

SEA STAR



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◀ **Seabird CSI:** Beached birds give vital clues to environmental changes
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HOW 'BAIT-SAVING LINES' BECAME GLOBAL BIRD SAVERS

By Chelsea Kahn, Washington Sea Grant Science Writing Fellow

Longlines carrying thousands of hooks and stretching many miles behind fishing vessels are brutally efficient devices for catching fish. For endangered albatross and other seabirds, they can be simply brutal. Birds chasing baited hooks, or foraging for discarded bait and fish waste, can get hooked or entangled and drown as the lines sink.

WSG's Ed Melvin and Troy Guy bring their collaborative seabird-bycatch solutions home to the West Coast's longline fleet.

This seabird toll adds to the enormous haul of unwanted bycatch — up to 8 percent of total catch worldwide — that fishing vessels discard. Bycatch has gotten a flood of attention from media, resource managers, and the environmental community in recent years, but most of this attention has focused on trawl fisheries.

Endangered Short-tailed Albatrosses (with large pink bills) mix it up with smaller juvenile Black-footed Albatrosses.

Longline fisheries have meanwhile continued to claim hundreds of thousands of seabirds each year.

Washington Sea Grant staff scientist Ed Melvin is trying to change this. For 20 years, Melvin has been developing and testing tangible solutions to seabird bycatch and trying to coordinate an international response to the problem. For six years, research associate Troy Guy, a self-proclaimed seabird and fish nerd, worked closely with Melvin. Guy, who left Sea Grant this year to rejoin his family's business in California, describes the effort as liaising between the "bird people" and "fish people," who otherwise rarely talk to each other.

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For the
Birds



Streamer lines at work; the birds hang back.

Bait-saving lines • continued from page 1

From Guy's perspective, solving local, regional, and international bycatch issues is all about collaborative research that relies on input from those with the most "skin in the game": the fishermen

themselves. Bycatch hurts them, too; birds can decrease catch rates by eating bait and occupying hooks, and can even prompt devastating fishery closures. And while fishermen may not be aware of measures that can benefit both their bottom lines and the birds, and may not come at the problem from the same perspective as the scientists, they bring more direct experience to bear on it. Researchers like Melvin and Guy listen to the fishermen's ideas, refine them, and inject scientific rigor.

That's how they discovered what's proven to be the most effective, economical, and easy-to-use technique of all for reducing bird bycatch in longline fisheries: bird-scaring lines (BSLs), also called tori or streamer lines. BSLs, invented by Japanese fishermen in the 1980s, consist of lines attached to the stern of a boat and towed behind it, with colored streamers dangling from them. This creates a brightly colored fence that, as the name implies, scares off the birds. It works even better when combined with other preventive practices, such as line weighting and fishing at night. These simple, inexpensive solutions can significantly reduce bird mortality with minimal disruption to the fishing operation and no noticeable reduction in fish catch.

In the summer of 1999, Melvin and his team got the opportunity to test new avoidance measures in Alaska, in collaboration with the North Pacific Fishery Management Council and other partners.

These deployments showed that, when used in pairs, bird-scaring lines can dramatically reduce, even eliminate, seabird mortality.

Then, answering a call for research closer to home, they began deploying BSLs off the Washington coast, starting with tribal fishing fleets in 2008. Because West Coast fishermen were generally unaware of the implications of seabird bycatch, appealing to their self-interest proved crucial to winning their cooperation. The trick, says Guy, was to seek ways to reduce bycatch and at the same time protect the fleet. He and Melvin initially pitched BSLs as "bait savers" to tribal fishermen, and most of the fishermen welcomed them.

Following this success, they moved farther offshore and around the globe in 2009 for what Melvin calls his "fairy tale of bycatch stories." Partnering with the Japanese tuna fleet off the coast of South Africa, he and Guy tested various combinations of avoidance measures to determine best practices for these far-ranging high-seas boats. Though they found it difficult at first to nail down a venue and partner fleets for this research, working with the tuna fishery and tackling the complex and dynamic community of birds associated with it led to remarkable results. The researchers and fishermen tested lighter lines with short streamers against mixed streamers of different lengths (the so-called Alaska-Japanese Line), and observed the effects of weighting the lines so they sank faster. Ultimately, they hit upon a gold standard, dubbed the Yamazaki Double-Weight Branchline after its creator, fishing master Kazuhiro Yamazaki: two BSLs with weights on the hooked branch lines, set at night. In 2011 Yamazaki's branchline won both the World Wildlife Fund's Smart Gear Award and a special prize from the International Seafood Sustainability Foundation.


Ed Melvin relaxes with not-so-shy shy albatrosses on Albatross Island, off Tasmania's north coast. Photo by Mike Double

The changes that resulted were profound: zero bird bycatch, with virtually no impact on crews or their fish catches. This research has been changing fishing practices around the world. In 2012 the committee overseeing the international Agreement on the Conservation of Albatrosses and Petrels officially adopted these suggestions for the tuna longline fisheries that overlap with these birds. Three of the four international tuna commissions adopted some of the recommendations.

In the latest phase of their work, Melvin and Guy shifted closer to home, reaching out to the West Coast groundfish fishery. They conducted an overlap analysis, in collaboration with a wide-ranging interdisciplinary team, to discover which West Coast fishery, where, and in what season posed the greatest risk to seabirds. They found that the West Coast's longline sablefish fishery showed the most overlap with the foraging patterns of vulnerable albatross species and thus represented the greatest threat.

The next step is to adapt, refine, and deploy tools to decrease albatross mortality in this region. Using successes from around the world, WSG, Oregon State University, and California Sea Grant Extension are aiming to fine-tune the options for the West Coast fishing community, especially for smaller vessels. This "slow boil," as Melvin notes, involves refining and customizing the technology in order to reduce risk to albatrosses and simultaneously avoid negative repercussions to the fishery. In the 2014 fishing season, they recruited sablefish longline vessels from California to the Washington–British Columbia border to test gear modifications at sea.

This there-and-back story shows how work done locally can have a global reach, and how findings from far afield can inform conservation here. There are challenges ahead for Melvin as he seeks to reach farflung fleets and convince them of the need to take action and employ avoidance measures, for their own sake and the birds'. And as fisheries evolve, technologies for protecting impacted species such as albatrosses must change with them.

To learn more, see Melvin EF, Guy TJ, Read LB (2014) Best practice seabird bycatch mitigation for pelagic longline fisheries. Fisheries Research, 149:5-18. 

FROM CORNHUSKER TO RESEARCH CRUISER

Most of those who attend WSG's NOAA Science Camp for middle school students and the camp's Junior Leadership Program for high schoolers come from Seattle and other nearby communities. But a handful come from much farther away: Alaska, New Jersey, Taiwan, China, and Colombia in past years, Tennessee and Wisconsin this year — plus Nebraska. Anna Wiebe travelled a full thousand miles, from Scottsbluff, Nebraska, where she's now a high school junior. And she's glad she did.

Why would a student come all the way from Nebraska for NOAA Science Camp?

"A lot of kids in Nebraska just waste their summers," says Anna, but she was determined not to. She and her mother were searching online for interesting summer-camp opportunities when she spotted NOAA Science Camp. "It seemed like a great opportunity to do biology," she explains. Biology, particularly marine and conservation biology, is her passion and her career goal. "There's not tons of marine biology to be done in Nebraska," she explains with dry understatement. "I always wish there were more opportunities for biology there. All you get is biology class, and a lot of kids zone out in class." She wanted something hands-on, like science camp.


Furthermore, unlike many of her classmates, Anna already knew and loved the sea, thanks to visits to an aunt and uncle in California. She also knew what summers are like on the Pacific coast and, she admits, welcomed the chance to escape the hundred-degree weather back home.

Despite her worries about whether she would fit it when most of the kids would be locals, she felt really accepted. Most importantly, she adds, "the program was great, a really great experience," rattling off the elements that made it so. "We got to go on a research cruise, deploy a CTD [a sensor system used to measure conductivity, temperature, depth, and other oceanic properties], test turbidity levels, look at zooplankton in a microscope a few minutes after we collected it, and go kayaking on Lake Washington." Nebraska has kayaks, she points out, but its lakes are much smaller.



The most illuminating experience, however, was testing chlorine levels around Lake Washington, and developing hypotheses as to why they were higher at certain sites. Boat docks seemed to be important sources of this deadly pollutant.

Anna hopes to resume this research at next year's Junior Leadership session, on the way to a scientific career that might include teaching, though she expects that "most likely I'll do research." If so, she's on the right track; two current Science Camp staffers graduated from the Junior Leadership Program.

"I'll probably suggest this camp to a lot of my friends back home," she says. If NOAA Science Camp starts welcoming a regular Cornhusker contingent, you'll know how it started. — Eric Scigliano 

STAYING ALIVE ON THE WATER AND IN IT

WSG's sea-safety team helps tribal divers be prepared in a uniquely risky fishery.

Continuing education coordinator Sarah Fiskien and her colleagues on WSG's marine safety training team have conducted more than 100 classes

in first aid, at-sea rescue, and emergency response for fishermen who work on the water's surface. This summer Sara, Steve Harbell, and Eric Olsson dove deeper into the subject, bringing their training to about 35 Lummi tribal fishermen who dive more than 100 feet deep to harvest geoducks, sea cucumbers, and occasionally sea urchins for the export market, and 15 more who tend their comrades' air hoses and tethers.

"Since they started in the mid-'90s, the dive fisheries have really become important," says Lummi shellfish biologist and diving safety officer Karl Mueller. About two years ago the tribe began developing a diving safety program. Soon afterward, one tribal member perished in a diving accident, bringing home the importance of safety training. The tribe now requires it for all its dive fishermen, even though they're exempt from Coast Guard training requirements because they work inshore.



Lummi divers get hands-on practice with safety flares.

WSG's vessel-safety curriculum complements the dive-safety and first aid training the Lummi crews received earlier. WSG trainers helped the divers and tenders prepare for everything that can go wrong on the surface, with lessons and drills in firefighting, countering hypothermia, retrieving a distressed diver from the water, and using flares, mayday signals, and dewatering pumps.

"Commercial fishing is dangerous work and dive fisheries even more so," explains Mueller, "so we're trying to be proactive about safety." — ES

SEABIRDS: BEAUTIFUL WHEN THEY'RE ALIVE, USEFUL WHEN THEY'RE DEAD

COASST volunteers use beached birds and an innovative post-mortem guide to track changes in coastal ecosystems. Feet and feathers tell a tale when other evidence decomposes.

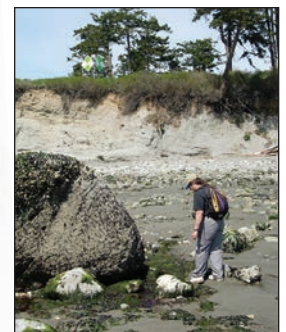
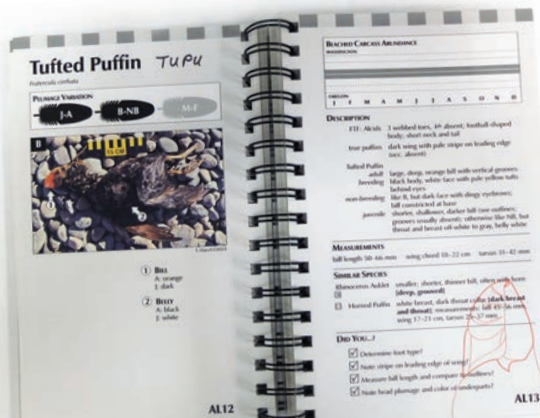
By Chelsea Kahn, Washington Sea Grant Science Writing Fellow

Imagine you're walking the wild shoreline of Second Beach on the outer Olympic Coast, admiring the knots of washed-up kelp, when you spot a beached shearwater amid the wrack. If you're a typical beach stroller, a dead bird is something to avoid. But if you're one of the 793 volunteers on the Coastal Observation and Seabird Survey Team (COASST), that unlucky bird is exactly why you are on the beach.

Seabirds are the coalmine canaries of the coast, indicator species for environmental change. Coastal bird species' survival and reproductive success are closely tied to the health of their ecosystems, making them extremely useful in regional environmental studies. Where and when they die gives insight into the lives they lived, illuminating what COASST's Executive Director Julia Parrish, bird enthusiast and UW Biology and Fisheries professor, calls "the natural history of dead birds."

COASST was born in 1999 out of Parrish's vision and frustration. For 10 years she had surveyed bird populations on table-topped Tatoosh Island, just off Cape Flattery at the Olympic Peninsula's northwest corner. There she noticed fluctuations in the resident common murre population. She wondered if there might be a way to determine if the patterns she had observed on Tatoosh were recurring more widely up and down the coast.

Gathering such data on a broad scale is labor-intensive and costly. But many local residents care about seabirds, their fate, and the state of coastal ecosystems. In California, researchers had recruited them to be eyes in the field. Why not do the same here — muster an army of citizen observers to dig into the roots of bird mortality by monitoring beached birds and collecting baseline data on the health of the environment?



Postmortem field workers tell the

If you are a scientist or have spent much time with scientists, you know how they love baselines. In the face of a rapidly changing environmental system, baselines provide reference points, benchmarks of how that system used to function. Parrish and COASST use seabirds as bio-indicators to discern and record those benchmarks.

By definition, seabirds live a dual lifestyle: they breed on land and feed at sea, and so depend on both. The availability of nesting habitat and the quality of food stocks are the most important factors in seabird health and survival. The birds have highly specialized diets, relying on the abundance of certain pelagic marine species. They also tend to live longer than their landlocked neighbors and breed later in life. Slight increases in mortality can have a big impact on such slow-growing, long-lived species.

These traits make seabirds highly sensitive to changes in environmental conditions. And they face many changes today: habitat loss, oil spills and other pollution, encroachment by invasive species, the fatal attraction of baited fishing hooks and prey-laden fishing nets, the growing impacts of global climate

COASST • continued on page 6



Above: COASST participants measure the bill of a Northern Fulmar at Cape Glazenap, Bering Sea, part of Izembek National Wildlife Refuge.

Below, left-right: A COASSTer checks a Puget Sound beach; Julia Parrish helps a new trainee in Homer, Alaska; two COASSTers pause after a long survey.



change. As a result, there is a new drive to not only monitor the more severely affected avian species but also to seek ways to reduce threats to them.

Parrish and her participants labor to ensure that the birds they find washed up do not die in vain. Today, her volunteer army ranges all along the West Coast, with a wingspan stretching from Kotzebue, Alaska, in the north to Eureka, California, in the south. Participants need only take one training session and bring a set of eyes and a friend to the beach. The buddy system is a must; COASST wants to ensure all volunteers are safe and enjoy their work.

Key to this process are the custom field guides for bird identification that Parrish and her colleagues have published with the help of Washington Sea Grant, billed as “a reference for the rest of us!” Jane Dolliver, COASST’s program coordinator, describes *Beached Birds: A COASST Field Guide* as “beached birds for dummies.” Over the years, the team has crafted individual guides for the Pacific Northwest, Alaska, and the North Atlantic. The Northwest guide’s 92 pages offer detailed profiles of more than 50 species. It is written for beginners, but the volunteers using it have racked up an impressive 85 percent average success rate at identifying fallen birds.


The book’s newest edition employs a novel strategy for distinguishing species: foot-type and wing identification, which is especially useful when a corpse is not easily recognizable because of damage or decomposition. Parrish reports that nearly two-thirds

of the carcasses found are no longer intact. By using the body parts that last longest, the COASST guide ensures maximum success in the field.

Once they’ve matched a dead bird with its species, volunteers record important data — such as body and wing measurements, foot and eye condition, and the presence of oil or entangling fishing gear — on the COASST Data Sheet. They send this form back to COASST, where scientists and other staff confirm identifications and record findings. This double-check ensures that data are legitimate and robust, so state, federal, and tribal agencies can use them with confidence.

COASST doesn’t just aid efforts to understand the local coastal environment. It is also paving the way for wider use of volunteer-collected data, giving individuals across the state and country a chance to participate in a greater scientific effort, and assisting similar efforts as far away as Russia and Argentina.

“COASSTers tend to be lifelong learners,” Parrish explains, and they’re now encountering the same questions she faced on Tatoosh Island many years ago: What is happening on my beach? Are these patterns happening elsewhere? What can I do about it? They thus gain a new sense of place and awareness of their environment, while providing cost-effective data collection for a broad range of scientists.

Prospective volunteers can learn more about COASST at <http://coasst.org>. 

WE’VE GOT JOLLY GOOD FELLOWS

A big welcome to WSG’s new fellows!

Seated (L to R): 2014-15 Marc Hershman Marine Policy Fellow Laura Nelson (from UW), working at The Nature Conservancy and the Makah Tribe Office of Marine Affairs; 2014-15 WSG Science Communications Fellow Nicholas Naylor-Leyland (UW); 2014 SG-NOAA Fisheries Fellow Jennifer Meredith (UW).

Standing (L to R): 2015 Dean John A. Knauss Marine Policy Fellow Laura Deighan (UW); 2014-15 Hershman Fellow Molly Bogeberg (WSU Vancouver), working at The Nature Conservancy; 2014 SG-NOAA Fisheries Fellow Peter Kuriyama (UW); 2014-15 Hershman Fellow Adi Hanein (UW), working at the Washington Department of Health; WSG Education Specialist Nancy Reichley; WSG Director Penelope Dalton.

Not pictured: 2014-15 Hershman Fellows Kathryn Graziano (UW), placed at the Puget Sound Partnership and Jessica McGrath (UW), at the Department of Ecology; and 2014 SG-NOAA Fisheries Fellow Christine Stawitz.



FIELD NOTES



Jennifer Runyan graduated to the new post of aquaculture outreach specialist after working for the past year as WSG's SoundToxins program assistant in Shelton. There she trained volunteers monitoring for harmful algal blooms. Jennifer had already logged many hours peering through microscopes at marine organisms. She earned a BS in marine biology from UC-Santa Cruz and an MS in environmental studies from Evergreen State College, using SoundToxins data to study *Dinophysis*, the culprit in diarrhetic shellfish poisoning. She also spent six years assembling aquarium exhibits and teaching marine biology at the Ocean Institute in Dana Point, California. Jennifer gave up a brief career making chocolate truffles to concentrate on marine science, but she still makes them for fun.

LETTER TO THE EDITOR

Editor: Re. your article in Sea Star about the Orca Bowl ["Bowling for Sand Dollars," spring 2014], the Garfield Pirates were robbed (or raided)! The only correct answer to "How many plates do chitons commonly have?" is eight; just inserting the word "commonly" in the question was a mistake, because the answer is always eight. "Seven or eight" may have been the multiple-choice answer, but it is incorrect. Aaargh, matey!

Dr. Megan Dethier
UW Friday Harbor Labs

Ed. note: Modern chitons have eight plates, but some fossil species appear to have had only seven.



Kevin Decker moved from sunny Idaho to drizzly Aberdeen to become WSG's new coastal outreach specialist. He holds a BBA in business economics from Boise State, one MS in environmental management from the University of Maryland, and another in applied economics from the University of Idaho, where he's wrapping up his PhD in environmental science. Kevin also worked in banking and financial services and served on the board and staff of the Idaho Wildlife Federation, dealing with such issues as preventing the spread of domestic livestock diseases to wild ruminants and banning hunting from helicopters and all-terrain vehicles. At WSG he'll conduct outreach and economic analysis in such fields as shellfish aquaculture and marine spatial planning. The marine part may be new, but Kevin's economic and planning expertise should be a big asset. He insists he's looking forward to Grays Harbor winters.



Brian Kirk brings a solid background as an operations and program manager, plus more than 20 years' marine experience, to the new post of WSG Associate Director. A member of a three-generation Navy family, Brian graduated from the Maine Maritime Academy with a BS in marine transportation and nautical science, a third mate's license, and a commission in the U.S. Navy. He spent most of his first 10 navy years at sea, then attended the Naval Postgraduate School in Monterey, where he crewed on a racing sailboat, received an MS in operations research, and often visited the Monterey Bay Aquarium. In 2010 Brian and his family moved to the Seattle area, where he directed current operations and training and readiness for Commander Carrier Strike Group Nine and made two deployments on the carrier USS *Abraham Lincoln*, including a 75,000-nautical-mile voyage. After leaving the Navy he enjoyed a brief stint working in health care, but he's delighted to rejoin the maritime world at WSG.

Marine research associate Troy Guy, who worked with WSG staff scientist **Ed Melvin** on seabird-bycatch prevention for the past six years (see page 1), has left the streamer lines behind to return to California and take charge of his family's Silicon Valley plumbing business. Wish him god-speed keeping the pipes clear and the water flowing around Appleland and the Googleplex. The world economy depends on them.

In May **Pete Granger** celebrated his retirement after 13 years at the helm of WSG's marine advisory services. But he didn't paddle off into the sunset, or at least not for long. Pete is back part-time as WSG's seafood industry specialist, helping tribal fisheries upgrade their catches and command premium prices. In July he led two training sessions for Nisqually tribal fishermen, where they refreshed their skills in handling, bleeding, and chilling fish just in time for the opening of the Nisqually River Chinook fishery. "The Nisqually are making a tremendous commitment to control the quality and add value for their own fishermen," says Pete. His work with the tribe over the last few years seems to be paying off. Approximately 40 fishers will collect bonus checks from last year's catch.



Chelsea Kahn traveled all the way from her downstairs office at WSG, where she worked as a student assistant, to join the staff as our new research and information analyst. She will play an integral role in implementing WSG's competitive research program, in addition to developing and implementing new program information systems. Chelsea, who's from New Jersey and proud of it, holds a bachelor's degree in biological oceanography from Rutgers University and received a Master's Degree in Marine and Environmental Affairs at the University of Washington in June 2014, with a focus on science communication and climate change. As a WSG science writing fellow, she wrote both feature stories in this issue.



Marine ecologists **Bridget Ferriss** and **Jon Reum** are working jointly at WSG and NOAA's Northwest Fisheries Science Center (NWFS) on a team investigating the cumulative ecological effects of shellfish aquaculture in Puget Sound. Bridget will apply many of the statistical and modeling tools she previously used to study finfish. She studied the flow of contaminants in marine food webs and worked with Brian Beckman at NWFS comparing growth rates in juvenile salmon at various sites along the coast. Bridget grew up in Toronto, where, she says, "Lake Ontario was my water body." She came west to do her undergrad work in oceanography at the University of British Columbia, then followed up with a master's and PhD from UW and served as a Knauss Fellow in Washington, D.C.

Jon grew up far from water fresh or salt, in California's Mojave Desert. "But growing up in the desert, I was fascinated by large amounts of water, and I was always into fish." So he attended UC-Santa Cruz, then got his master's and PhD at UW's School of Aquatic and Fishery Sciences, looking at how climate variability affects forage fish in Puget Sound. He did his postdoc research at the Northwest Fisheries Science Center and worked with researchers at the Pacific Marine Environmental Laboratory on acidification in the California Current. "Shellfish is new, but also familiar," he explains. "In my spare time I feast on" — you guessed it — "shellfish."





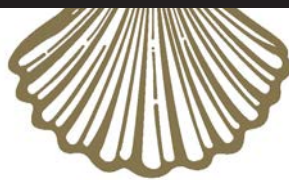
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SHELLFISH & ENVIRONMENT THE RESEARCH SYMPOSIUM

DECEMBER 8, 2014

WORTHINGTON CENTER, ST. MARTIN'S UNIVERSITY

Registration is at 8 a.m., conference is at 8:30 a.m.

The event is free. Participants need to pre-register at <https://catalyst.uw.edu/webq/survey/wsgcanal/252492>