



Major Accomplishments 2010 - 2011

The SeaDoc Society works to protect the health of marine wildlife and their ecosystems through science and education.

We fund and conduct innovative science, make sure it gets off the shelf and into the hands of decision makers, and bring people together to catalyze change.

Our work focuses on the transboundary Salish Sea ecosystem in Washington and British Columbia.



Doing the Science

SeaDoc looks for gaps in the science that are hindering efforts to restore our ecosystem and tries to fill them. While some restoration or science projects can cost in the millions of dollars, we fund projects that are relatively small (most cost between \$15K and \$100K) but which will have disproportionately large impact.

Birds and Mammals Species List

What we did: Joe Gaydos and Scott Pearson of WDFW identified and listed the 172 bird and 37 mammal species that depend on the Salish Sea marine ecosystem.

Why it matters: You might ask, “Why is it a big deal to list all the animals that use an ecosystem?”

First, in the words of the editor of the nascent *Encyclopedia of Puget Sound*, “this work is seminal.” Knowing what is here is the first step

to conserving it. Several different researchers have been keeping lists, but only on one side of the border, or only of certain groups of species.

Second, it’s a big deal because of the value this list has for the next 50 years of restoration efforts. The species list collects, all in one place, a scientifically-rigorous list

of all the birds and mammals that use the Salish Sea as of 2011. Like a family snapshot, it’s a reference point that will help us see future changes. (“Remember when Uncle Phil was so thin?”)

Finally, the study showed that a huge number of birds and mammals depend on both the land and the sea, proving once again that land and sea are interconnected and what we do on land impacts the sea.

Eelgrass Disease Study

What we’re doing: Together with collaborators, SeaDoc investigated

the role of a slime mold-like organism (*Labyrinthula*) in causing disease in eelgrass. We found that the organism is present in both healthy and unhealthy eelgrass meadows, and now we’re working to identify the suite of factors that enable it to cause disease.

Why it matters: Eelgrass is critical habitat for juvenile salmon and other fish, as well as a nursery for many different marine animals. Without eelgrass, the base of the food web could start to unravel.

Labyrinthula wiped out 90% of the eelgrass beds on the East Coast of the US in the 1930s, but nobody knew if it could be playing a role in eelgrass declines locally. This important study showed that it’s not just a question of having *Labyrinthula* or not having it. What likely matters more is the number of other compromising factors that are also present, like elevated water temperatures and increased water turbidity.

To borrow from human medicine, we’re exposed to germs all the time, but often can fight them off, except when we haven’t had enough sleep or are not eating well. We can’t rid the world of *Labyrinthula*, but we can improve water quality and take other measures to prevent *Labyrinthula* from causing the massive eelgrass die-offs seen on the East Coast.

Dolphin Population Study

What we’re doing: SeaDoc is funding a photo ID study of Pacific White-sided Dolphins in the Salish Sea. The investigators are looking at thousands of contemporary and archival photographs of dolphins to identify individuals so that we can understand population dynamics.

Why it matters: Pacific White-sided Dolphins are being seen more and more in the inland sea, but we don’t know enough about their populations to manage them properly. We know, for instance,



that fishery bycatch in British Columbia is killing dolphins, but we don't know whether this creates a serious impact on the population or is just incidental.

This study, like the first studies that used photographs to individually identify killer whales, lays the groundwork for decades of future research and management by allowing us to identify and track individuals, families, and larger groups. It will help us determine how long these animals live, how far they travel, and their birth, death and survival rates. From this, we'll be able to determine whether things like fisheries bycatch are impacting the population.

Killer Whale Strandings

What we did: SeaDoc has compiled and analyzed over 70 years of killer whale stranding data in the North Pacific Ocean to look for underlying patterns that might help us better understand where, when and why killer whales strand.

Why it matters: Strandings are important because they are one of the few chances we get to investigate the effects of pollution and disease on free-ranging killer whales.



Thanks to support from NOAA, SeaDoc worked with BC Pathologist Dr. Stephen Raverty to publish a protocol for necropsying stranded killer whales. The idea was to help collect data that would establish baseline patterns in causes of death, compare diseases in different geographic regions, understand possible human factors in killer whale deaths (contaminants, human interactions), and learn more

about the natural history and biology of wild killer whales.

Thanks to that protocol and significant funding for necropsies from NOAA, our data show that the rate of complete stranding investigations has gone from 15% to almost 80%. These data have shown us

when and where to expect killer whale strandings and have pointed to a multitude of factors that cause strandings, including factors caused by humans.

Cool Fact: Past SeaDoc intern--and now Veterinarian--Dr. Michelle Barbieri is leading this project.

Eagle Predation Study

What we did: SeaDoc funded a study of eagle predation on marine birds and showed that recovery of declining marine birds is tied to salmon recovery.

Why it matters: During times when salmon aren't plentiful, eagles eat the very birds we are trying so hard to protect, birds like Western grebes and Tufted Puffins. The study reminds us that the ecosystem is tightly tied together. It shows that when we're making management decisions, we have to think larger than one species at a time, but instead consider the entire food web.



Improved Surgical Procedure to Track Western Grebes

What we did: Joe Gaydos and collaborators improved a surgical procedure to allow scientists to implant transmitters in Western Grebes and track their migratory patterns.

Why it matters: Western Grebes, which have declined precipitously in the Salish Sea, winter on marine waters and breed on freshwater lakes. Unfortunately we haven't been able to tie declining winter populations to specific freshwater lakes to see how factors like development and irrigation are hindering reproduction. The new surgical technique has allowed us to track the first migration of a Western Grebe in real time and will allow for future tracking studies that will help us protect these birds.

Seal Pup Tracking Study

What we did: To compare the movements of wild and rehabilitated seals, SeaDoc and collaborators used satellite tags to track a cohort of 10 wild harbor seal pups and 10 abandoned-and-then-rehabilitated pups. We found that rehabilitated seals not only swim twice as far on a daily basis, but they also end up traveling twice as far from their release locations as do the wild-weaned pups.

Why it matters: The Federal government spends a lot of money rehabilitating stranded seal pups, but we haven't had a way of measuring if this is money well-spent. We didn't know if they behaved like wild seals or how long they survived. The study results suggest that learned behavior during the brief 3-4 week nursing period when a pup is with its mother likely enables wild harbor seal pups to move less each day and remain closer to their weaning site than rehabilitated pups, making us ask, can we improve rehabilitation methods?

Marine Bird Decline Project



What we're doing: Postdoctoral Fellow Dr. Ignacio Vilchis is half way through a two-year project to study marine bird abundance across the entire Salish Sea. Combining data from the US and from Canada, he is looking at which birds are declining and which are increasing and then is asking what are the common factors for declining birds. The goal is to identify specific risk factors that are making bird populations decline.

Why it matters: This is the first time anyone has tried to investigate ecosystem-level mechanisms driving declines of multiple marine bird species in the Salish Sea. Just as doctors have shown common risk factors for a shortened human life (smoking, obesity, etc.), if we can identify factors for bird population declines, we can address those issues.

Cool fact: This groundbreaking research project is supported by a legacy gift from a SeaDoc supporter.

Getting Science Off the Shelf

Science for science's sake is cool, but when it comes to restoring an ecosystem you've got to get the data out of peer reviewed journals and into the hands of decision makers. And it has to be in a format that they can understand. Here are a few examples of SeaDoc work and its direct link to management.

Tufted Puffin Status Review

What we did: SeaDoc hired scientist and bird expert Thor Hanson to write a "status review" of the Tufted Puffin. This review will enable the Washington Department of Fish & Wildlife to make a decision about listing the Tufted Puffin as threatened or endangered.

Why it matters: Tufted Puffin populations in Washington State have been crashing. The science supports this but the species can't be listed in Washington State until a status review is written. And until they're listed, the State won't write a management plan. SeaDoc stepped in to write this report and catapult Tufted Puffins from a species in decline to a species being recovered.

Scoter Hunting Limits

What we did: In 2006, SeaDoc funded a study that showed that the seaducks called scoters were being hunted at unsustainable levels in four Washington counties. We continued to work with the Washington Department Fish & Wildlife and last year the Commission cut the daily scoter hunting limit in half and ruled that if the population drops below 55,000 birds all scoter hunting will cease.

Why it matters: For 25 years, scoter populations have been declining in Washington. Hunting isn't to blame, but unsustainable hunting wasn't helping an already declining population. WDFW had a lot of data on scoters, but didn't have the money to analyze it. SeaDoc stepped in to fund the data analysis, but we didn't stop there. We presented our results to the Fish & Wildlife Commission, and by asking the right questions about their own research we prompted them to start a new research project that led to changing the hunting limits.

Turning science into action doesn't happen instantly, but SeaDoc has the persistence to keep moving the ball forward, and we've developed

relationships and trust with many managers. In this case a relatively small investment on SeaDoc's part was able to leverage existing data and resources into a big win for scoters, without having to stop hunting completely.

Derelict Gear Economics

What we did: In partnership with the Northwest Straits Initiative, we created a statistical model to calculate the economic cost of a derelict fishing net in order to show the value of restoration efforts.

Why it matters: Derelict gear kills thousands of marine invertebrates, fish, birds and mammals. That's pretty bad, but doesn't always motivate people to fund the removal of these lost fishing nets. This study showed that removing lost nets is an economic win-win. The cost of removing a net is recaptured in the first year just in terms of the number of Dungeness crab saved from dying in the net.

As Joe Gaydos puts it, "Ecosystem restoration is not just about the feel-good and the cuddling and the hugging. From our science we're learning that if we take care of the ecosystem it's going to take care of us. The finances are coming back."

Public Presentations

What we did: Over the past year SeaDoc Chief Scientist Joe Gaydos gave 21 professional presentations for groups as diverse as talented high school students in Everett, the Washington State Senate Natural Resources and Marine Waters Committee, and supporters of the Port Townsend Marine Science Center.

When Joe spoke to the high school students at the **Ocean Research College Academy**, a Gates Foundation funded program for high school students in Everett, he presented SeaDoc's Top Ten Principles for Designing a Healthy Ecosystem. The instructor wrote that the teenagers "were inspired by the use of science research to make decisions about how to manage the environment." They appreciated the realistic presentation of factors involved in solving problems, including compromise and Joe's emphasis on the complexity of decision making.

For the **Washington State Senate**, Joe reported on the economic value

of a healthy ecosystem. He noted that 47% of Washington residents participate in wildlife watching, that watchable wildlife accounts for a total economic output of \$1.78 billion, and that watchable wildlife generates or maintains nearly 22,000 jobs. He framed the issue in a way that resonated with the senators, and he got their attention.

At the **South Sound Symposium**, and again at the **2nd Annual International Marine Conservation Congress**, Joe gave a talk on "How Scientists Can Communicate Better." His basic message: just doing great peer-reviewed science isn't enough. You have to get out and talk about it with the public. "You're the expert and if you're not talking about it, somebody else is and they don't have all the data you have." Joe's challenge to fellow scientists has been well-received at each presentation.

At the **Port Townsend Marine Science Center**, Joe spoke on the importance of place-based conservation, making the point that science without public education and involvement isn't enough. In order to make the hard choices necessary to save the Salish Sea, people need to know and love and appreciate the resource, and they need to want to do what it takes to restore it. Joe contrasted the scant attention paid to the ecosystem with the vast amounts of attention paid to professional sports or television shows, and made a call to action for people to take personal responsibility for local stewardship of local resources.

Additionally, Joe Gaydos provided background material and quotes for many important TV, radio and newspaper stories, including those appearing in *Canadian Geographic*, *Crosscut Magazine*, *Fox News*, *KFMB* and *KGTV*, *Kitsap Sun*, *LA Times*, *Oregon Field Guide TV*, *Seattle Times*, *Three Sheets Northwest Magazine* and the *Vancouver Sun*.

Why this matters: Getting science off the shelf means getting it into the hands of people who can make a difference. You can't just hand someone a copy of a peer reviewed scientific paper and expect it to make a difference. You have to translate the findings into concepts and issues that make sense to them and that seem important even among all the competing demands in their lives. SeaDoc is giving people the information and the tools to deepen their commitment to restoring our ecosystem.

Catalyzing Rapid Change

A unique part of SeaDoc's mandate is to bring people together -- across political boundaries and across disciplines -- to tackle difficult issues. As you know from your own life, you often make more progress when you get a bunch of smart people together in one room than when you try to solve everything in isolation. This year we helped convene two major events.

Forage Fish Needs Assessment Workshop

What we did: In January, SeaDoc and the Northwest Straits Commission brought together 25 scientists and managers from the US and Canada to discuss future research needs for forage fish. The meeting was funded by an anonymous donor who asked SeaDoc to help organize the meeting because he knew of our track record with similar meetings for abalone and killer whales.



Why it matters: Forage fish -- small, energy-rich schooling fish that feed other fish, birds and mammals in the Salish Sea -- are a critical part of the food chain.

They directly feed many birds and fish, including several species that are threatened or endangered.

Although quite a few researchers are working on forage fish issues, they're working in different areas and on different species, and there's little overall coordination. At the meeting, participants shared their current research and identified important gaps. The meeting ended with a detailed list of priorities for science and research, policy and management, and education and outreach.

This list of priorities will help create a long-term plan for forage fish and bring more attention, from both scientists and policy makers, towards conserving these important fish.

The forage fish workshop also shows how SeaDoc can help a single donor make a big difference in the health of the Salish Sea. Through

SeaDoc, a private individual was able to turn a \$5,000 donation into a significant advancement in the future of research and policy for a foundational species in the ecosystem. Depending on how the future unfolds, it's potentially a very large impact for one person to have.

Rockfish Recovery Workshop

What we did: In June, SeaDoc, NOAA, and WDFW hosted a rockfish recovery workshop. Over 100 scientists, managers and members of the public spent two days sharing information about the state of the science and management efforts, and participated in brainstorming future needs for research, policy and education.

Why it matters: Three species of rockfish were recently listed under the Endangered Species Act, so this was, in essence, the kickoff meeting for species recovery efforts. SeaDoc made sure that Canadian rockfish experts were able to attend the meeting and share what they know.

Protecting rockfish will require extensive collaborations across organizations and jurisdictions. A follow-up meeting in September brought together a dozen of the most committed researchers to work out priorities for research, management and outreach. Without this kind of sustained effort and clear identification of priorities and actions, protecting rockfish won't make it into the long-term planning process.

SeaDoc is unique in its mandate to catalyze collaboration across the international border, and this workshop was a great example of the value of orchestrating these kinds of strategic convenings. Creating these synergies by getting people together face to face to meet each other, develop relationships, and exchange ideas means that we'll be able to make the best use of limited funds to protect these species.

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About the SeaDoc Society

The SeaDoc Society is a program of the Wildlife Health Center at the UC Davis School of Veterinary Medicine.

SeaDoc is a private-public partnership of people healing the sea with science. It weds the business savvy of Pacific Northwest citizens to the institutional reputation for excellence earned by the Wildlife Health Center at the University of California, Davis. SeaDoc promotes marine wildlife and ecosystem health through science and education. It provides objective science to inform and guide effective policy and management.

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