

Shellfish at Work – Nutrient Bioextraction Trials in Budd Inlet & Thea Foss Waterway

Project Summary: 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.

In spring 2013, over 400 nylon straps were placed under existing docks at 7 locations in lower Budd Inlet and the Thea Foss Waterway to provide a home for blue mussel larvae to settle upon and grow. In fall 2013 and spring 2014, over 5,000

pounds of mussels were harvested, tested for contaminants, and turned into rich compost at The Evergreen State College Organic Farm, Washington State University Extension in Puyallup, and two Washington Department of Corrections facilities: Cedar Creek and the Washington Correctional Center for Women. These pilot trials removed over 50 pounds of nitrogen from the two inlets converting it into approximately 6 cubic yards of rich compost.



Andy Suhrbier leads a team of UW-Tacoma students to measure and record growth parameters and the community assemblage on mussel lines at West Bay Marina in Budd Inlet. Water quality parameters were also measured during these twice monthly assessments.



Vegetative growth trials demonstrate high performance with "Surf to Turf" mussel compost created by this research project.

This project also serves as a way to provide outreach about nutrient sources and reduction strategies via community citizen monitoring and harvest events; student mentoring; and interactive workshops. Fieldtrips and hands-on classroom presentations were provided to over 500 K-12 and college level students in the Olympia region and are ongoing at Foss Waterway Seaport Museum. Discussions are also underway to explore bioextraction as a complement to traditional waste treatment.

Funding for this work was provided by two grants: the Russell Family Foundation (for Thea Foss) and the US EPA under Puget Sound Ecosystem Restoration and Protection to the Washington Dept. of Ecology (PC-00J20101). More research is recommended to better understand nutrient dynamics and oxygen concentrations below and around these types of nutrient bioextraction systems.



Compost structures at The Evergreen State College Organic Farm, including green, enclosed bioreactors in the background.

