

# Monitoring our Estuaries: Where the Streams Meet the Sea

Caitlin Sidhu, Western Washington University, Huxley College on the Peninsula

## What is An Estuary? How are they Important?

An estuary is a body of water where fresh water and salt water come together. This creates a unique environment for specialized plants and animals alike! Many species live within this special zone including Washington's favorites such as: Great Blue Herons, Coho Salmon, Bald Eagles, Sandhill Cranes, and Mollusks a-plenty! Many of these animals seem small and disconnected, but they all provide stability in local food chains. Some plants like Pickleweed, Salt Grass, Salt Marsh Bulrush, and Pacific Silverweed can only be found in estuaries, making it a one-of-a-kind home. Estuaries are important because they are the most productive ecosystems in the world, making robust food webs and providing more ecosystem services than other natural areas. In addition, estuaries take in so much carbon from the atmosphere and hold it deep in sediment to create a substantial carbon sink. This is important because it helps reduce massive contribution of carbon dioxide that humans provide to global climate change.

## What Can an Estuary do?



Figure 2: Niawiakum River Estuary, located on the Niawiakum River Natural Area Preserve in South Bend, Washington. Although this site was used for logging purposes, the estuary here is one of the highest quality estuaries in the Pacific Northwest. (<http://www.stevebisig.com/niawiakum-river-estuary-washington-2018>)

## Restoration and Monitoring:

It is important to restore and protect estuaries and wetlands in the Pacific Northwest not only because they are important to the health of the Puget Sound, but also because they make up about 938,000 acres of Washington State. Just as important, estuaries and wetlands should be monitored for changes to help maintain healthy functions. Currently, there is a monitoring effort at Harper Creek Estuary in Port Orchard, WA. The first one investigates the culvert restoration project completed in 2017 (Figure 3). The second, is monitoring the pre-restoration of the second culvert, marked for future removal. Monitoring the estuary is important for understanding how estuaries recover after prolonged periods of human impact. This monitoring project looks at:

- Plant Structure and Communities Including Invasive Species
- Soil Carbon and Organic Matter Levels
- Macro/Micro Nutrients with an Emphasis on Heavy Metal Accumulation
- Water Quality including Flood Channel Dynamics and Sediment Stability



Figure 1: A Great Blue Heron, which is commonly found in Washington state estuaries. Their diet is composed of amphibians, fish, insects, other birds, and rodents. They can weigh up to 8 pounds with a wingspan of up to seven feet! (<https://www.audubon.org/field-guide/bird/great-blue-heron>).

Estuaries provide many cost effective ecosystem services that humans rely on, such as:

- Protection from Harsh Storms and Hurricanes (In the form of a physical barrier of plant life)
- The Removal of Toxins and Chemicals through Water Filtration
- The Removal of Carbon Dioxide from the Atmosphere
- Increased Species Biodiversity
- Harvesting of provisions such as Mollusks, Birds, and Fish
- Scenic, Recreational, and Cultural Value
- Protection from Floods and Sea Level Rise
- Cooler Climate and Water Temperatures



Figure 3: Harper Creek after the removal of a culvert and addition of a bridge to allow adequate water flow in and out of the estuary. This is predicted to allow salmon access to the Kitsap County local streams, which in turn may increase salmon populations and biodiversity. (<https://pugetsoundblogs.com/waterways/2016/11/09/harper-estuary-project-gets-started-following-years-of-discussion/>)