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## ***Case Study: Spokane Urban Runoff Greenways Ecosystem Innovative Stormwater Management***

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The City of Spokane, Washington has developed a demonstration program to construct street-side rain gardens to control pollution from stormwater runoff. Polluted stormwater and combined sewer overflows have been identified as some of the leading causes of urban water pollution and have significantly contributed to pollutant loadings of the Spokane River, affecting downstream drinking water resources and water quality for threatened and endangered salmon species. The Spokane River is a tributary of the Columbia River and runs through the city. The Spokane Urban Runoff Greenway Ecosystem (SURGE) program will retrofit the existing urban landscape of curb and gutter systems in several places around the city using low-impact and green infrastructure strategies to mimic the natural hydrologic process by capturing, treating, and infiltrating stormwater runoff, to study the impact on water quality.

This project was selected by Spokane over gray infrastructure approaches to municipal stormwater management for its alignment with the goals and policies laid out in the city's Comprehensive Plan to restore, protect and enhance features of the natural environment. The policies included in the Comprehensive Plan call for watershed studies, the reduction of impervious surface areas, and the maintenance of natural areas within the urban environment. With this project Spokane was able to implement innovative stormwater techniques to protect both surface water and groundwater from contamination as well as to utilize and protect areas of natural drainage.

Spokane received a \$599,000 American Recovery and Reinvestment Act (ARRA) loan from the Washington State Department of Ecology's Water Pollution Control Revolving Fund, 50 percent of which was in the form of principal forgiveness. The city used these funds to construct the West Broadway



SURGE project, which was included as part of the city’s Sustainability Action Plan. The plan describes Spokane’s ongoing commitment toward adopting green practices that support a more sustainable approach towards publicly owned treatment works and the urban environment.

“The Broadway Avenue Spokane Urban Runoff Greenways Ecosystem or SURGE project is a low cost solution to capture, treat, and infiltrate runoff as close to where it falls as possible,” says Mayor Mary Verner. “The storm gardens will enhance the beauty of Broadway Avenue and improve water quality by reducing the contaminants going to the Spokane River.”

The city constructed a network of rain gardens between the curbs and sidewalks to intercept stormwater runoff on either side of Broadway Avenue, extending from Elm to Oak Streets. Rain gardens are an example of green infrastructure design particularly suited for the inland Northwest as they are capable of properly treating stormwater runoff flows from both rain and snow events. Street-side depressions, planted with native vegetation, are designed to capture runoff from impervious areas like roofs, streets, and parking lots, allowing it to naturally be absorbed into the ground. In all, 37 rain gardens were constructed along with five drainage structures and over 1,200 square yards of pervious sidewalk.

The project makes use of different plant palettes, or planting schemes, based upon specific criteria including drought tolerance, low maintenance, aesthetic appeal and local availability. Native species grown in the local area were selected for the 37 rain gardens not only for their aesthetic appeal but also for their ability to thrive during the long, dry summers and cold, snowy winters of the inland Northwest. Vegetative cover was not the only design consideration given to the rain gardens. Careful selection of the proper soils to augment the treatment and infiltration process was another specific planning element in the creation of the greenway ecosystem. An innovative approach used on the West Broadway SURGE was the utilization of the “tree zone” concept, which addresses multiple site conditions such as building set-back distances and amounts of available sunlight. Such varied conditions make selecting one species of tree impossible, so planners selected five different tree varieties suitable for each of the existing site conditions.

Palette 1



Palette 2



Potential Street Trees



*Native plant species used in the rain gardens*



Each rain garden is comprised of a layer of structural soil, which includes a mix of gravel, topsoil, and moisture retaining gel to support the growth of tree roots; a layer of treatment soil consisting of topsoil, sand, and organic matter to provide biological treatment to stormwater; and a layer of composted mulch at the surface to regulate moisture, minimize weed growth, and further enhance biological treatment cleansing.



The West Broadway SURGE project has numerous environmental, economic, and social benefits, including improving the operation of Spokane’s combined sewer system, providing a low-cost alternative to treating and managing stormwater runoff, and increasing urban green space that provides an enhanced aesthetic environment and improves water quality. This project won EPA’s Performance and Innovation in the SRF Creating Environmental Success (PISCES) award in 2010.

*For more information please contact the Washington Clean Water State Revolving Fund Loan Program*  
<http://www.ecy.wa.gov/programs/wq/funding/FundingPrograms/CWSRF/cwsrf.html>