OCEANSINITIATIVE

Impact Report 2021

Oceans Initiative is a team of scientists on a mission to protect marine life and the ecosystems on which they depend, and to share our innovative science to guide conservation action.

Dear Friends,

"The world as it is is enough."
— Anthony Doerr

This year, we were reminded that the changing planet will affect us all. As flood waters threatened his new home in British Columbia just months after nearly losing his home to fire in California, writer Malcolm Johnson remarked, "It's also hard to believe that when we moved back to BC from California, not long after almost losing our home to an out-of-season wildfire, we thought we were moving away from climate disasters. But the truth is that there's no away."

There is no *away* for wildlife that have evolved over millennia to occupy particular habitats and ecological niches. In fact, it is precisely this variety of unique ecological roles that captivates us as scientists, inspires awe, and drives us to learn more. The things that make animals special and bring us into their world can be the very things that make them vulnerable. Among the extraordinary animals we at Oceans Initiative study in order to protect: walrus and belugas that rely on icy habitats; river dolphins, nearly blind, using sound to swim through submerged forests in the Amazon River; and of course, killer whales evolving particular ways to make a living in the sea, with populations specializing on prey ranging from herring to salmon to stingrays and sharks.

For these animals, there is no *away*. They cannot occupy new habitats if we degrade or destroy the critical habitats they have occupied for millennia. After evolving cultural traditions (and anatomical adaptations) to hunt specific prey items, orcas cannot switch from eating salmon to jellyfish, just because we've destroyed their prey base.

But what about us? Human evolution is taking place over millions of years, but humans are rare in that our cultural and technological evolution can also take place in the blink of an eye. We can change our behavior, so the onus is on us to fix the environmental problems we have caused, collectively. How do we make real change? How is change born? After such a rough few years, do we still have the capacity to change? I hope so, because countless lives depend on our ability to change. Change can feel overwhelming, because it is. When faced with complex challenges, it can be alluring to just keep "admiring the problem" as former President Obama said, and do nothing. We find there is power and joy in creating change together. Human ingenuity and creativity allow us to take large problems, and break them down into smaller solutions quickly. But sometimes the enormity of what has been lost, and the changes we will see in an ever-warming climate, can seem too much to bear. So we need to build resilience to stay on the path together. One way we do this is to look for joy in our work. We find joy in the beautiful animals we study and the magic of this planet. We see joy in the teams and partnerships we build and the inspiring people we meet. And, when we reflect on our unique place in this world, and see that our strengths and gifts are needed, we can take a small step and then another on a joyful journey toward healing the world.

Oceans Initiative is committed to this joyful journey to build resilience and make change in the world. We hope you will join us.

With oceans of gratitude,

Erin Ashe

Dr. Erin Ashe
Executive Director

Our Vision

Oceans Initiative is a global conservation and research organization that delivers innovative science to conserve biodiversity and build resilience in the face of climate change. We envision a world with healthy ocean ecosystems that support marine life and sustain equitable human communities.

Founded and run by two scientists dedicated to protecting marine wildlife, our team tackles every aspect of marine conservation science with the goal of making conservation both easier for decision-makers to understand and easier for people to practice. Oceans Initiative operates at the interface of science, conservation, and policy. We conduct science to support communities in their missions to protect their environment by providing accurate and trustworthy scientific information to those responsible for environmental policy-making. We believe that our boots-on-the-ground approach keeps our science grounded in first-hand experience. By bearing witness to environmental problems, we are authentically qualified to advocate for evidence-based policy change.

Our People

Our Board of Directors and team are ambassadors for our vision and values. We are grateful for the opportunity to do our work to protect marine life.

Oceans Initiative Board of Directors

Erin Ashe, PhD
Debra Boyer, PhD
Duschka Fowler-Dunning, MBA
Melissa Hornbein, MSc, JD
Nan McKay
Gae Weber, MSW

Oceans Initiative Team

Erin Ashe, PhD — Founder, Executive Director, and Scientist
Rob Williams, PhD — Founder and Chief Scientist
Asila Ghoul Bergman — Research Associate
Laura Bogaard — Research Associate and Coordinator
Marena Salerno Collins — Research Associate
Natalie Mastick Jensen — Graduate Fellow in Marine Parasite Ecology
Catherine Lo — Research Associate
Andrea Mendez-Bye — Research Assistant
Ben Nelson, PhD — Quantitative Ecologist
Kimberly Nielsen — Research Associate
Stephanie Reiss — Research Assistant
Karen Sinclair — Development Director
Katie Wold — Biological Field Technician

A Message from our Chief Scientist

Have you ever read the fine print on your retirement plan? There's probably a footnote somewhere to warn you that past performance of mutual funds or stocks do not guarantee similar results in the future. Investing in biodiversity conservation needs a similar caveat. Sometimes, protecting endangered species comes down to common sense. When we stopped killing whales—after the 1986 moratorium on commercial whaling—many populations of large baleen whales recovered quickly. Many populations of humpback or grey whales, for example, have been growing at 5-10% each year for decades. Some have done so well that they have been taken off endangered species lists in countries around the world. But, there are exceptions to the rule.

Hundreds of thousands of dolphins were killed accidentally in seine nets in tuna fisheries in the eastern tropical Pacific until public pressure forced industry to adopt dolphin-safe fishing practices. After the initial problem was solved, spotted and spinner dolphin populations have barely recovered. The southern resident killer whale population was depleted by about 30% during live-capture fisheries for display in aquaria. Even though the live-captures stopped in 1977, the population has not recovered to historic levels. On the contrary, the population has declined from 98 to 73 individuals over the last two decades. Our newest research on beluga in the St Lawrence Estuary showed that, even though beluga hunting stopped in the 1970s, the population is unlikely to recover to pre-exploitation levels in our lifetime, because the threats of contaminants, inadequate prey, noise, and climate change work together to hinder recovery. Now think of the passenger pigeon. It went from billions to zero in 50 years.

What do these populations teach us? Complacency leads to extinction. Decimating whale and dolphin populations is easier than recovering them. We see this in our own health. You can fall out of a tree and break your arm in an instant, but healing takes time. With whales, we cannot count on populations bouncing back from harm. Each population is unique. Some may need us to slow ships down to make less noise. Others may need us to reroute ships to avoid striking and killing coastal whales. Others may need us to invest in ropeless gear for lobster and crab traps. Each action, on its own, seems trivial. But collectively, we can build the natural resilience of the population to buffer the next threat—climate change.

In 2022, we need your help to build our organization's resilience, as we build resilience of wildlife populations in the Pacific Northwest and beyond.

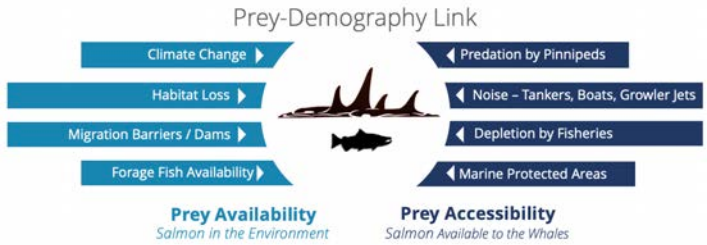
As the effects of climate change become too obvious to ignore, there has never been a more urgent time to invest in our efforts to keep important ocean habitats clean, quiet, and full of life. Thank you for supporting our conservation mission.

— Dr. Rob Williams, Chief Scientist

Killer Whale Conservation

Oceans Initiative is best known for conducting innovative research to understand human threats to the critically endangered southern resident killer whale population, and guiding effective recovery plans.

Understanding the Impact of Chinook Salmon Availability and Accessibility on SRKW Recovery



Our most critical and urgent initiative in 2021 was to quantify the changing relationships between Chinook salmon abundance and southern resident killer whale (SRKW) survival and reproduction (i.e., the link between prey and demography). We are constructing an integrated population dynamics model that improves our understanding of how salmon availability in the ocean, and accessibility of salmon to the whales, affect SRKW recovery.

Quantifying this relationship between endangered predator and endangered prey is key to informing our work in 2022. With support from Puget Sound Partnership, we will use this model to make predictions about how the SRKW population will respond to natural changes in Chinook salmon abundance, and anthropogenic changes in prey accessibility (e.g., fisheries competing with whales for scarce salmon, or vessel noise and disturbance making it harder for this apex predator to find salmon in a noisy ocean). Crucially, these models can act as a road map to guide real-world activities to get more salmon in the mouths of orcas.

Preliminary results from our new models are showing that the effect of Chinook salmon abundance on SRKW reproduction does appear to be changing over time. We are still seeing that salmon abundance does appear to be positively associated with survival rates—in years when Chinook salmon abundance is relatively high, so is the survival of SRKWs. But as the population declines toward extinction, other factors, including disease and contaminants, will take over in importance. We are continuing to refine these models and will then submit them for peer review. The more accurate our models are, the more confidently we can make predictions about how much more salmon the whales need to recover and how much quieter we need to make the Salish Sea for the whales to catch salmon. Most importantly, this work provides a road map to tell us which threats we can mitigate to maximize recovery.

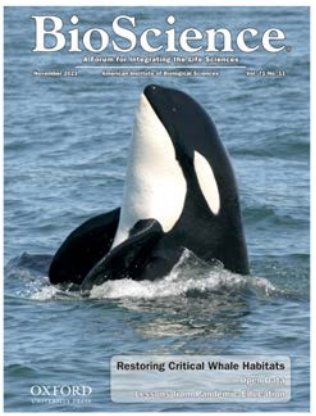
Assessing the Impact of Noise on Southern Resident Killer Whale Foraging

It was a quiet summer for southern resident killer whale research in the Salish Sea. The whales spent less than 48 hours in their core critical habitat in July and August. This is a marked contrast to our experiences in 2003-2005, when we had a 50:50 chance of seeing orcas on any given day between May and October. Oceans Initiative now has a team based year-round on San Juan Island, and they were ready to jump into action the moment the whales returned at the end of August, which allowed them to collect data through September. The team had days in the field with as many as 60 southern residents, and they collected data from several land-based vantage points on the whales' movement, behavior, distribution and habitat use, as well as the presence and activity of boats and ships.

In its 5th year, our land-based study is designed to assess whether we're doing enough to reduce vessel noise and disturbance in SRKW's critical habitat. What we hope to see is that the whales have a chance to feed more when the conditions are quiet enough for them to find food. This year, we will be reporting our findings to the Washington Department of Fish & Wildlife, and providing an assessment of the effectiveness of recently implemented whale-watching rules (January 2021) and licensing (May 2021) to inform the adaptive management of the commercial whale-watching licensing program.

Destroying and Restoring Critical Habitats of Endangered Killer Whales

Endangered species legislation in the U.S. and Canada aims to prevent extinction of species, in part by designating and protecting critical habitats essential to ensure survival and recovery. These strict laws prohibit adverse modification or destruction of critical habitat. The population dynamics of SRKWs are now driven largely by the cumulative effects of prey limitation, anthropogenic noise and disturbance, and toxic contaminants, which are all forms of habitat degradation. It is difficult to define a single threshold beyond which permissible habitat degradation becomes unlawful destruction. In a recent paper in *BioScience*, with lawyers, scientists, and policy experts from Natural Resources Defense Council, Ecojustice, and the US Marine Mammal Commission, we present evidence suggesting that line may have already been crossed.



Dolphin Ecology

Each day, we ask how our science can best protect species we know are endangered and identify other species that are simply neglected in conservation and management.

Minding the Data-Gap Trap: Exploring Dynamics of Abundant Dolphin Populations Under Uncertainty

Conservation biology heavily prioritizes species that we know are at imminent risk of extinction. This often comes at a cost to abundant (yet declining) populations that underpin ecosystem structure and function. After all, it took humans only 50 years to hunt passenger pigeons from billions to extinction. Pelagic dolphin populations tend not to be listed under national endangered species legislation and there is little incentive to study the population-level impacts of human activities such as fisheries bycatch or noise from seismic surveys or military sonar.

Lack of data on threat exposure or population decline can lead to a species remaining in a low concern or data-deficient category, and unlikely to be prioritized for conservation funding or management intervention. In a study published in *Frontiers in Marine Science*, Dr. Erin Ashe discusses this problem we call the "data-gap trap."

Population viability analyses (PVA) were used to model how four populations of oceanic dolphin are likely to respond to changes in three sublethal threats (prey limitation, ocean noise, and chemical pollution) and one lethal threat (fisheries bycatch). Our study highlights the value of using simple models and expert opinion to keep dolphins from falling victim to the data-gap trap, in which neglect leads to extinction.

Disentangling Natural and Anthropogenic Forms of Mortality and Serious Injury in a Poorly Studied Pelagic Dolphin

Entanglement in fishing gear is the most significant anthropogenic threat to the survival of cetaceans worldwide. Distinguishing between natural and human-caused sources of mortality and injury is a key task in marine mammal conservation.

Dr. Erin Ashe and colleagues recently published a study in *Frontiers in Marine Science* to identify common themes with respect to predatory behavior of mammal-eating Bigg's killer whales and anti-predatory responses of Pacific white-sided dolphins. With funding from Erin's National Geographic Explorers grant, we examined photographs of well-marked dolphins for evidence of injuries and scars consistent with either killer whale attacks or fishery interactions. Healed scars from interactions with killer whale predators were ~8× more common than scars from fishery interactions, suggesting that natural predation by orcas may be a much bigger threat to Pacific white-sided dolphins in the study area than anthropogenic impacts.

Sound Ocean

Whales and dolphins live in an acoustic world. Our team is working to identify noisy habitats that require mitigation, and quiet habitats we'd like to keep quiet.

Protecting the Acoustic Quality of Critical Salish Sea Habitats

After many years of studying noise from ships and boats, last year, Oceans Initiative conducted a study that assessed underwater noise from Growler jets in Puget Sound. Our hydrophone, anchored in nearly 100 feet of water offshore of the runway from Naval Air Station Whidbey Island, distinctly picked up the sound of the jets, with noise levels high enough to warrant concern for fish, seabirds, and marine mammals, including southern resident killer whales. The study was the first to show that Growler jet noise crosses the air-sea interface.

In 2021, we expanded our underwater noise monitoring beyond Whidbey Island to the nearby San Juan Islands, to find out if jet noise is penetrating into the waters critical to SRKWs. We used an extremely sensitive hydrophone called an AMAR (Autonomous Multichannel Acoustic Recorder), a specialized, high-performance

recording system that can be deployed using rope-less technology. Deployment sites were chosen based on their importance to SRKWs for feeding. This approach gave us the chance to measure noise at new depths. The AMAR is a huge addition to our toolkit to keep SRKW habitats clean, quiet, and full of life, and we'll be deploying it for studies of whales and ship noise throughout 2022.

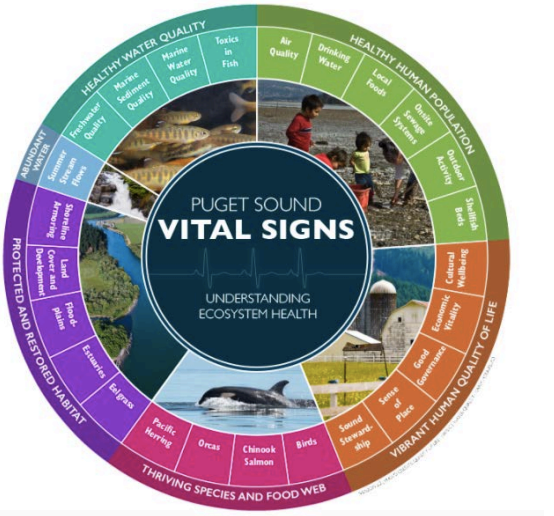
Reducing Vessel Noise Increases Foraging in Endangered Killer Whales

In our recent study published in *Marine Pollution Bulletin*, we measured the effectiveness of the Port of Vancouver's voluntary vessel slowdown in SRKW critical habitat. Exploratory analyses found strong support between received noise level from ships and the probability of SRKWs engaging in foraging activity. Reducing ship speed, and therefore ship noise amplitude will help decrease the probability of ship noise disrupting SRKW foraging activity and may help to increase the proportion of accessible salmon. Put simply, if we make less noise, it helps the

whales hunt for salmon. In 2022, we will engage closely with the Quiet Sound program, and encourage the Ports of Seattle and Tacoma to adopt similar measures to benefit the whales.

Measuring Noise in Marine Waters — a Puget Sound Vital Sign

Vessel noise and other chronic noise sources are known to reduce habitat quality for a multitude of marine species in Puget Sound that depend on acoustic cues to forage, find mates, and avoid predators. In June 2020, the Puget Sound Leadership Council adopted a new set of Vital Signs, adding 'Noise in Marine Waters' as a key Water Quality indicator for understanding the health of the Puget Sound ecosystem.



Oceans Initiative was recently selected by Puget Sound Partnership to help build a foundation to measure ocean noise in Puget Sound. We have taken a creative approach to developing a monitoring network capable of collecting acoustic data from a broad range of locations throughout the Sound with a combination of bottom-mounted hydrophones, and community scientists operating handheld recording systems (Acoustic Prospecting Toolkit). Our aims are to ensure that the new ocean noise Vital Sign is grounded in evidence, and to help Ports make smart decisions about how they can incentivize efforts to reduce noise from individual ships.

Assessing the Impact of Noise from Deep Sea Mining

In September, the International Union for Conservation of Nature (IUCN) passed a motion calling for a moratorium on deep seabed mining and a halt to the International Seabed Authority's issuing of new contracts for mining and for exploration of mining sites until certain conditions are met. These include conducting rigorous and transparent scientific research and impact assessments to comprehensively understand the environmental damage that mining could cause, and ensuring the effective protection of the marine environment. With funding from the Pew Charitable Trusts, our team is currently working with colleagues from Hawaii, Australia, and Japan to explore the potential contribution of deep sea mining operations to ocean noise. We are specifically looking at the Clarion-Clipperton zone, an expanse of the North Pacific between Hawaii and Mexico. Lying atop the muddy bottom are trillions of fist-sized polymetallic nodules—rocklike deposits containing nickel, manganese, copper, zinc, cobalt, and other minerals. Mining the nodules would involve scraping off the top layer of the ocean floor, separating the nodules from the mud, using a giant tube to pump them to a surface ship. These habitats may take centuries to recover from local disturbance. We are exploring how much noise may be generated by this new industry, and consequently, how big the acoustic footprint of deep sea mining could be.

Protecting Species

We're implementing a proven strategy to protect migrating salmon while ensuring the safety of harbor seals that also play an important role in the ecosystem.

Protecting Salmon from Harbor Seal Predation at Seattle's Ballard Locks

In 2020, Oceans Initiative piloted a study to measure harbor seal behavioral responses to a non-lethal acoustic deterrent device called GenusWave Targeted Acoustic Startle Technology, or TAST. The sound made by the TAST provokes a startle response in the seals without harming the seals or bothering the salmon. Last year, our efforts allowed more than 4,000 additional salmon to pass through the Ballard Locks fish ladder to spawn. If those salmon result in more juveniles heading out to sea, we should see more fish for the whales to eat 4-5 years from now. For perspective, that's enough salmon to feed the southern resident population for about a week.

Following our 2020 success, we returned to the Ballard Locks fish ladder this year from June through September. Our field technicians collected over 200 hours of data on harbor seal presence, proximity to the TAST device, and observed predation events (where we see a seal with a fish in its mouth). In addition, our acoustician measured the TAST signal and ambient noise levels throughout the area, so we can find the noise level that is just noisy enough to disturb seals, but quiet enough to minimize our impact on other species.

Employing Targeted Acoustic Startle Technology to Reduce Harbor Seal Predation at the Nisqually River

During the Spring of 2021, Oceans Initiative partnered with Long Live The Kings, the Nisqually Indian Tribe, and NOAA on a National Fish and Wildlife Foundation funded project to evaluate the effectiveness of the GenusWave TAST as a deterrent for seal predation on juvenile steelhead in the Nisqually estuary. In natural chokepoints within the Nisqually estuary, seals take advantage of salmon migratory constraints to increase their hunting efficacy. Our team deployed the TAST and observed seal behavior over a four-week period. Consistent with our results at the Ballard Locks, we found the TAST was effective at reducing the number of seals in the immediate vicinity of the TAST, and displacing seals away from the study sites.

Climate Change

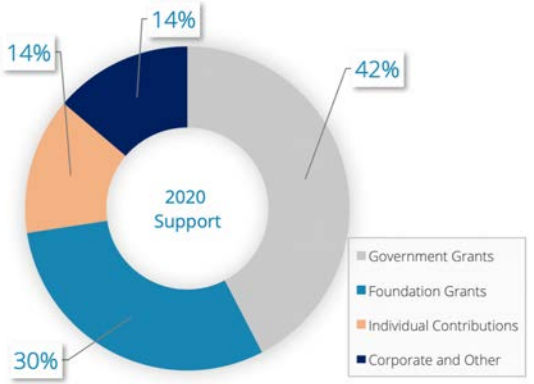
Oceans Initiative is at the forefront of including climate change in models to assess and guide recovery of endangered species.

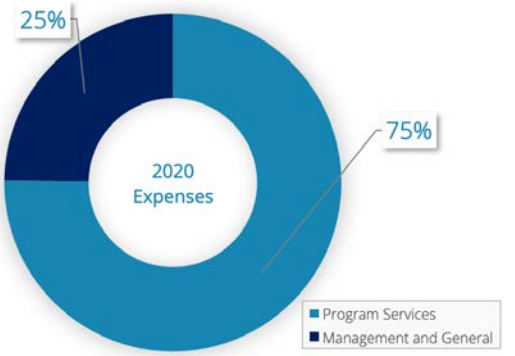
Climate Change Complicates Efforts to Ensure Recovery of St. Lawrence Estuary Beluga

Belugas are thought of as an Arctic species, but a small population is found in Canada's St Lawrence Estuary. The population was heavily depleted by hunting, but even though hunting was banned in the 1970s, the population has failed to recover. The belugas are facing a perfect storm of threats. Their bodies are heavily contaminated by toxic chemicals that have been dumped in the river for decades. The contaminants, including PCBs, are highly concentrated in the mother's milk, and high levels of calf mortality are a major factor in the population's failure to recover. In a recent paper with colleagues from Fisheries and Oceans Canada and IUCN, we explored the three main human-caused threats to recovery—ocean noise, contaminants, and prey limitation. What we found surprised us. As bad as the three immediate effects are, the predicted effects of climate change will be a bigger driver of the St Lawrence Estuary beluga population dynamics than the threats we are dealing with now. To prevent extinction of these beautiful whales in the St Lawrence, we need ambitious mitigation efforts for noise, prey limitation, and contaminants *now* in order to build the population's resilience to survive climate change in the coming decades.

Financials

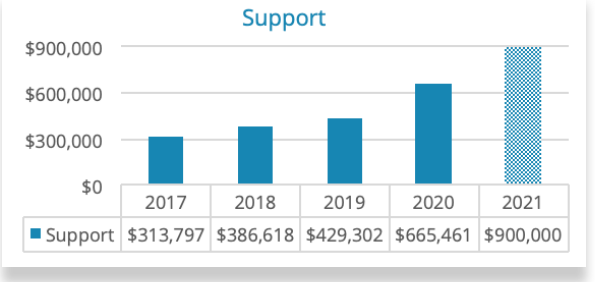
Our full year 2020 financials showed positive growth in support to $665,461. We expect this trend to continue into 2021, with revenue projected to reach $900,000.

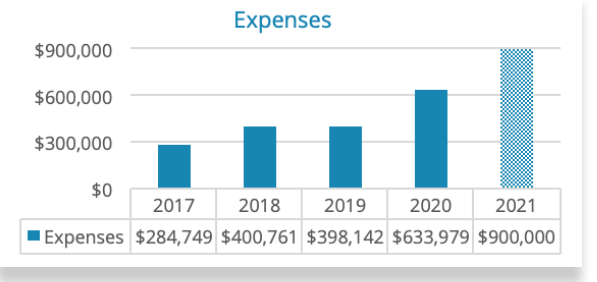




Support	
Government Grants	$282,065
Foundation Grants	$200,980
Individual Contributions	$90,831
Corporate and Other	$91,585
Total Support	**$665,461**

Expenses	
Program Services	$476,853
Management and General	$157,126
Total Expenses	**$633,979**





Get Involved

Please spread the word about the work we do, and know that your involvement makes all the difference in the world.

Oceans Initiative is a Seattle-based 501(c)3 non-profit organization. We rely on your donations to do the ocean conservation work that we do. Help us keep whale and dolphin habitats clean, quiet, and full of life by making a tax-deductible donation today. For online donations, please visit our website at **oceansinitiative.org**.

Some of Our Recent Partners

GENUSWAVE

KING COUNTY FLOOD CONTROL DISTRICT

LAKE WASHINGTON CEDAR SAMMAMISH WATERSHED

University of St Andrews

Washington Department of Fish and Wildlife

NATIONAL FISH AND WILDLIFE FOUNDATION NFWF

PEW

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NOAA's NATIONAL MARINE FISHERIES SERVICE

U.S. FISH & WILDLIFE SERVICE

NATIONAL PARKS CONSERVATION ASSOCIATION

US Army Corps of Engineers

MARINE RESOURCES COMMITTEE SAN JUAN COUNTY WASHINGTON OUR WATERS ARE IMPORTANT

SUQUAMISH TRIBAL COUNCIL

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LONG LIVE THE KINGS

THE RUSSELL FAMILY FOUNDATION

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