability of pumpouts. Marina owners and managers are more aware of federal grant funds to install pumpouts and

the operation and maintenance assistance that goes with them." Also, five pumpout boats launched in recent years have brought mobile service to previously underserved waterways, from Semiahmoo to the Snake River. The first sponsored service, operated by Terry Durfee on Lake Washington, collected 210,000 gallons from more than 1,000 boaters in 2015.

Wolslegel and Barnett each visited 60 to 70 marinas last year to promote pumping out. In February, Barnett gave out 900 hands-free pumpout adapters at the Seattle Boat Show and marveled at how many attendees "gave positive feedback after they'd had a chance to use the adapters for a season or two." To date he and his volunteers have delivered adapters to more than 9,000 of the state's 20,000 eligible boaters.

Building on that momentum, Pumpout Washington has set an ambitious target for 2016: to divert a whopping 10 million gallons of sewage. This year Barnett also hopes to deliver 1,000 small-oil-spill cleanup kits, containing absorbent "bilge socks" and "bilge pillows" for removing oil from bilge water, to Washington boaters. Key

to reaching that goal is a partnership piloted last year with the U.S. Coast Guard Auxiliary. When Auxiliary members perform courtesy vessels inspections, a popular service for boaters, they'll also deliver spill kits, pumpout adapters, and a pep talk on why and how to use them.

The spill campaign gains new urgency from a somewhat surprising finding. As Captain Joe Raymond, the Coast Guard's Seattle sector commander, puts it, "Recreational boats and fishing vessels are the leading source of known oil spills in Puget Sound."

That means boaters have a key role to play in protecting the Sound and other vulnerable waters. Barnett has five short words to say to them: "Keep up the good work!"