



Living *with the* Shoreline

A stewardship guide for property
owners in the San Juan Islands



Living with the shoreline

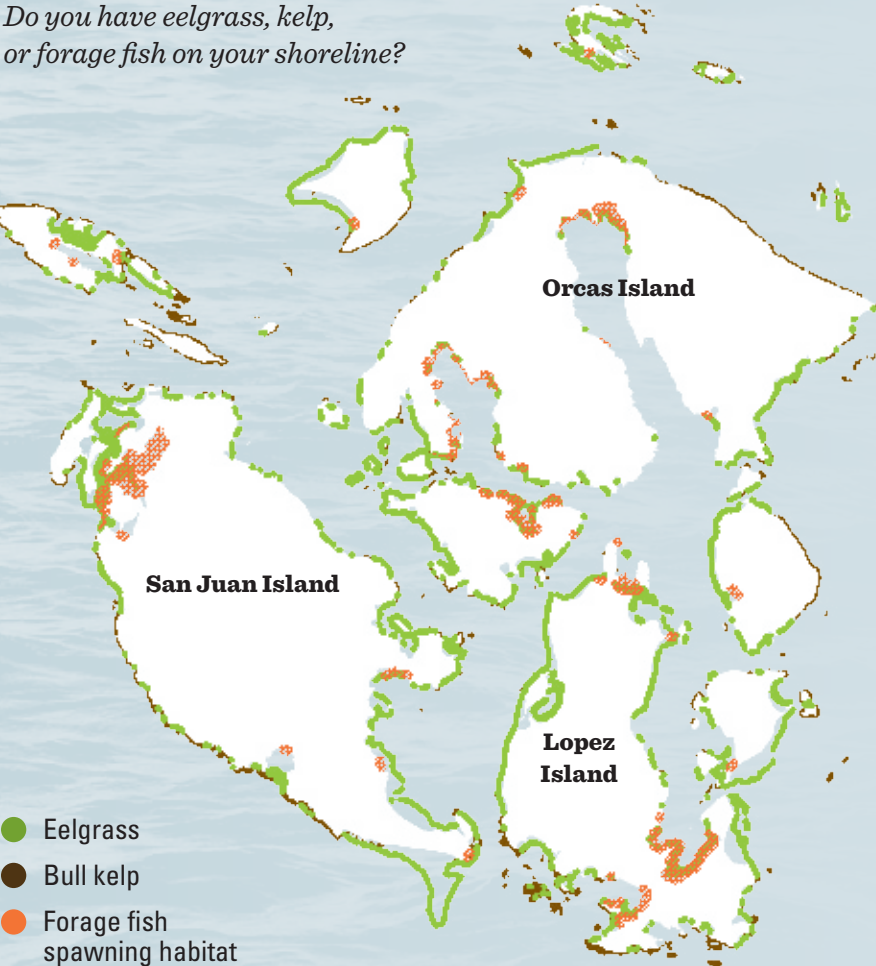
Your waterfront property

is part of a beautiful, complex, and increasingly fragile marine ecosystem that supports salmon, rockfish, seabirds, whales, and human communities.

Outside your window, where your family finds inspiration and recreational opportunities, fish and wildlife find food and shelter.

Explore this guide to learn about cost effective and natural approaches to protecting your property for people and nature.

Do you have eelgrass, kelp, or forage fish on your shoreline?



Stewardship Guide Contents

Forage fish feed the marine food web	5	Erosion is natural and can be influenced by your choices	20
Shorelines are a nursery for salmon	7	You can help fish and wildlife	22
Eelgrass is a haven for fish, crabs, and wildlife	9	Are there restoration opportunities on your property?	24
Kelp beds are the rainforests of the seas	11	Preserve healthy shorelines for now and the future	27
Trees and shrubs are silent heroes	13	Healthy shorelines can adjust to rising seas	29
Feeder bluffs are beach builders	15	Are you worried about storms and erosion?	30
Wetlands provide essential services for people, fish, and wildlife	17	Landowner resources	32
Clean and clear waters benefit all	19		



I always wondered what can I, as one small person, do to help all of the animals that live in the water. It turns out that the orca feed on salmon, and salmon feed on the tiny little fish that spawn on my beach. For this reason we will do all we can to keep our shoreline natural.
– Mariluz Villa and Tom Reynolds, Brown Island

Shoreline development practices like removing vegetation, and adding impervious surfaces and hard armoring often lead to maintenance issues for landowners and limit habitat for fish and wildlife.

Natural shoreline development practices such as maintaining adequate setbacks, limiting impervious surfaces, and preserving healthy vegetation protect property from coastal flooding and erosion, improve water quality, and allow fish and wildlife to thrive.

ORCA *need* SALMON *need* FORAGE FISH *need* HEALTHY SHORELINES

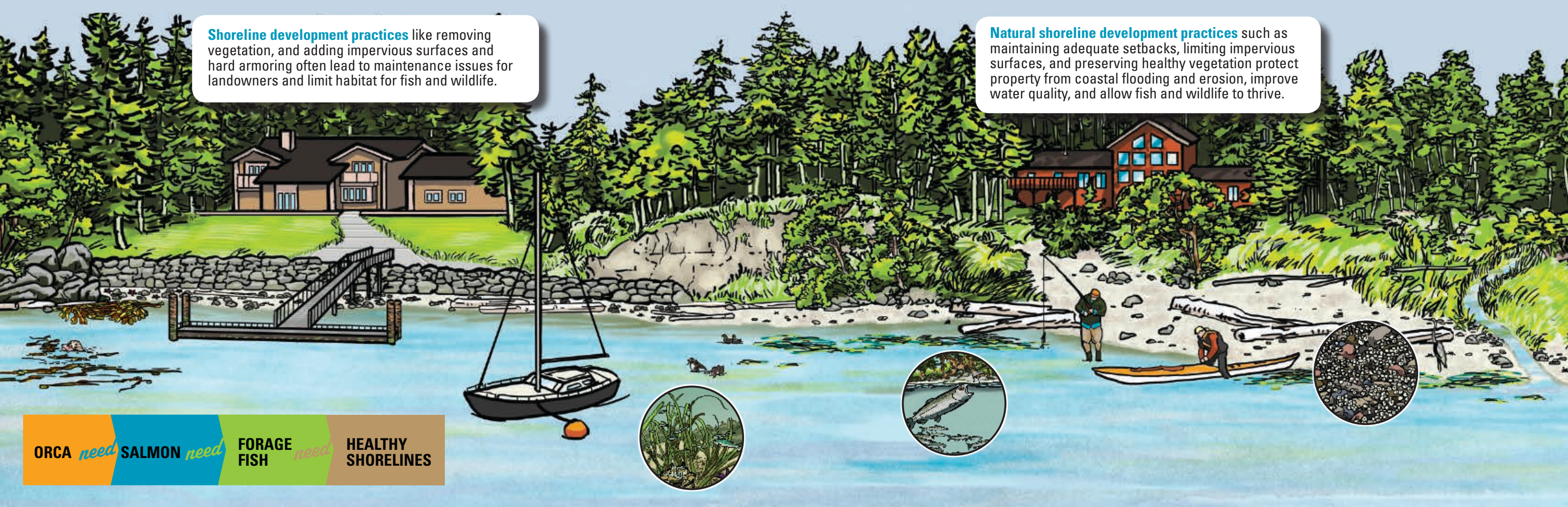




photo by Andrew Reding



Beach spawning forage fish come in on a high tide and lay their eggs on sand and gravel; the survival of these fish is especially vulnerable to changes on the land.

Forage fish feed the marine food web

your choices impact this vital link in the food chain

Forage fish are small schooling fish that are eaten by larger fish, seabirds, and marine mammals. They play an essential role in marine food webs by transferring energy from plankton to larger species. Forage fish are staples in the diets of Chinook and Coho salmon, lingcod, Marbled Murrelets, Rhinoceros Auklets, and Minke whales.

Forage fish do not spawn just anywhere. Pacific herring deposit transparent, adhesive eggs on eelgrass and marine

algae. Surf smelt and Pacific sand lance incubate their eggs in sand and small gravel on the upper third of beaches.

Forage fish utilize the same shoreline areas that humans do, which makes them vulnerable to modifications such as bulkheads, docks, roads, and the removal of vegetation. You can help forage fish by keeping beaches natural with overhanging trees, shrubs, and large driftwood which maintain cool and moist conditions.

FACT!

A NOAA Fisheries study in northern Puget Sound found that surf smelt egg survival was reduced by 50% in places where the beach habitat was both warmer and drier as a result of the presence of hard armored bulkheads and the absence of trees and shrubs.



Shorelines with native vegetation, eelgrass, and kelp help young salmon feed, grow, and avoid predators as they migrate to the open ocean.



Shorelines are a nursery for salmon

your vegetation and nearshore habitats provide food and shelter for salmon

The San Juans are important rearing habitat for out-migrating juvenile salmon. The time young salmon spend in the marine nearshore is critical to their ability to survive as adults. People and marine mammals such as southern resident orcas depend on adult salmon for food when the salmon pass back through the San Juans on their way to spawn in their natal rivers.

Juvenile salmon often avoid swimming under docks, and instead move out into deeper waters where they are at risk from

predators. To reduce demand for new docks, consider using a marina, mooring buoy, or sharing an existing dock with neighbors. If you already have a dock, look into improvements that can increase light penetration such as grating.

You can also help salmon by retaining overhanging vegetation, detritus and driftwood; these natural shoreline features support insects and forage fish that young salmon eat.

FACT!

Researchers have found juvenile salmon from twenty of the twenty two populations of threatened Puget Sound Chinook salmon (along with many other species and populations of young salmon) throughout the shallow waters of the San Juans.



photo by West Howland



Eelgrass provides food and shelter for many juvenile fish and shellfish of ecological, cultural, commercial, and recreational importance.

Eelgrass is a haven for fish, crabs, and wildlife

you can help eelgrass thrive by protecting water quality

Eelgrass is a flowering plant that grows in shallow, light-filled marine waters. Eelgrass abundance varies seasonally with some winter die-off and spring/summer growth.

Eelgrass supports marine food webs. The long blades of eelgrass are home to incubating eggs and animals, including crabs and juvenile fish. Eelgrass beds are also important feeding areas for birds. In addition, eelgrass mitigates wave energy and traps sediments, protecting shorelines from wave driven erosion.

You can help improve eelgrass health by limiting use of lawn and garden chemicals and controlling upland runoff to avoid excessive sedimentation that clouds the water. If you are a boater, anchor your boat in 30 foot or deeper water to avoid ripping up eelgrass. Since eelgrass needs light to grow, use a marina or mooring buoy instead of building a new dock which can shade out marine vegetation. If you already have a dock, upgrade to best design practices.

FACT!

Significant losses of eelgrass have occurred in many bays in the San Juans. Due to eelgrass's sensitivity to environmental stressors, it is an indicator of changing water conditions.



Kelp helps reduce wave energy that causes beach erosion and provides protected feeding areas for marine mammals, birds, and fish.



Kelp beds are the rainforests of the seas

avoid impacts to kelp to protect and feed wildlife

Clusters of bull kelp can be seen offshore of almost any high energy rocky coastline in the San Juans. Bull kelp grows in subtidal waters to depths of over 60 feet and is the most well known of the kelps due to its high visibility at the surface. There are also numerous species of understory kelps that grow along rocky bottoms, providing additional habitat complexity to the kelp forest. Kelp shelters urchins, crabs, juvenile rockfish, anemones, starfish, sea cucumbers, octopuses, and many other marine creatures.

Kelp needs clean water and light to thrive. It is very sensitive to pollution from small and large oil spills, soil erosion, and yard chemicals. You can help by making sure your septic system is in good working order and reducing use of chemicals. If you are a boater, keep your engine clean, steer clear of kelp beds when underway, and avoid locating docks in kelp habitat.

FACT!

Bull kelp is one of the fastest growing organisms on earth! Growth rates of 5.5 inches per day have been documented. The San Juans are home to one-third of all floating kelp in the inland waters of Washington State.



Healthy shoreline vegetation provides food and shade for fish, bank stability, clean water, and wildlife habitat.



Trees and shrubs are silent heroes

use vegetation to protect slope stability, water quality, and wildlife habitat

Trees and shrubs do a lot of work. Roots provide 70% to 95% of a slope's sheer strength! An undisturbed forest can intercept up to 40% of rainfall, protecting against erosion while also slowing surface runoff, increasing infiltration, and protecting water quality.

Overhanging vegetation also provides shade, a key factor in keeping beach conditions cool, moist, and organically rich. These conditions support food webs and forage fish egg survival. The insects

that live in the trees and shrubs then become food for small fish.

Shoreline vegetation is feeding, nesting, roosting, breeding, and migratory habitat for hundreds of wildlife species including eagles, herons, and osprey.

On your shoreline property, retain as many of the native trees and shrubs as possible. Careful limbing and pruning techniques are ideal for creating and maintaining views while protecting shorelines for you and wildlife.



The native trees and shrubs between our home and the ocean amplify our connections to nature. Through the seasons, our views of the water are both dramatically and intimately enhanced by the abundance of wildlife that use our nearshore vegetation.

– George and Peggy Hunt, San Juan Island



Feeder bluffs provide the sand that forms and maintains beaches and marine habitats.



Feeder bluffs are beach builders

maintain vegetation and control runoff to preserve a healthy bank or bluff

Erosion is a natural process. This is especially true for feeder bluffs. Both the classic high bluffs and the much lower and slower receding banks provide the majority of the sand and gravel that form and maintain local beaches. Experts estimate that over 90% of the sand and gravel that comprise the beaches of Puget Sound and the San Juans comes from eroding banks and bluffs.

If your property has a feeder bluff, be sure to set structures far away from the bluff. Large erosive events on bluffs are frequently caused by heavy, saturated soils, so it is important to direct all home drainage into well vegetated areas away from the bluff crest. Maintaining native vegetation will also help reduce the impact of heavy rains and provide habitat for wildlife.

FACT!

The San Juans are geologically diverse. Within its 400+ miles of shoreline, there are 30 miles of feeder bluffs, 34 miles of transport zones, 25 miles of barrier or accretionary beaches and spits, 48 miles of pocket beaches, 17 miles of embayment estuaries and lagoons, and 250 miles of rocky shores.



Coastal wetlands, including estuaries, salt marshes, and lagoons, provide numerous ecosystem functions that benefit people and nature.



Wetlands provide essential services for people, fish, and wildlife

protect water quality to help wetlands thrive

Coastal wetlands are critical to the survival of many species of fish and wildlife. They provide key services like producing organic nutrients, filtering out sediment, limiting flooding, and cleaning water. Coastal wetlands are also a major source of the insects which are an important food source for juvenile fish.

Wetland distribution across Puget Sound is at just 18% of historic conditions, and the San Juans have even fewer

remaining intact wetlands than the regional average. If you own property with a wetland, be sure to leave adequate vegetation between any improvements and the wetland, ensuring space to allow it to fully function. Reduce or eliminate the use of lawn and garden fertilizers, and maintain the wetland's connection between the marine environment to ensure the proper flushing and exchange of species and nutrients.



Every morning the wetland looks different with more birds and wildlife than one would normally see. Since the wetland's connection to the marine environment was restored, we also see small fish that were not there before. The wetland is truly one of Mother Earth's great artistic manifestations.

– Nancy and Tyler Gazecki, Shaw Island



Adequate setbacks for structures, low impact development techniques, and vegetated buffers protect water quality and marine habitats.

Clean and clear waters benefit all

use permeable surfaces and native vegetation to help keep waters clean

Stormwater that runs off the land (runoff) carries sediments, debris, and pollutants like fecal coliform bacteria, petroleum, and heavy metals directly to local waters. These contaminants don't just break down and disappear—they can persist and adversely affect the health of shellfish, fish, and wildlife—as well as of people. While the San Juans do not have large industrial sources of pollution, cars, creosote pilings, failing septic systems, sedimentation, fertilizers, and household chemicals all cause water quality issues.

Individual and onsite efforts to control stormwater and the pollutants it carries are essential in San Juan County, as public infrastructure is extremely limited. You can help by maintaining or restoring native vegetation along the shore to slow and filter runoff, installing pervious walks and driveways to allow filtration, directing stormwater flow from gutters and roads into vegetated areas, maintaining onsite sewage systems, and using compost instead of chemical fertilizers.

FACT!

Stormwater pollution and excessive nutrients from failing septic systems and fertilizers are some of the factors behind ocean water's unbalanced acidity levels. Reducing local sources of these inputs can decrease acidity in Washington's marine waters and help reduce the effects of ocean acidification on local marine species such as shellfish.

Erosion is natural and can be influenced by your choices

consult a coastal geologist if you have concerns

Erosion is a natural condition of healthy shorelines that is essential to overall marine health. Clearing vegetation and modifying site drainage can dramatically increase erosion rates. Rock bulkheads, or hard armoring, can reduce erosion caused by wave action but does not address runoff-induced erosion from the top of the bank, a common source of problems. And bulkheads actually cause erosion of the beach itself when waves reflect off the hard structure.

Engineered solutions such as bulkheads might be appropriate for some sites, but are often unnecessary and can be very expensive. Fortunately, there are other options. Plants can help stabilize eroding areas while maintaining important habitat. Nourishing the beach with gravel and/or large wood can reduce wave action and create a more accessible beach. Moving threatened structures away from risks may be less expensive than protecting them in place, especially over the long term.



In San Juan County, there are hundreds of unnecessary bulkheads on beaches, placed in areas with low natural erosion rates. Bulkheads not only have direct habitat impacts but also interrupt or alter the actual processes that are essential to maintaining our beaches over the long term.

– Engineering Geologist Jim Johannessen of Coastal Geologic Services



before

Brown Island

Three property owners came together to remove an unnecessary bulkhead and restore a small historic feeder bluff. The project resulted in a wider and sandier beach for use by people, fish, and wildlife.



after

You can help fish and wildlife

protect your investment, restore habitat, and support marine ecosystem recovery

Over 18 miles (and 700 parcels!) along San Juan County's shores are already armored with hard bulkheads. Hardened shorelines and derelict structures negatively impact fish, seabirds, and marine mammals. Our island community is profoundly influenced by the health of these animals and our environment.

Numerous private, public, and tribal landowners have joined with groups like Friends of the San Juans to restore habitats for people, fish, and wildlife.

armor removal

Many shoreline structures are outdated or unnecessary and can be removed or redesigned to better protect property and help feed forage fish, salmon, and orca.

debris removal

Removal of degraded structures such as derelict docks, boathouses, and creosote pilings can reduce known sources of toxic materials in our waters and recover habitat for fish, shellfish, and people.



before

North Beach, Orcas Island

This pioneering project removed large rock armoring and constructed a gravel berm along multiple residential properties. After 25 years, residents are still enjoying a much more accessible beach, reduced erosion rates, and intact habitat.



after

photo by Jim Johannessen



We are very pleased that the Friends of San Juans worked in collaboration with the Tulalip Nation and the Department of Natural Resources to remove debris and creosote piles from Barlow Bay. These efforts on behalf of natural resources and future generations have improved the environment we cherish.

– Hank and Joyce Landau, Lopez Island

Are there restoration opportunities on your property?

small actions can make a big difference

coastal wetland reconnection

Removal of barriers to restore connectivity between the uplands and the sea can improve water quality, fish passage, the transfer of nutrients and sediments, and reduce the risk of flooding. Coastal wetland reconnection projects include a wide range of alternatives, depending on the site: from removal of fill, tide gates, or culverts, to the installation of large open culverts or short span bridges.

beach nourishment

Beach nourishment projects add appropriate sized material to eroded beaches. Nourishment can restore the natural beach slope and substrate, resulting in a more beautiful and accessible beach that also benefits fish and wildlife by replacing lost habitat.



before

Turn Point, San Juan Island

12 dump truck loads of unnecessary rock were removed from a coastal wetland to unbury the beach and reconnect a small tidal channel. This improved the usability of the beach for property owners and fish.



after



To our surprise, excitement, and amazement, all of the effort involved with our restoration project came to fruition as we watched surf smelt spawn on our beach. We also observed two salmon foraging on the surf smelt, which is all part of this marine environment life cycle! We have such a feeling of fulfillment.

– Gary and Patty Bergren, Lopez Island



Shoreline protection programs honor a family's legacy and preserve the property for future generations.

Preserve healthy shorelines for now and the future

you can leave a legacy for your family, fish, and wildlife

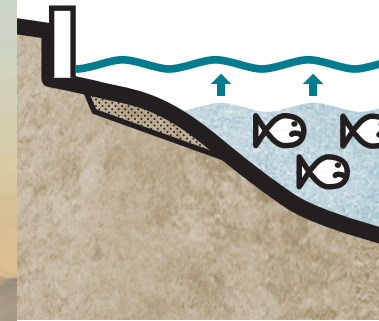
Protecting intact habitat is the most efficient and effective thing you can do to support the marine environment. A conservation easement is a voluntary tool that can provide permanent protection and be fully compatible with residential activities. Easements are legal, recorded documents that protect key scenic and natural features while the property remains in private ownership and use. In addition, preservation may entitle property owners to economic benefits.

As 90% of the waterfront tax parcels in San Juan County are in private, residential ownership, voluntary stewardship is an essential component of maintaining a healthy community for people and nature. San Juan County is fortunate to have two organizations that work with interested property owners to permanently protect priority habitats, species, and processes: the San Juan Preservation Trust (360.378.2461) and the San Juan County Land Bank (360.378.4402).



What makes our land so special is the feeling we get as we see eagles and otters co-existing with our family's low-impact way of interacting with the land—enjoying the fruits of our stewardship. Our family grew closer during the thoughtful discussions we had about our property's future when we pursued our conservation easements.

– Terrigal Burn and Christine Johnson, Waldron Island



The “coastal squeeze” is when hard armoring prevents the beach from naturally adjusting landward in response to rising seas, causing the beach to be under water even at lower tides.

Healthy shorelines can adjust to rising seas

planning for change will protect people and the environment

Coastal communities around the globe are increasingly talking about and feeling the impacts of climate change and sea level rise. Forward-thinking individuals and governments are taking steps to prepare.

In our area, the most likely impacts associated with sea level rise are higher water levels/high tides and increased frequency and magnitude of coastal flooding and erosion events.

Beach habitat for recreation, shellfish, and forage fish spawning will also be lost in a process known as the coastal squeeze.

Everyone can play a proactive role addressing increased erosion and flood hazards—whether as individuals or as a community in terms of public infrastructure and the siting of new development. How we adapt will impact how our shorelines look and function for generations to come.

FACT!

Many places in the San Juans, especially low lying shoreline roads, are already impacted by coastal erosion and flooding. The numbers are expected to increase dramatically—with 11 miles of county roads threatened by increased flooding or erosion from rising sea levels by 2050, and 20 miles vulnerable by 2100.

Are you worried about storms and erosion?

you can help your property adapt to changing conditions

It is important to understand potential impacts of sea level rise on your shoreline and the best management options for your site.

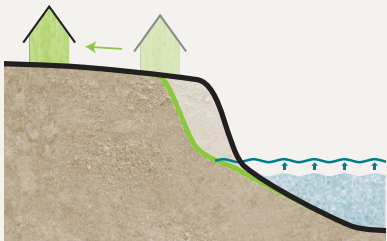
Common adaptation strategies include fortifying with hard armoring, setting infrastructure back out of harm's way, elevating structures, and using natural protection approaches such as gravel berms and vegetation. Each solution is site-specific.

For many, simple, low cost steps such as setting back development and retaining a buffer of native trees and shrubs between your home and the water can help avoid or reduce storm driven erosion and flood impacts associated with rising seas. For others, a coastal geologist can advise you on the best option to protect your home and the natural resources that define these islands

adaptation approaches

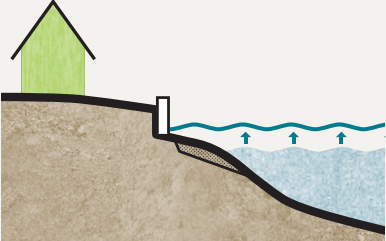
Each shoreline type will respond differently to the increased erosion and flood hazards associated with rising sea levels.

If you have concerns, consult a coastal geologist on the best adaptation approach for your property.



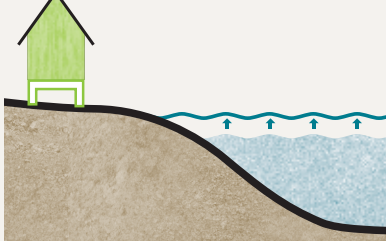
relocate structures

Moving a structure away from an eroding or low lying shore will protect your home, maintain habitat, and save you money in the long term.



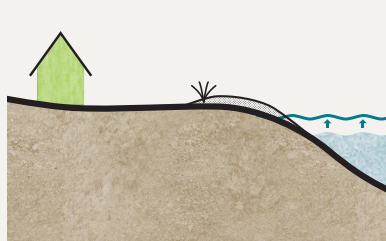
fortify

Hard shoreline armoring can reduce short-term wave erosion hazards, but it also starves nearby beaches, impacts fish and wildlife habitat, requires maintenance, and does not address flooding.



elevate structures

Raising the elevation of vulnerable structures can reduce flood hazards in low lying areas and protect fish and wildlife habitat; however, it does not address erosion.



beach nourishment

Natural materials such as gravel and vegetation can be used to build a storm berm to absorb wave energy, reduce erosion, and protect structures and shoreline habitats.



When we were looking at our options for redeveloping our property, one of the things we took into account was sea level rise. We wanted to get rid of the big seawall and make sure both the house and beach would be around in 100 years. By moving the house back, we were able restore the beach for now and the future.

– John and Maia Vechey, Orcas

KEY

- current water levels
- future water levels

Landowner resources

there are many resources available to help you understand and manage your shoreline

REGULATORY AGENCIES

To protect your property, your safety, and our region's natural and cultural resources, landowners are required to check with the County Planning Department before proceeding with any tree and vegetation removal, clearing, grading, drainage alteration, erosion control, or other construction activities within 200 feet of the shoreline. Many shoreline activities also require review and permits from the Washington State Department of Fish and Wildlife and the U.S. Army Corps of Engineers.

Office of Regulatory Innovation and Assistance helps coordinate between state, local, and federal permits. 800.917.0043 www.oria.wa.gov

Army Corps of Engineers requires a permit for any beach structures/modifications occurring below mean higher high water. 206.764.3495 www.nws.usace.army.mil

SJC Community Development manages permits, exemptions, variances and code violations. 360.378.2354 www.sanjuanco.com

WA Dept. of Fish and Wildlife reviews and permits hydraulic permits for activities that occur or impact habitat below ordinary high water. 360.902.2534 wdfw.wa.gov/licensing/hpa/

WA Dept. of Ecology provides assistance with water quality certifications 360.407.6068 and State Environmental Policy Act review 360.407.6922 www.ecy.wa.gov

WA Dept. of Natural Resources authorizes and/or provides leases projects on or over state-owned aquatic lands. Orca Straits District: 360.856.3500 www.dnr.wa.gov

LOCAL RESOURCES

Do you have questions, concerns or need help? Many organizations provide free assistance to shoreline property owners.

Friends of the San Juans researches, protects, and restores local shoreline habitats and provides resources to landowners. 360.378.2319 www.sanjuans.org

Northwest Straits Foundation offers incentives and services to shoreline landowners. 360.733.1725 www.nwstraitsfoundation.org

SJC Environmental Services is home to stormwater, salmon recovery, derelict vessel program, and the Marine Resources Committee. 360.370.0500 sanjuanco.com/839/Environmental-Services

SJC Marine Resources Committee (MRC) is an advisory board to the County Council on the marine environment; serves as the local salmon recovery citizen committee. 360.370.7592 www.sjcmrc.org

San Juan Islands Conservation District works with landowners to improve stewardship and conservation in the islands. 360.378.6621 www.sanjuanislandscd.org



We both strongly support strengthening shoreline protections. Why? We believe that our property is more valuable if we and our neighbors protect the shoreline. Orcas need salmon. Salmon need forage fish. Salmon and forage fish need the protection of eelgrass and kelp. Eelgrass and kelp need clean water. Shoreline protections are good for ecosystems and for the long-term economy of these lovely islands.

– Val and Leslie Veirs, San Juan Island



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Friends of the San Juans works to protect and restore the San Juan Islands and the Salish Sea for people and nature.



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