- Nearshore Habitats on Puget Sound Shorelines
- Coastal Landforms
- Forces at Work on the Shoreline
- Shoreline Change Over Time
- Human Modifications on the Shoreline

Key Points: Shore Friendly San Juan County 2024 Workshops

Nearshore Habitats in Puget Sound/Salish Sea

Definition by Washington State Department of Fish and Wildlife: *a narrow band of land and shallow water. It includes cliffs or bluffs that neighbor beaches, portions of streams/rivers that are influenced by the tides, and shallow water areas to a depth where sunlight no longer supports marine vegetation*.

Puget Sound Nearshore Ecosystem Restoration Project[1]

Definition by Washington State for Regulatory Purposes: 200 ft landward from Ordinary High Water Mark (OHWM)

Eelgrass and Kelp cycle carbon, provide three-dimensional structure, are a critical habitat in Puget Sound nearshore. **Eelgrass** is found throughout Puget Sound other than South sound in sandy/silty substrate just below mean lower low water, most **kelp** can be found below the extent of eelgrass and just slightly deeper water if no eelgrass present and is attached to larger substrate.
Friends of San Juans
Northwest Straits Foundation Sound IQ

Salmonids use the nearshore, pocket beaches, and estuaries to rear, have been found in all shoretypes in San Juans.

Forage Fish
Forage fish spawn on beaches throughout Puget Sound, work has been completed by Friends of San Juans mapping spawning and impacts to spawning. Surf smelt and sand lance use upper intertidal to spawn, shoreline armoring tends to be placed in this zone. Herring used submerged three dimensional structure including eelgrass and kelp, as well as human created structures such as pilings.

Please Note: All blue text is a hyperlink to a website resource. This document will be sent electronically to all participants after the workshop to make it easy to access these resources electronically. It will also be on Friends of the San Juans Shore Friendly Living website http://sanjuans.org/shore-friendly/ along with recordings of the workshop presentations and workshop materials.

Coastal Landforms

Landforms develop based on underlying geology and erosion/deposition processes. The three **most common landforms** in San Juan County are rocky shorelines, pocket beaches, beaches and bluffs Depending on the **bluff height** of your property the forces at work on your shoreline and the methods that would be applicable for shoreline stabilization differ.

Forces at Work on the Shoreline

Water Levels in Puget Sound are mixed diurnal tides with 2 highs and 2 lows each day. The highest water levels determine regulatory boundaries, high tide line (king tide) is the federal regulatory boundary.

Shoreline structures are typically located near the high tide line or a bit lower, so they interact with water levels on a regular basis.

Sea level rise is documented in Puget Sound and other effects of climate change may have negative impacts on Puget Sound shoreline properties if there isn't sufficient space or elevation change between development and the shoreline.

These **water levels are elevated by weather events** where storms can increase water levels through pressure systems and wind.

On shorelines with a structure high water levels tend to interact with the structure, once the height of the water exceeds the height of the structure, the upland will flood, and water may retreat slower due to the presence of the structure.

Most shoreline structures in Puget Sound are designed to slow erosion, but **not designed for flood control** as water can go under/through/over and around these structure too. Most shoreline armoring in Puget Sound is designed as a retaining wall that supports the land directly behind it and may reduce erosion from waves.

Wind-waves are the main driver of sediment movement on the beach. Wind speed, duration, fetch (distance), water depth and slope, and shoreline orientation all play a role on effects of waves on your shoreline.

Wind drives **wind-waves which** are controlled by the surrounding landforms/ topography in Puget Sound. Outer shorelines receive southwest and northerly winds , interiors more protected.

Vessel wakes and tidal currents can also move sediment.

Waves are not the only driver for shoreline erosion, sediment/soil type, vegetation, and upland drainage are three other key factors.

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How Shorelines Change Over Time

Sediments from banks and bluffs erode and deposits on the beach and this sediment moves along the shoreline in **seasonal patterns and changes over longer periods of time**. High bank shorelines are called "feeder bluffs" because they feed the beaches with sediment.

Wind pushes **waves** towards the shoreline and **moves sediment along and across** the beach.

Shoreline structures change sediment movement and can block longshore drift

Sediment moves along shore in **littoral drift cells** which are mapped based on sediment sources, shoreline orientation relative to wind and wave forces, and barriers to sediment movement.

While much of the San Juan Islands shoreline is no appreciable drift because of the prolific bedrock, there are lots of drift cells and pocket beaches where sediment is moving and structures affect this sediment movement.

Document **changes on your shoreline** by taking photos in May and October (end of summer and winter seasons), include something to show scale, measure from fixed point to toe or top of bluff, document erosion (date/time), document structures.

Human Modifications on the Shoreline

Hard shoreline armoring uses a variety of materials to stabilize the upland. It is **not typically designed as a flood control structure**.

Hard armoring does not **prevent the weathering of bluff** above and behind the structure and **does not prevent landslides.**

Hard shoreline armoring **blocks sediment deposition** on the beach and **may increase erosion at the toe or ends of the structure**.

Softshore protection and hard shoreline armoring have different **costs and benefits**, study done in Island County comparing hard armor, soft shorelines, and managed retreat. We found that homes on low bank who remove hard armor had an increase in property value; high banks homes who moved their homes back had an increase in property values; the data on medium banks is very mixed.

Local, state, and federal permits are required for virtually all work on the shoreline.

Hard armor removal, where feasible, allows restoration of natural processes.

Softshore protection uses different techniques that **mimic natural processes** to protect upland property. Softshore protection is **not suitable for all properties and also requires permitting**.

Managed retreat is the practice of moving structure up and/or back, away from the shoreline.

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Drainage management is critical for maintaining slope stability. Look for areas of ponding, damaged irrigation or drainage lines, and seepage on exposed bluffs.

Drainage systems should be **designed by qualified professionals** and may incorporate discharging water to the shoreline, collecting rainwater, and/or methods to slowly infiltrate water to the ground.

Vegetation management is the **easiest** way to improve the resilience of your property.

Native vegetation improves the **habitat** on your property, **disperses rainfall**, roots **adhere soil** layers together and **uptake water**.

Keep existing vegetation and if changes are desired do them over time to **allow for new vegetation to establish**.

Invasive plants/noxious weeds can overtake a property. The local weed control board and USDA are good resources for identifying weeds and learning control methods that are best for each species.

Native plants are acclimated to the climate and the best suited to protect upland properties while creating habitat.

You can get help with **identifying species** and selecting suitable species for your site from nurseries (sound native plants, fourth corner nursery, plantas nativas, salish seeds project) and a variety of plant id apps.

Plant during the wet season, you may need to water over the first summer, but once established native plants do not require watering.

Bare roots or plugs/stakes are good options.

Plant a variety and identify nearby species to target those that should do well on your property.

Use a professional to **prune trees** and use methods that preserve the integrity of the tree (windowing, skirting up, etc). **Do Not Top Trees!**

Native plants are beautiful!

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