

Shellfish at Work – Nutrient Bioextraction Trials in Budd Inlet

Main Goals: To quantify the nutrient (nitrogen and phosphorus) removal capabilities of mussels as a tool to mitigate urban, estuarine pollution and examine the potential to create a marketable compost product from harvested mussels.

Background: Eutrophication has been identified as one of the most serious threats to coastal environments worldwide. During this process, excess nutrients fuel phytoplankton growth that, upon decay, results in low oxygen levels in bottom waters of oftentimes poorly flushed inlets. Hypoxic conditions are harmful to marine life and raise concerns about the overall health of the watershed. This project evaluates the use of nutrient bioextraction, or growing and harvesting shellfish to remove nutrients from natural water bodies, as a strategy for mitigating anthropogenic nutrient loads in urban watersheds.

Project Summary: Bioextraction trials were carried out in Budd Inlet during the spring and summer months in 2014 and 2015. Canvas straps were secured underneath docks to provide a surface for mussels to attach to. During the mussel growing season, instruments were deployed to measure chlorophyll *a*, phytoplankton cell counts, and dissolved carbon and nitrogen levels to evaluate the effect of mussel filtration on water quality. Additionally, sediment traps were used to estimate how mussel biodeposits may contribute to the flux of marine sediments. In the fall, mussels were chipped and turned into nutrient rich compost. Compost generated from this project has been used in experimental growth trials at Marshall Middle School and at The Evergreen State College. It will also be incorporated into the sustainable landscape design of Olympia’s Capitol Campus. Demonstration sites from our nutrient bioextraction trials have been used to engage the public and as educational field experiences for local K-12 schools.



Growing mussels on experimental straps fouled with bright orange tunicates.

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Vegetative growth trials demonstrate high performance with “Surf to Turf” mussel compost.



PSI staff harvests and chips mussels at the Port of Olympia.

