

# Letter of Intent to Submit an NPDES Effectiveness Study Proposal

*All fields must be completed*

1. Proposed Study Title: Measuring natural mechanisms for source control of stormwater through urban forest restoration

2. Short Description of Proposed Study:

This study aims to quantify stormwater uptake by restored urban forests using both laboratory experiments and field measurements. The laboratory component involves instrumenting trees grown in mesocosms to determine stormwater assimilation by measuring transpirative and canopy interception rates. The field component involves selecting an urban forest parcel selected by the City of Tacoma that has been restored by removing invasive species and planting native vegetation through the existing Green Tacoma Partnership. We will measure stormwater runoff at the site and at an alternate "reference" to establish a baseline and to establish pre-restoration hydrology. The two sites would provide a comparative measure of stormwater runoff pre and post urban forest restoration, allowing for the assessment of changes in infiltration, retention, and release of water as the native vegetation matures and the forest achieves a healthier natural state. Laboratory and field results will be related using a computational hydrologic model. Outreach and education of results produced by this study focused on the impact of urban forests on stormwater will be substantial aspect of this study.

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:

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 support implementation of NPDES permit conditions by quantifying the reduction in stormwater runoff volume and water quality achieved through restoration of urban forests. Having a means to measure this impact will be a valuable addition to help cities design comprehensive approaches to achieving their permit conditions through urban forest restoration and managing lands for multiple benefits. It is important to emphasize the contribution that this can make by giving cities another tool for meeting permit requirements and taking a watershed scale approach to stormwater management.

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

Anticipated measurable outcomes are: A) A characterization of stormwater assimilation rates of individual trees in highly controlled soil/water conditions growing in Western Washington climatic conditions; B) Stormwater assimilation rates of a restored urban forest in the City of Tacoma.

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

While not generally included as a part of gray or green stormwater management systems, native trees and shrubs, especially in the context of healthy urban forests, provide a number of direct stormwater control benefits. This study will quantify through direct measurement the stormwater benefits associated with urban forests. The broader implication for regional stormwater management is that restoration of urban forests has potential as an inexpensive and effective component of a strategy to use natural infrastructure as source control in the built environment, thereby reducing peak events and alleviating the burden on existing gray infrastructure. This study will also serve to augment efforts by King Conservation District (KCD) and others who are using computational modeling tools (i-Tree model) to characterize stormwater mitigation by urban forests. By contrasting our proposed empirical approach with the KCD's modeling effort, we should have a robust and rigorous means to quantify the impact of urban forests on urban hydrologic processes.

6. Applicant(s) Contact Information:

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

Désirée Pooley, City of Tacoma, Environmental Services, Center for Urban Waters, 326 East D Street, Tacoma, WA 98421, 253-502-2126

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

- |  |   |  |
|--|---|--|
| <input checked="" 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](mailto:Brandi.Lubliner@ecy.wa.gov)