



Summer 2021

This newsletter is written by Jerilyn Ritzman, WSU Extension Island County Shore Stewards Program Coordinator.

The Many Benefits of Shoreline Vegetation



Figure 1: Overhanging vegetation provides many benefits, including shade, insects, and detritus to the beach below. **Image Credit:** Jerilyn Ritzman

Introduction

Growing up on Camano Island I could usually be found at the beach playing with my dog or looking for agates. I remember being vaguely annoyed by the amount of vegetation hanging over the beach or brought down by landslides. We would often have to cut a walk short because the tide was in too far to make it around the vegetation. Other times we could get around the vegetation initially, but then the tide would come in and we would have to choose: take the lower route around a fallen tree and walk home with wet shoes, or maneuver through the snarl of logs, roots, and branches (and possibly spiders!) but stay dry. Why did the shorelines have to be so messy?

Since then, I have learned that shoreline vegetation is not a mere nuisance but instead is incredibly important. Removal of shoreline vegetation, along with shoreline armoring, has been one of the most prevalent and

damaging actions taken by humans in the shoreline environment. While you can have vegetation removal without shoreline armoring, the two often go hand in hand. More than a quarter of Puget Sound's shoreline has been modified with "hard armor," most of which was erected decades ago. Researchers and planners now better understand the damage that vegetation removal and shoreline armoring can cause to the nearshore environment and many projects have been undertaken around Puget Sound to remove shoreline armoring in favor of a more natural, vegetated shoreline. Studies have shown that this process increases the amount of biota and beneficial wrack (the line of seaweed and other detritus left behind by retreating tides) along the shoreline, with favorable results usually seen as soon as one year after the restoration is complete.

Vegetation is one component of a healthy, functioning shoreline. Despite its visibility, its benefits can be difficult to recognize. Each beach is different, and this newsletter only covers some of the many benefits that shoreline vegetation can provide, but I hope it underscores the critical role it plays in our nearshore environment.

Benefits of shoreline vegetation

Erosion control, water quality, and habitat

Established natural vegetation along the shoreline provides a suite of erosion control mechanisms that are difficult to replicate using other means. Many of these processes reduce both gradual erosion and the risk of landslides. Deep-rooted plants help anchor steep slopes and provide structure to soil layers that could otherwise shift past each other. A buffer of mixed vegetation can help trap fine sediments that can carry chemical contaminants downhill and cloud coastal waters. Tree canopy can intercept rainwater that could otherwise cause soil runoff, and roots can absorb some of the water that does make it to the ground, helping prevent soil oversaturation. Even fallen leaf litter can reduce soil displacement by dampening the impact of raindrops, soaking up even more water, and slowing surface water runoff.

Removal of natural shoreline vegetation is a major contributing factor to landslide risk in the Puget Sound, where coastal bluffs are common and rainfall is high during storm events. While shoreline modification often increases several landslide risk factors, such as increasing impervious surface area, the loss of natural erosion control mechanisms can carry significant consequences for property owners and increase the cost and complexity of modification projects.

Large Woody Debris

Vegetation does not still need to be rooted and alive to benefit the nearshore environment. Fallen trees or large logs washed ashore during storms, known as large woody debris, provide a buffer that absorbs wave action and protects shoreline properties. Fallen logs also provide habitat and forage opportunities for many species of insects, worms, fish, birds, and more. Like the amount of intact vegetation, the amount of large woody debris found along shorelines has declined over the past several decades through the removal of drift logs to reduce navigation hazards, general declines in shoreline logging and log boom usage, and removal for art or other purposes. Large woody debris is also not as



Figure 2: Large woody debris like this fallen tree can serve as a food source or habitat for many species while also protecting the shoreline from wave action. Image Credit: Jerilyn Ritzman.

likely to collect on armored beaches, meaning that those beaches do not see many of the benefits of large woody debris as much as more natural shorelines do.

Shade for forage fish spawning grounds

The last newsletter briefly described the preferred spawning habitat for some of Puget Sound's most important species of forage fish. Two of those species, the Pacific sand lance and surf smelt, lay their eggs in the sand and gravel of the intertidal zone. Once the eggs are deposited, the sand lance and surf smelt rely on the beach environment to incubate their eggs at an appropriate temperature and moisture level.



Figure 3: Forage fish spawning habitat can be found along much of Island County's shoreline, as well as around the Puget Sound. **Image Credit:** Earthstar Geographics | Washington Department of Natural Resources Aquatics Division | These data were collected by WDFW staff with contributions from the North Olympic Salmon Coalition and the Friends of the San Juans. | Esri, Garmin | ArcGIS by Ryan Gatchell.

Fish embryos are generally durable but can be susceptible when exposed to extreme conditions. Beaches without overhanging vegetation are more likely to experience direct sunlight, which heats the substrate and causes moisture to evaporate. Beaches shaded by overhanging vegetation better maintain moisture and temperature levels throughout the day and into the night. As we continue to see warming trends in our region, vegetation overhang will play an important role in protecting the spawning grounds below.

Insects and other nutrients for juvenile salmon

The marine nearshore waters of Puget Sound are also heavily utilized by several species of salmonids, including chinook and chum salmon (juveniles) and sea run cutthroat trout (juveniles and adults). During the time they spend in the nearshore habitat, these fish prey heavily on terrestrial insects, which can be blown or dropped from overhanging vegetation and large woody debris. Terrestrial insects are considered a high-quality food source due to their high energy density and can form an important part of these fishes' diets, especially for juveniles that are too small to feed on forage fish.

Migratory salmon who feed insufficiently during the juvenile stage are at higher risk of predation as they migrate out to the ocean. Human modification of shorelines, such as the installation of hard armoring, has been implicated in reducing the abundance and diversity of insects and other salmon prey species. It is hypothesized that removal of shoreline vegetation is one of the main contributors to the prey reduction on these modified beaches. For example, without beach vegetation, terrestrial insects have less habitat, and there is also less wrack and organic detritus that provide nutrients for other important salmon prey species.

Resources

Our desire for clear views and clean, walkable beaches can sometimes cause us to remove critical parts of our shoreline environment. It is good every once in a while, to remind ourselves that what sometimes makes our beaches look (naturally) messy can also be what helps keep them healthy. If you're curious about how you can help support healthy vegetation along shorelines, check out the resources below!

The idea for this newsletter partially came from an excellent presentation given by Karen Strelloff, Shore Friendly South Sound Coordinator and Conservation Program Manager at Thurston Conservation District. Check

out the presentation, "[Messy is beautiful - isn't it? Understanding homeowner responses to restoration and stewardship goals](#)," on YouTube.

To see where nearshore forage fish spawning habitat is in Puget Sound, check out the [Washington Department of Fish and Wildlife's interactive web map on ArcGIS Online](#).

Almost every guideline on the [Shore Stewards website](#) touches on shoreline vegetation, especially Guidelines 2, 5 and 10. The [Shore Friendly website](#) also has many resources and tips on how to protect your shoreline property and Puget Sound.

Bibliography

- Brennan, James S. 2007. *Marine Riparian Vegetation Communities of Puget Sound*. Puget Sound Nearshore Partnership Report No. 2007-02. Published by Seattle District, U.S. Army Corps of Engineers, Seattle, Washington. 27 p. <https://wdfw.wa.gov/publications/02192>.
- Brennan, James S., and Hilary Culverwell. 2004. *Marine Riparian: An Assessment of Riparian Functions in Marine Ecosystems*. Published by Washington Sea Grant Program. Copyright 2005, University of Washington Board of Regents. Seattle, Washington. 34 p. <https://wsg.washington.edu/wordpress/wp-content/uploads/Marine-Riparian-Function-Assessment.pdf>.
- Daly, Elizabeth A., Richard D. Brodeur, and Laurie A. Weitkamp. 2009. "Ontogenetic Shifts in Diets of Juvenile and Subadult Coho and Chinook Salmon in Coastal Marine Waters: Important for Marine Survival?" *Transactions of the American Fisheries Society* 138 (6): 1420–1438. <https://doi.org/10.1577/T08-226.1>.
- Duffy, Elisabeth J., David A. Beauchamp, Ruston M. Sweeting, Richard J. Beamish, and James S. Brennan. 2010. "Ontogenetic Diet Shifts of Juvenile Chinook Salmon in Nearshore and Offshore Habitats of Puget Sound." *Transactions of the American Fisheries Society* 139 (3): 803–823. <https://doi.org/10.1577/T08-244.1>.
- Fresh, Kurt L. 2006. *Juvenile Pacific Salmon in Puget Sound*. Puget Sound Nearshore Partnership Report No. 2006-06. Published by Seattle District, U.S. Army Corps of Engineers, Seattle, Washington. 28 p. <https://wdfw.wa.gov/publications/02203>.
- Lee, Timothy S., Jason D. Toft, Jeffery R. Cordell, Megan N. Dethier, Jeffrey W. Adams, and Ryan P. Kelly. 2018. "Quantifying the effectiveness of shoreline armoring removal on coastal biota of Puget Sound." *PeerJ* 6: Article e4275: 19 p. <https://doi.org/10.7717/peerj.4275>.
- Menashe, Elliot. 1993. *Vegetation Management: A Guide for Puget Sound Bluff Property Owners*. Shorelands and Environmental Assistance Program, Washington Department of Ecology. Olympia. Publication 93-31. 53 p. <https://apps.ecology.wa.gov/publications/SummaryPages/9331.html>.
- Myers, Rian D. 1993. *Slope Stabilization and Erosion Control Using Vegetation: A Manual of Practice for Coastal Property Owners*. Shorelands and Coastal Zone Management Program, Washington Department of Ecology. Olympia. Publication 93-30. 23 p. <https://apps.ecology.wa.gov/publications/SummaryPages/9330.html>.
- Penttila, Dan. 2007. *Marine Forage Fishes in Puget Sound*. Puget Sound Nearshore Partnership Report No. 2007-03. Published by Seattle District, U.S. Army Corps of Engineers, Seattle, Washington. 30 p. <https://wdfw.wa.gov/publications/02193>.
- Quinn, Timothy, Kirk Krueger, Ken Pierce, Daniel Penttila, Kurt Perry, Tiffany Hicks, and Dayv Lowry. 2012. "Patterns of Surf Smelt, *Hypomesus pretiosus*, Intertidal Spawning Habitat Use in Puget Sound, Washington State." *Estuaries and Coasts* 35 (5): 1214–1228. <https://doi.org/10.1007/s12237-012-9511-1>.
- Rice, Casimir A. 2006. "Effects of shoreline modification on a Northern Puget Sound beach: Microclimate and embryo mortality in surf smelt (*Hypomesus pretiosus*)." *Estuaries and Coasts* 29 (1): 63–71. <https://doi.org/10.1007/BF02784699>.
- Rhodes, Linda. 2019. "The Marine Nearshore: Interface between Land and Sea." PowerPoint presentation. Presented in person on November 4, 2019, for Washington State University (WSU) Extension, Island County. Recording is public on YouTube. <https://youtu.be/9-z-uPjuGY0>.
- Sobocinski, Kathryn L., Jeffery R. Cordell, and Charles A. Simenstad. 2010. "Effects of Shoreline Modifications on Supratidal Macroinvertebrate Fauna on Puget Sound, Washington Beaches." *Estuaries and Coasts* 33 (3): 699–711. <https://doi.org/10.1007/s12237-009-9262-9>.
- Streliaoff, Karin. 2021. "Messy is beautiful - isn't it? Understanding homeowner responses to restoration and stewardship goals." PowerPoint presentation. Presented virtually on March 10, 2021, for the 2021 Nearshore Restoration Summit and Synthesis. Recording is public on YouTube. <https://youtu.be/jntLdMHI61I?t=2879>.
- (WDNR) Washington State Department of Natural Resources, and (DOGAMI) Oregon Department of Geology and Mineral Industries. 2017. *A Homeowner's Guide to Landslides*. Shorelands and Environmental Assistance Program, Washington Department of Ecology. Olympia. Publication 93-31. 53 p. https://www.dnr.wa.gov/publications/ger_homeowners_guide_landslides.pdf



To view back issues please visit our [website](#). Thank you for reading [Shore Stewards News](#).

Shore Stewards, Washington State University, Pullman, WA
[Accessibility](#) | [Copyright](#) | [Policies](#)

WSU Extension programs and employment are available to all without discrimination. Evidence of noncompliance may be reported through your local WSU Extension office.