

Letter of Intent to Submit an NPDES Effectiveness Study Proposal

All fields must be completed

1. Proposed Study Title: Long term maintenance and operations of rain garden/bioretenion to optimize soil and plant health

2. Short Description of Proposed Study:

This study will use replicated bioretention cells located at the WSU-Puyallup LID test facilities to quantify long term bioretention condition in terms of soils and plant health. Bioretention cells will be retrofitted and replanted with typical rain garden plants.

Replicated maintenance protocols such as pruning, weed removal etc. will be compared to controls (no maintenance). Critical aspects of long term performance such as soil organic content, nutrient/metal accumulation in upper soil horizon, soil compaction, and plant health will be quantified. Hydraulic loads (inflows and soil moisture) to the cells will be continuously monitored.

2. What specific Stormwater Management Program condition(s) or other permit condition(s) in the NPDES W. WA. Phase I and/or Phase II Municipal Stormwater Permit does your study address?

Phase I Permit: S5.C.5: "Controlling Runoff from New Development, Redevelopment & Construction Sites"; S5.C.6: "Structural Stormwater Controls"; S5.C.7: "Source Control Program for Existing Development"; S5.C.9: "Operations & Maintenance Program"; S5.C.10 "Education & Outreach Program"

Phase II Permit: S5.C.4: "Controlling Runoff from New Development, Redevelopment and Construction Sites" AND S5.C.5 "Municipal Operations and Maintenance"

3. How will this study inform, assess effectiveness and/or support implementation of the specified NPDES permit conditions (e.g., project goal) and future permit conditions?

This study will provide information on how specific maintenance protocols impact the soil and plant health of bioretention systems compared to minimal to no maintenance. With the proliferation of installed rain gardens and bioretention systems in Western Washington a rigorous quantification of the impacts of maintenance effort on soil and plant health, and how these parameters change over the long term, is still an open question. This work will provide Phase I and II permittees a means to assess bioretention health in terms of maintenance effort - allowing for prioritizing maintenance in regions that are ecologically vulnerable.

4. What are the anticipated measurable outcomes or deliverables of this proposed study?

Measurable outcomes from this project are a determination of: A) operations and maintenance protocols best suited to maintain plant and soil health; B) nutrient accumulation rates in bioretention soil; C) changes in soil structure over time. Project deliverables are a final report, peer-reviewed fact sheets, peer-reviewed journal articles, one masters thesis, and multiple research/outreach presentations at state and national level.

5. How does this study advance regional understanding for stormwater management?

The focus of most operations and maintenance within bioretention systems in Western Washington are to ensure that plants appear healthy, and that inlets and outlets are functioning. However, understanding how much "operations and maintenance" effort is needed to ensure properly functioning plant and soil processes in the long term is still a critical and unanswered question. We propose to add considerable understanding to how much effort is needed to ensure long-term sustainability of rain garden/bioretenion practices. Further, quantifying the rate of nutrient/metal accumulation in the upper soil horizon is essential in order to determine how often replacement of the upper horizon might be required in typical bioretention systems in Western Washington.

6. Applicant(s) Contact Information:

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7. Permittees you are coordinating with (Provide contact information):

Joy Rodriguez, <JRodriguez@ci.puyallup.wa.us>, City of Puyallup, 333 S Meridian, Puyallup, WA 98371, (253) 841-5549

Merita Trohimovich City of Tacoma, Environmental Services, Center for Urban Waters, 326 East D Street, Tacoma, WA 98421, (253) 502.2103

8. Select Stormwater Work Group study category (select all that apply):

- | | | |
|---|---|--|
| <input type="checkbox"/> Source Control | <input checked="" type="checkbox"/> Retrofits | <input checked="" type="checkbox"/> Education & Outreach |
| <input checked="" type="checkbox"/> LID | <input type="checkbox"/> O&M | <input type="checkbox"/> Other: |

Submit LOI to Brandi Lubliner (WA Department of Ecology) via email at Brandi.Lubliner@ecy.wa.gov