

## Trees for Stormwater Management

### PURPOSE

To encourage the effective application of strategies for parking lot stormwater management that take advantage of trees' ability to increase filtration and infiltration of runoff while optimizing trees' other environmental benefits.  
Reduce runoff quantity. Reduce pollutant load. Save money.

### THE CHALLENGE OF STORMWATER MANAGEMENT

Urban development converts permeable surfaces like grasslands and forests into impermeable surfaces such as roofs and asphalt. As the amount of impermeable surface in a watershed increases, so does the volume and pollutant load of runoff that enters receiving waterways. Stormwater runoff can lead to ecological and physical degradation of riparian ecosystems. High runoff volume often results in costly mechanical remediation, such as bank stabilization. Even small quantities of the many pollutants carried by stormwater runoff can harm rivers and streams, necessitating expensive water treatment processes. Using strategic tree planting, stormwater managers may be able to decrease runoff volume and pollutant load from parking lots, reducing downstream infrastructure cost and protecting the environment. To optimize the benefits of trees for parking lot stormwater management, planners and installers need detailed information regarding:

- Species selection
- Site construction and installation
- Long term maintenance.

Trees should be selected, planted and maintained to maximize tree health and longevity, stormwater management effectiveness and other environmental functions while minimizing environmental costs, like increased ozone-forming potential and water consumption, and financial costs, such as tree replacement and root damage.

## A PROJECT OF THE INSTITUTE FOR ENVIRONMENTAL SOLUTIONS 2009 PROJECT PROSPECTUS

Trees can reduce and clean up runoff through their ability to increase both infiltration (the rate at which water enters the ground) and filtration (the process of reducing pollutant load). Trees trap a significant amount of rainfall on leaf and trunk surfaces. As tree roots grow then decompose, they change soil structure, increasing both the rate at which water enters the soil as well as soil water storage potential. Trees also slow erosion by reducing the velocity of drops hitting the ground. Depending on climate and local stormwater management policies, investing in the urban forest may return large savings from avoided infrastructure development (including, in some cases, avoided retention ponds) and water treatment. Average amount of runoff intercepted by a medium-sized tree in a year: 2,300 gallons. The value of the runoff volume and pollution reduction function of Golden, Colorado street trees: over \$50,000 per year.

### PROJECT OBJECTIVES

1. Offer practical guidance to stormwater managers on applying trees to parking lot stormwater management. The audience will learn about species selection, site design, installation procedures and maintenance strategies for ensuring long-term success.
2. Evaluate the application of trees to parking lot stormwater management in terms of runoff volume and pollution reduction as well as cost-effectiveness.

### PROJECT TIMELINE

Fall / Winter 2008: Research, stakeholder outreach, and experimental design.

Spring / Summer 2009: Experimentation to test local adaptation of tree strategies.

Fall / Winter 2009: Dissemination through presentations, documents, and the web.

Trees reduce the urban heat island effect, improve air quality and sequester carbon dioxide. Trees have especially great potential for environmental improvement when planted strategically in parking lots. Tree shading can reduce evaporative emissions of air pollutants from parked automobiles and trap airborne particulate matter while helping to manage stormwater.

Urban Watershed Forestry Manual Part 3

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**T R E E S FOR STORMWATER MANAGEMENT** Project Prospectus • 2009  
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