

Optimizing Bioretention Soil Mixes for Infiltration, Phosphorus Retention and Plant Growth

Horticulture M.S. proposal

By: Ian Grinter, WSU Puyallup

Abstract:

Stormwater management has come to the forefront of Low Impact Development practices. WSU Puyallup is currently constructing a Stormwater Research Center to conduct the first full-scale, replicated tests of Bioretention Best Management Practices. In preparation for this and in collaboration with Puget Sound municipalities a series of column studies will be performed to measure infiltration rates and nutrient leaching of bioretention soils. While bioretention studies have shown excellent results in stormwater volume control, the variability in soil infiltration makes designing bioretention areas difficult. Additionally, bioretention provides excellent removal of suspended solids and heavy metals, but has poor nutrient retention capabilities and has even been documented as increasing phosphorus concentrations in stormwater runoff. In my research, an initial study will survey the locally available suitable aggregates and determine the range of expected infiltration rates when used in a standard 3:2 aggregate:compost bioretention mix. Next, the City of Tacoma's biosolid product(Tagro) will be evaluated as a potential substitute for compost, with a focus on comparing phosphorus mobility between the Tagro and compost mixes. Finally, various soil amendments and the role of plants will be evaluated for their effects on infiltration and phosphorus mobility.