WATERSHED SCIENCE BULLETIN

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AWSPs
Association of Watershed & Stormwater Professionals

Journal of the Association of Watershed & Stormwater Professionals

A program of the Center for Watershed Protection, Inc.

Watershed Land Cover / Water Resource Connections

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Cover photo courtesy of Dot Cappiella
This bird's-eye view of Bucks County, Pennsylvania, taken from a hot air balloon, shows the variety of land cover types on this rural and suburban landscape. Trees, turf, pavement, cropland, and even bare soil are present in this fast-developing suburb of Philadelphia.

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Grey to Green:

A Watershed Approach to Managing Stormwater Sustainably

The average annual rainfall in Portland, Oregon, a city of approximately 585,000 located near the confluence of the Willamette and Columbia Rivers, generates approximately 38 billion liters (10 billion gallons) of stormwater runoff. The quantity and quality of stormwater runoff resulting from rain falling on impervious surfaces, such as streets, rooftops, and parking lots, is one of Portland's greatest environmental challenges. As an alternative to traditional grey infrastructure that moves stormwater from the point of collection to a centralized treatment area, the City of Portland (City) is incorporating techniques that manage stormwater at its source with facilities that work like natural systems.

Portland is a national leader in green development and sustainable stormwater management. The *Portland Watershed Management Plan* (Plan) uses a scientific foundation to provide a comprehensive, strategic, and integrated approach to the management of stormwater and the improvement of watershed health. This approach addresses the sources and causes of environmental issues, rather than focusing solely on the symptoms or meeting specific regulatory requirements. Recognizing that urban watershed management is complex and requires coordination between City bureaus and community partners, this approach also promotes innovative and cost-effective solutions to stormwater management that meet multiple requirements and provide a range of benefits. The primary goals of the Plan include protecting, restoring, and improving hydrology, water quality, fish and wildlife habitat, and biological communities.

To accelerate implementation of the Plan, the City increased its commitment to funding green infrastructure through the Grey to Green (G2G) initiative. Started in 2008, the G2G initiative invests $55 million over five years in strategies that mimic natural systems to manage stormwater at its source. The purpose of G2G is to expand and enhance the City's green infrastructure using the following strategies, or best management practices: ecoroofs, green streets, tree planting, invasive species removal, revegetation, culvert replacement, and land acquisition (Figure 1). In addition to improving watershed health, integrating stormwater into the landscape saves money in both the short and long term by avoiding investments in grey infrastructure

Figure 1. Ecoroof examples include a backyard community effort (A),an ecoroof overlooking the Willamette River (B) and inclusion of solar panels (C). Photos courtesy of the City of Portland, Bureau of Environmental Services.

for stormwater management, ensuring service longevity for current investments, and providing cost-effective ways to meet water quality regulatory requirements. Measurable co-benefits of green infrastructure include improved public health, energy savings, and enhanced community livability.

The City designed G2G as an opportunity to transform sustainable stormwater management practices from the realm of innovative approach to everyday practice. To accomplish this, the initiative needed to provide value to people and communities, provide opportunities for partnerships and incentives, and include investments in the city's forested ridgelines as well as its urban neighborhoods. The City chose practices that complemented existing efforts but would realize meaningful results within the five-year time-frame.

The City's monitoring approach, which incorporates the best available science and protocols developed by the national Environmental Monitoring and Assessment Program, provides the basis for measuring the effectiveness of G2G strategies. The City convened a group of experts to assess the benefits of G2G beyond stormwater management. The 2010 report, *Portland's Green Infrastructure: Quantifying the Health, Energy and Community Livability Benefits,* presents the panel's findings, which will help guide decisions and funding priorities for future green infrastructure investments.

To date, G2G accomplishments include the following:

- Added 2.7 ha (6.7 acres) of ecoroof (100 roofs) and approved incentive funding for an additional 0.9 ha (2.2 acres). Ecoroof monitoring indicates greater than 50% annual retention of stormwater, meaning that half of the rain runoff from a roof that previously went to the treatment plant or into rivers and streams is now captured on the roof.
- Built 432 green streets, nearly half-way to the five-year goal of 920, at which point the estimated energy saved from avoided pumping and treatment costs will be enough to power 25 Portland homes per year.
- Planted 13,500 street trees and 13,100 yard trees. This was accomplished by partnering with the local nonprofit Friends of Trees and by giving a "treebate" to each city ratepayer who planted a tree on his or her own property.
- Treated 1,214 ha of invasive weeds by working with the Youth Conservation Crew.
- Acquired 106 ha of natural habitat areas in partnership with the City's parks department and other stakeholders.

For More Information

For more information, contact Daniela Brod Cargill, City of Portland Bureau of Environmental Services (daniela.cargill@portlandoregon.gov or 503-823-7226), or see www.portlandonline.com/bes/index.cfm?c=47203&.

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