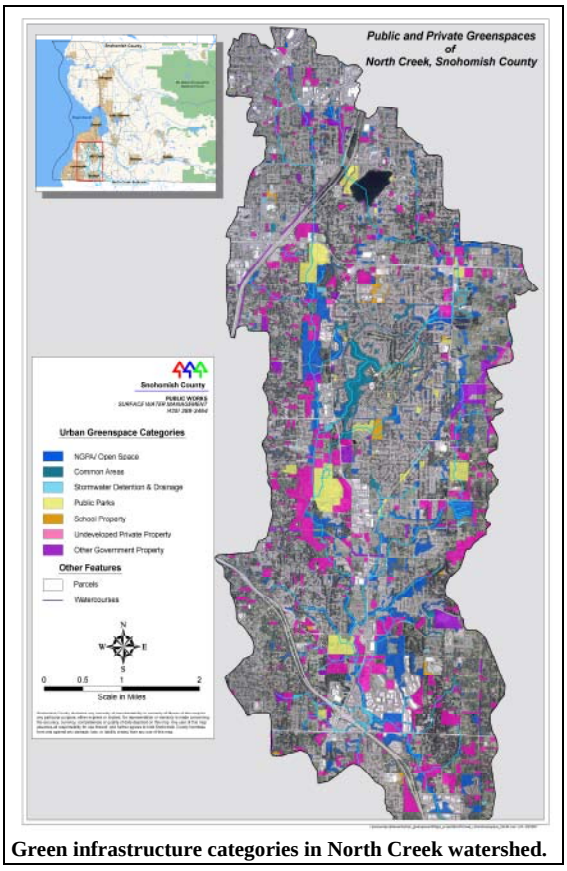
Too Much Water in the Neighborhood

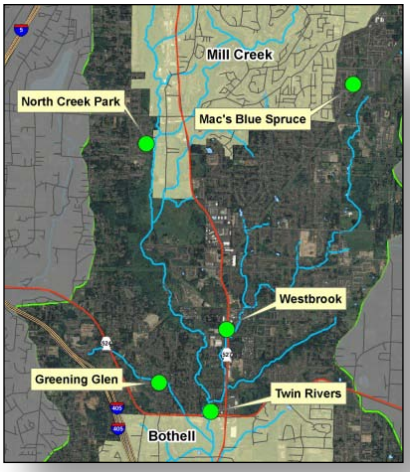
Neighbors find stormwater infiltration provides many benefits

Introduction

Stormwater management in Snohomish County historically consisted of engineered delivery systems associated with impervious developed areas. Some stormwater management measures included "green infrastructure" within native growth protection areas (NGPA). A Snohomish County grant project pilot study began in 2004 to implement green infrastructure retrofits to stormwater facilities within existing neighborhoods and to educate and involve the public in stormwater management.



Green infrastructure categories in North Creek watershed.



Problem

The North Creek watershed is built out with few large, undeveloped areas, and with medium-density residential areas with roughly 25 to 35 percent impervious cover. Over time, residents can become disconnected from the natural areas in their neighborhoods and from their responsibility to understand and maintain engineered drainage facilities. Lack of a sense of ownership can result in overgrown/weedy conditions, illegal dumping of materials into engineered facilities within natural areas, and unwanted illegal activity within natural areas that can trigger development of informal trails, soil compaction, and garbage accumulation. The project used engineered green infrastructure within these areas to manage stormwater through infiltration and filtration; education to inform landowners of things they can do on their property to reduce runoff and pollutants; and outreach activities to reconnect residents to their natural areas in order to ensure the long-term health of these areas for the purpose of natural stormwater management.

Stormwater and the pollutants it picks up generally flow untreated into North Creek and its tributary streams, which flow from Snohomish County to the Sammamish River in King County. Nonpoint source pollution, including nutrients; metals; high stream temperatures; sediment; and fecal coliform bacteria has resulted in degraded aquatic habitat and impairment to streams, lakes, and rivers of the Cedar-Sammamish Watershed. This watershed provides critical habitat for Chinook salmon and bull trout char listed as threatened under the Endangered Species Act.

This project addresses low impact development strategies to benefit stormwater management. Best management practices (BMPs) were implemented to improve water quality and to reduce the quantity of stormwater in the North Creek watershed from

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source to piped outfalls within residential areas. This project worked at two levels: the individual scale of landowner BMPs and the neighborhood scale of BMPs for community open space such as NGPAs. Landowner BMPs were implemented in specific neighborhoods using established criteria including revegetation, soil amendments, pervious pavement, rain gardens, and terraced gardens. Project monitoring was originally designed to assess water quality improvement, runoff control, and landowner participation.

Project or event goals milestones and outcomes

Specific neighborhoods were chosen using Snohomish County GIS and other land records to identify NPGAs, drainage easements, and public open spaces. These factors and other demographic data were used to select the project neighborhoods of Macs Blue Spruce, Greening Glen, Westbrook No. 3, North Creek Park Division 1, and Twin Creeks for BMP management and NGPA plans. Stormwater issues in these neighborhoods included uncontrolled and untreated stormwater being conveyed directly into North Creek and its tributaries and flooding in one of the project's neighborhoods.

Public Opinion Research – Focus Group

Public opinion research was conducted by Cascadia Consulting Group, Inc., a market research firm. The research included conducting focus groups with residential community members and homeowner association officers. Participants' knowledge regarding stormwater flow and NGPAs in and around their properties was assessed. Focus groups were used to gauge participant impressions of specific stormwater BMPs, their willingness to adopt individual BMPs, and to identify factors that motivate neighborhood residents to adopt BMPs as well as factors that are barriers to residents adopting BMPs. Focus group sessions revealed that residents did not understand the interconnectivity between soil and water infiltration. Findings were used by county staff to develop an education and outreach plan for each neighborhood with the goal to motivate residents to implement BMPs that reduce stormwater runoff and improve stormwater infiltration and water quality.

North Creek Park Division 1 Subdivision – Before and After – Bioswale Installation

County staff implemented the education and outreach plan for each neighborhood, which involved neighborhood meetings, mailings, events, and door-to-door conversations with individual residents. Key talking points included an overview of the neighborhood's stormwater drainage facilities; how this system was intended to function; how contaminants are conveyed unfiltered to the nearby stream; and their impact to water quality in North Creek. Residents learned how the proposed projects would improve water quality by infiltrating the stormwater into soil before it reaches their local stream, and the specific infiltration techniques proposed for their neighborhood. These techniques include outfall remediation; rain gardens; porous pavement; compost-amended soils; invasive plant removal; revegetation of affected areas using native plants; an NGPA Management Plan; and options for implementation of BMPs on individual properties. Landowners discovered that their neighborhood NGPA and stormwater facilities were being used as dumps and were covered with noxious weeds. They learned, too, that low-impact development techniques such as terracing, compost-amended soils, rain gardens, and landscaping with native plants would infiltrate stormwater and filter out contaminants.

Project highlights

Through Snohomish County's education efforts, residents within the watershed participated in NGPA improvements, 8 pervious driveway aprons replaced impervious ones, 6 stormwater outfalls were retrofitted to allow stormwater to infiltrate before it reached a nearby stream, 14 rain gardens were installed, and riparian buffers restored.

Westbrook - Before and After – Outfall Remediation

Rain Garden Handbook for Western Washington Homeowners – Field Tested

Checklist	Element
✓	**Inlet**: higher than overflow, with opening exposed
✓	**Bottom of excavated area** is level
✓	**Ponding area** is level, and a minimum 6" below overflow
✓	**Berm** is compacted, level, and a minimum of 6" above overflow
✓	**Overflow** is rock-lined
✓	**Mulch layer** (2 to 3 inch depth): - coarse compost in ponding area - wood chips above ponding are

Snohomish County's pioneering use of the Rain Garden Handbook for Western Washington Homeowners provided valuable field-testing and comment by landowners, neighborhoods, and landscapers. The findings are helping professionals and homeowners alike to make better use of this resource to carry out infiltration improvements on their own. Residents now find that implementing stormwater low-impact development on an individual and community basis filters water and allows clean water to go into the ground and to the streams. They are pleased that the low impact development techniques have alleviated drainage and flooding issues for themselves and their neighbors. Neighborhood residents have a renewed sense of ownership and connectivity with their green areas and the local streams. The BMP installations were so effective at infiltrating water that the lack of surface water hampered the County's ability to collect samples for water quality monitoring. With the improved infiltration of stormwater, water quality should improve as the soil and plants filter out contaminant as stormwater moves slowly through the soil to reach North Creek and its tributary streams.

Partners

This project was conceived and executed by Snohomish County with input from Ecology TMDL Lead Ralph Svrjcek as an innovative project to work on private property and in community green infrastructure areas to help improve water quality in the North Creek watershed. It was managed with grant oversight by Ecology staff. Public opinion research was conducted by Cascadia Consulting Group, Inc.

Funding

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For more information

Peggy Campbell
Watershed Steward
Snohomish County
425-388-6497
peggy.campbell@snoco.org

Joan Nolan
Water Quality Specialist
Northwest Region
425-649-4425
joan.nolan@ecy.wa.gov

Ralph Svrjcek
Water Quality Specialist
Northwest Region
425-649-7165
ralph.svrjcek@ecy.wa.gov

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