Stormwater Action Monitoring

Project Title

Rain Garden and Bioretention Assessment Protocol

Effectiveness Study

Lead Entity

City of Puyallup

Partners

Stewardship Partners

Washington State University Extension

Collectively improving stormwater management

Stormwater Action Monitoring (SAM) is a collaborative, regional stormwater monitoring program that is funded by more than 90 Western Washington cities and counties, the ports of Seattle and Tacoma, and the Washington State Department of Transportation. SAM's goal is to improve stormwater management to reduce pollution, improve water quality, and reduce flooding. We do this by measuring stormwater impacts on the environment and evaluating the effectiveness of stormwater management actions.

Questions about SAM? Send an email to SAMinfo@ecy.wa.gov

Study goals

The purpose of the project was to create an easy-to-use field protocol for anyone to use to assess the condition and maintenance needs of a bioretention facility or rain garden in the Puget Sound region. The goals of the project were to:

- Develop data collection methods that are volunteer- and staff-friendly and do not need extensive equipment or access to lab facilities,
- Collect defensible data,
- Better understand landowner values about rain gardens and bioretention purpose, maintenance and acceptance.
- Determine what maintenance incentives landowners might need,
- Provide an initial assessment of rain garden and bioretention function, and
- Create a consistent protocol to assess functionality and help prioritize facilities that need maintenance.

Stormwater management problem

Rain gardens and bioretention facilities are cost-effective tools in the Low Impact Development (LID) toolbox that are being implemented at an accelerating rate in Washington State. In most jurisdictions these facilities have not been assessed for function. In jurisdictions where facilities have been assessed, data are not collected in the same or comparable manner. A tool is needed to uniformly evaluate local and region-wide effectiveness, and to identify common issues that might be more effectively addressed at the regional scale.

Project findings

The Rain Garden and Bioretention Assessment Protocol was developed in two iterations of methodology development and field testing using both trained and untrained volunteers. For field testing of the second version, 77 volunteers in four counties (Pierce, Snohomish, Thurston and Jefferson) received eight hours of training. Six additional volunteers conducted assessments without any formal training; these "untrained" volunteers received the identical instructions developed with the assessment protocol and used by the trained volunteers. Working in teams of 2-3, volunteers assessed 41 sites. At most sites, a different team of volunteers conducted repeat assessments. This field testing with all these different people demonstrated:

- The assessment protocol provides replicable results,
- The assessment provides an overall indication of the current state of a rain garden or bioretention facility,
- The assessment appropriately identifies if maintenance actions are needed,
- Extensive training is not necessary, but some training is suggested (even if self-directed),
- The assessment provides sufficient detail to indicate if a site needs further actions, and



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- The assessment can provide direction for future maintenance and some design considerations.

The assessment protocol yields information that can:

- Flag important functional issues related to hydrology, vegetation, and public perception,
- Identify facilities that are prone to issues,
- Indicate issues of concern and guide remediation, and
- Identify common issues that might be addressed at a regionally coordinated scale.

The assessment protocol cannot:

- Precisely quantify hydrologic performance,
- Precisely quantify overall effectiveness of one facility, or of bioretention in general, nor
- Quantify treatment performance.

Recommendations

New rain gardens and bioretention facilities should be assessed at least twice in the first year following construction to assure success of plantings and facility function. Less frequent assessments are recommended for established facilities. Assessments should be conducted periodically and coordinated so that maintenance and issues that are identified may be corrected immediately. Instructions for maintenance activities could be integrated into the assessment protocol.

Municipalities should use the assessment protocol so that information collected can be easily compared to data from other municipalities across the region. Standardized data is critical for regionally coordinated analysis of the ongoing and long-term effectiveness of rain gardens and bioretention facilities.

A combined data form/data entry system should be developed as an app or webform for mobile devices, integrated with a data management system and database that is georeferenced and shareable. The mobile system could link to instructions for each part of the assessment protocol and indicate maintenance activities that should be performed.

The study leads recommend a regional entity oversee, manage, and own the assessment data. Oversight of the assessment database could be minimal, but with more effort, more value could be derived from the data, such that with adequate quality assurance, data analysis at the regional scale could be used to ask and answer questions about effectiveness of design, installation and maintenance, and inform best practice recommendations in the future.



Why does this study matter?

Many jurisdictions and individuals have invested in rain gardens and bioretention facilities as green stormwater management strategies. A consistent methodology to assess the functionality and ongoing management needs of these facilities will improve jurisdictions' ability to manage and utilize these facilities, as well as their confidence in requiring their use. The Rain Garden and Bioretention Assessment Protocol provides consistent methodology that will allow jurisdictions to compare their information at the regional level and potentially collaborate on solutions to common issues.

What should we do with this information?

Stormwater managers should have staff and/or volunteers implement the assessment protocol and use the outcomes to identify maintenance needs. Permittees can use the outcomes to inform, refine, and improve their rain garden and bioretention efforts. The assessment can help permittees determine their staffing needs and prioritize maintenance activities.

What will Ecology do with this information?

Ecology will encourage permittees to use the assessment protocol to help them prioritize maintenance needs. Ecology will support efforts to develop a mobile app on an appropriate platform and to subsequently analyze data from jurisdictions across the region.

For more information

See "Raingarden and Bioretention Assessment Protocol" at SAM Effectiveness Studies website.

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This was written by the SAM program for the Department of Ecology. It was originally hosted on EZview and was transferred to Biblio for records purposes as a publication in 2026.

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