

Green Infrastructure Approaches to Managing Wet Weather



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What is “Green Infrastructure”?





Technologies and practices that use natural systems – or engineered systems that mimic natural processes – to manage wet weather and enhance overall environmental quality. As a general principal, Green Infrastructure techniques use soils and vegetation to infiltrate, evapotranspire, and recycle stormwater. In addition to managing rainfall, these technologies can simultaneously help filter air pollutants, reduce energy demands, mitigate urban heat islands, and sequester carbon while also providing communities with aesthetic and natural resource benefits.

Core Group of the Partnership for Strategy Development

- American Rivers
- Association of State and Interstate Water Pollution Control Administrators
- Low Impact Development Center
- National Association of Clean Water Agencies
- Natural Resources Defense Council
- U.S. Environmental Protection Agency



Statement of Support

Purpose

To bring together organizations that recognize the benefits of using green infrastructure in mitigating overflows from combined and separate sewers and reducing stormwater pollution and to encourage the use of green infrastructure by cities and wastewater treatment plants as a prominent component of their Combined and Separate Sewer Overflow (CSO & SSO) and municipal stormwater (MS4) programs.

Signatories of Statement of Support

ALLIANCE FOR THE GREAT LAKES
AMERICAN INSTITUTE OF ARCHITECTS
AMERICAN PUBLIC WORKS ASSOCIATION
AMERICAN RIVERS
AMERICAN SOCIETY OF LANDSCAPE
ARCHITECTS
AMIGOS BRAVOS
ASSOCIATION OF ENVIRONMENTAL
AUTHORITIES of NJ
ASSOCIATION OF STATE AND INTERSTATE
WATER POLLUTION CONTROL
ADMINISTRATORS
BAY AREA CLEAN WATER AGENCIES
CALIFORNIA ASSOCIATION OF SANITATION
AGENCIES
CENTER FOR NEIGHBORHOOD
TECHNOLOGY
CITIZENS CAMPAIGN FOR THE
ENVIRONMENT
CLEAN WATER ACTION
COALITION FOR ALTERNATIVE
WASTEWATER TREATMENT

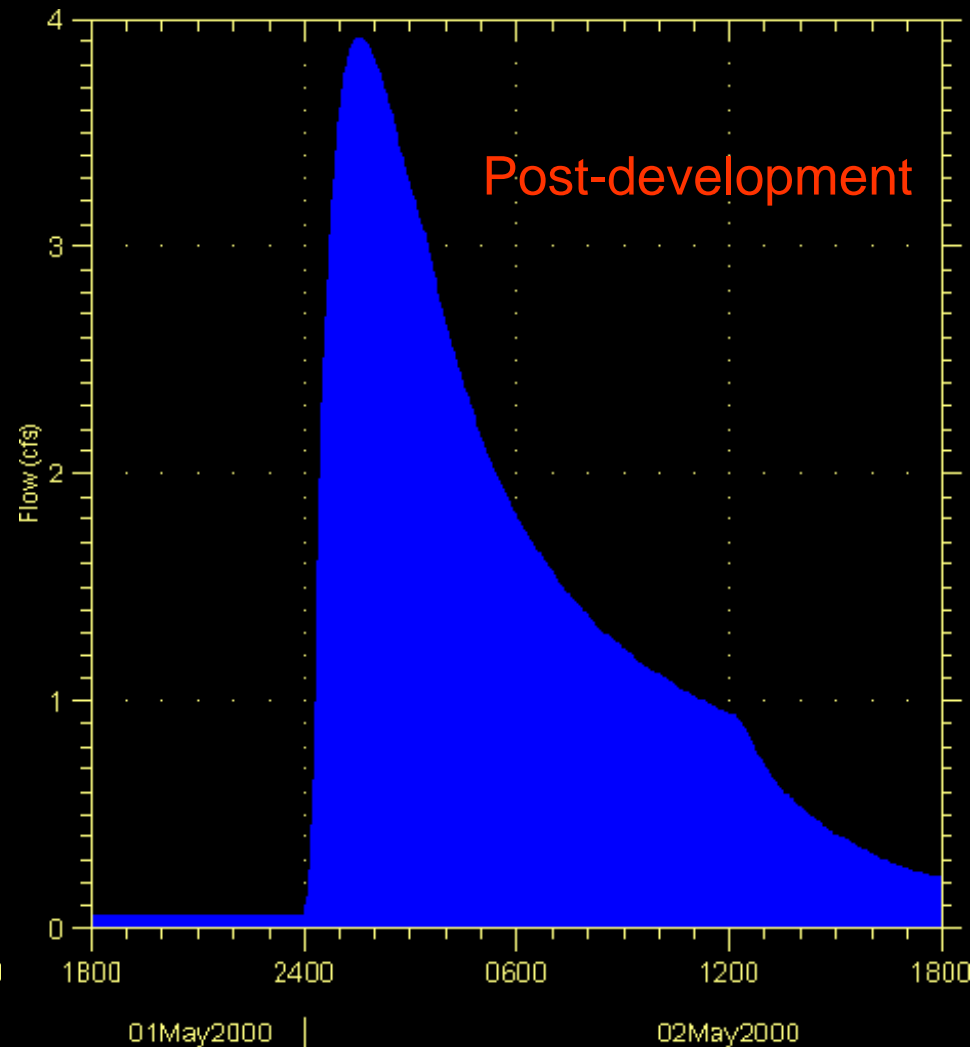
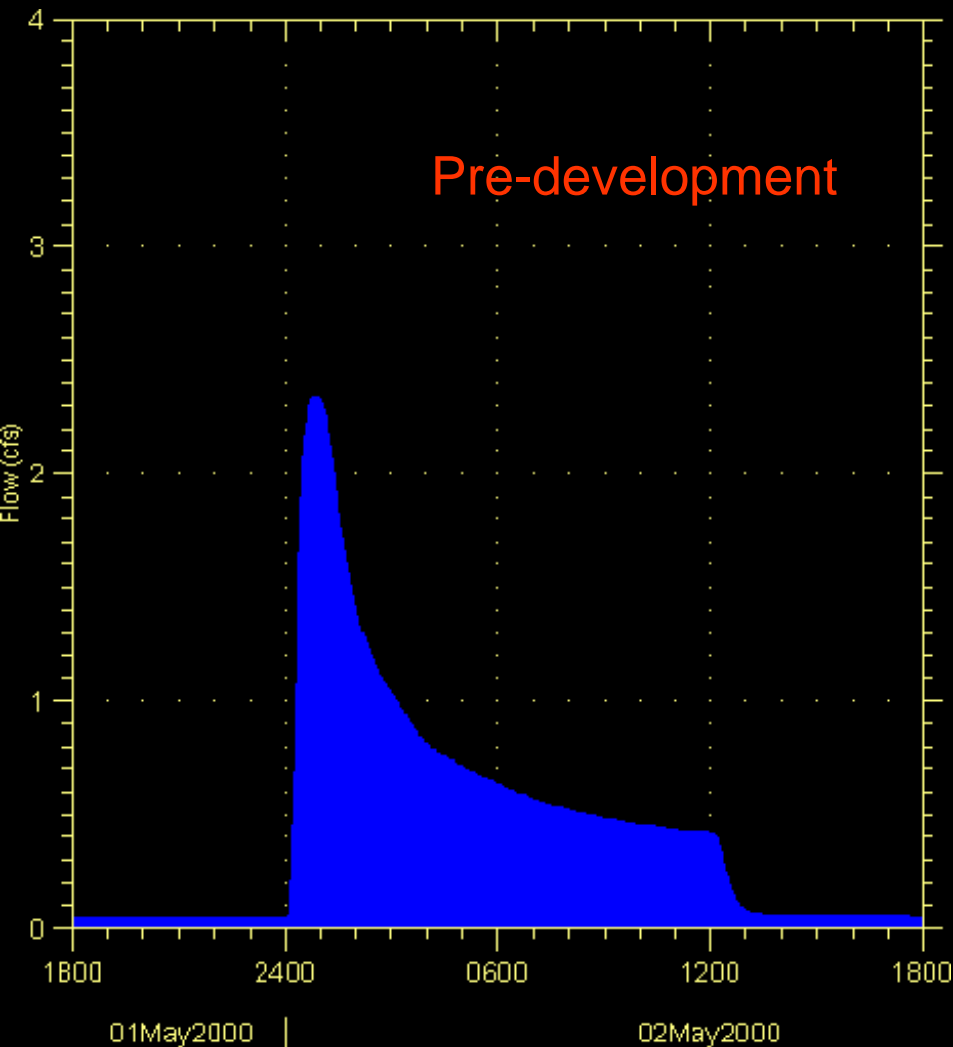
THE CONSERVATION FUND
ENVIRONMENTAL INTEGRITY PROJECT
GULF RESTORATION NETWORK
HEAL THE BAY
HEALING OUR WATERS
HUDSON RIVERKEEPER
INTERNATIONAL SOCIETY OF ARBORICULTURE
THE LOW IMPACT DEVELOPMENT CENTER
NATIONAL ASSOCIATION OF CLEAN WATER
AGENCIES
NATIONAL AUDUBON SOCIETY
NATURAL RESOURCES DEFENSE COUNCIL
NY/NJ BAYKEEPER
OREGON ASSOCIATION OF CLEAN WATER
AGENCIES
SANTA MONICA BAYKEEPER
SIERRA CLUB
TENNESSEE CLEAN WATER NETWORK
WATERKEEPER ALLIANCE
WET WEATHER PARTNERSHIP

70% increase in peak flow.

Blakeslee Creek

170% increase in runoff volume.

Former instantaneous peak flow now lasts ~4 hours.

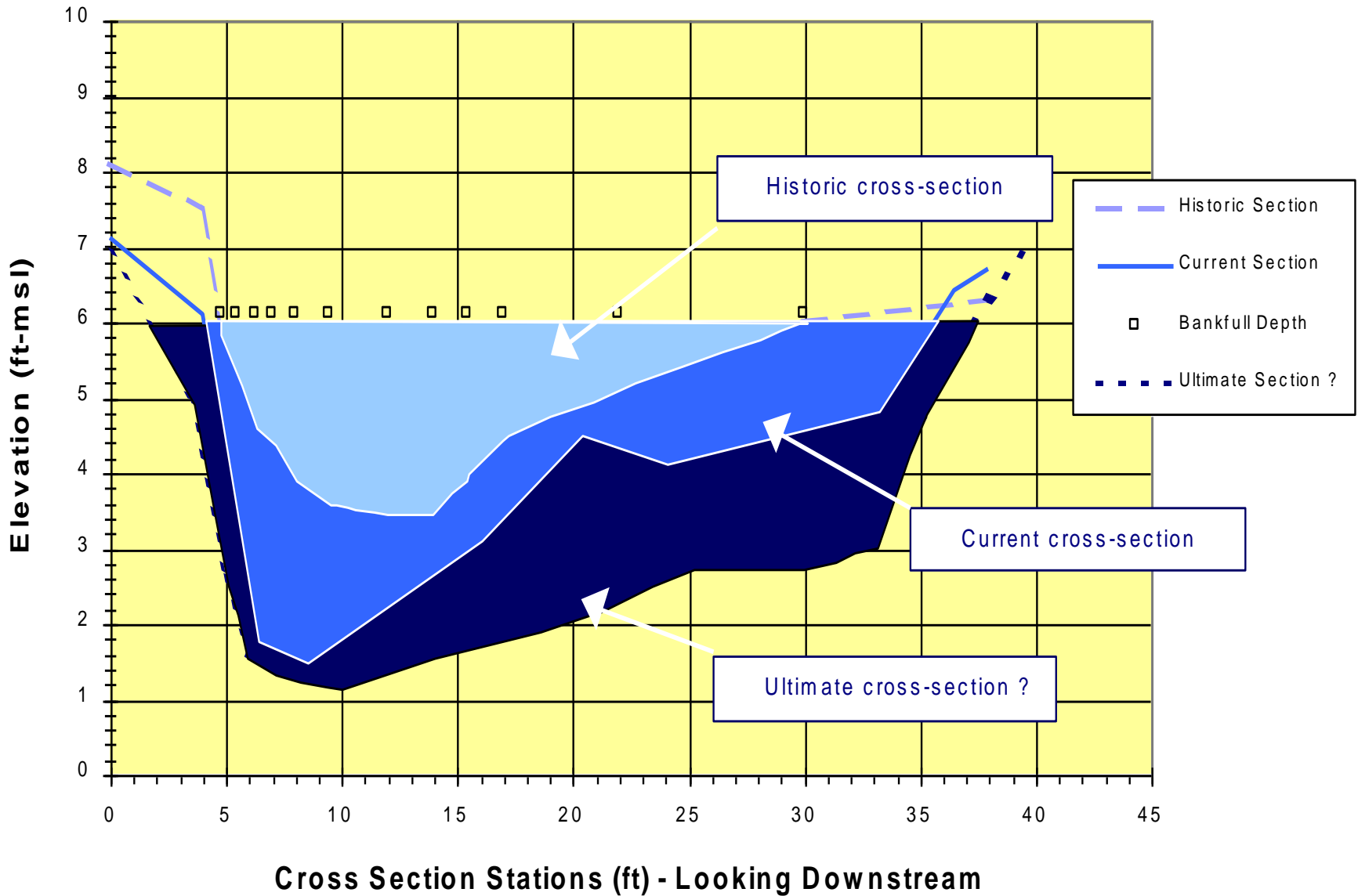


Era of the Big Basin

Stormwater management designs that manage only discharge rates often exacerbate the problem.



Natural systems respond to runoff volumes, frequencies and durations as well.



Increased rates and volumes of storm water discharges lead to stream widening and down-cutting, or incision.



What needs to change?

Paradigm Shift: Rain is a Resource, Not a Waste

- Drinking water
- Ground water recharge
- Stream baseflow
- Trees & other plants
- Aesthetic qualities



Paradigm Shift:
Get away from the curb and gutter,
big basin approach

- Shift from the concept of moving stormwater as far away as quickly as possible in large, buried collection and conveyance systems.



- Shift towards the concept of managing stormwater the way mother nature would do it: where it falls; plants & soils.

Paradigm Shift: Trifocal Approach to Stormwater Management

Region or
Watershed



Neighborhood



Site



Approaches to Flow Management

- Good Site Design
- Good Neighborhood and Community Design
- Water Conservation & Reuse

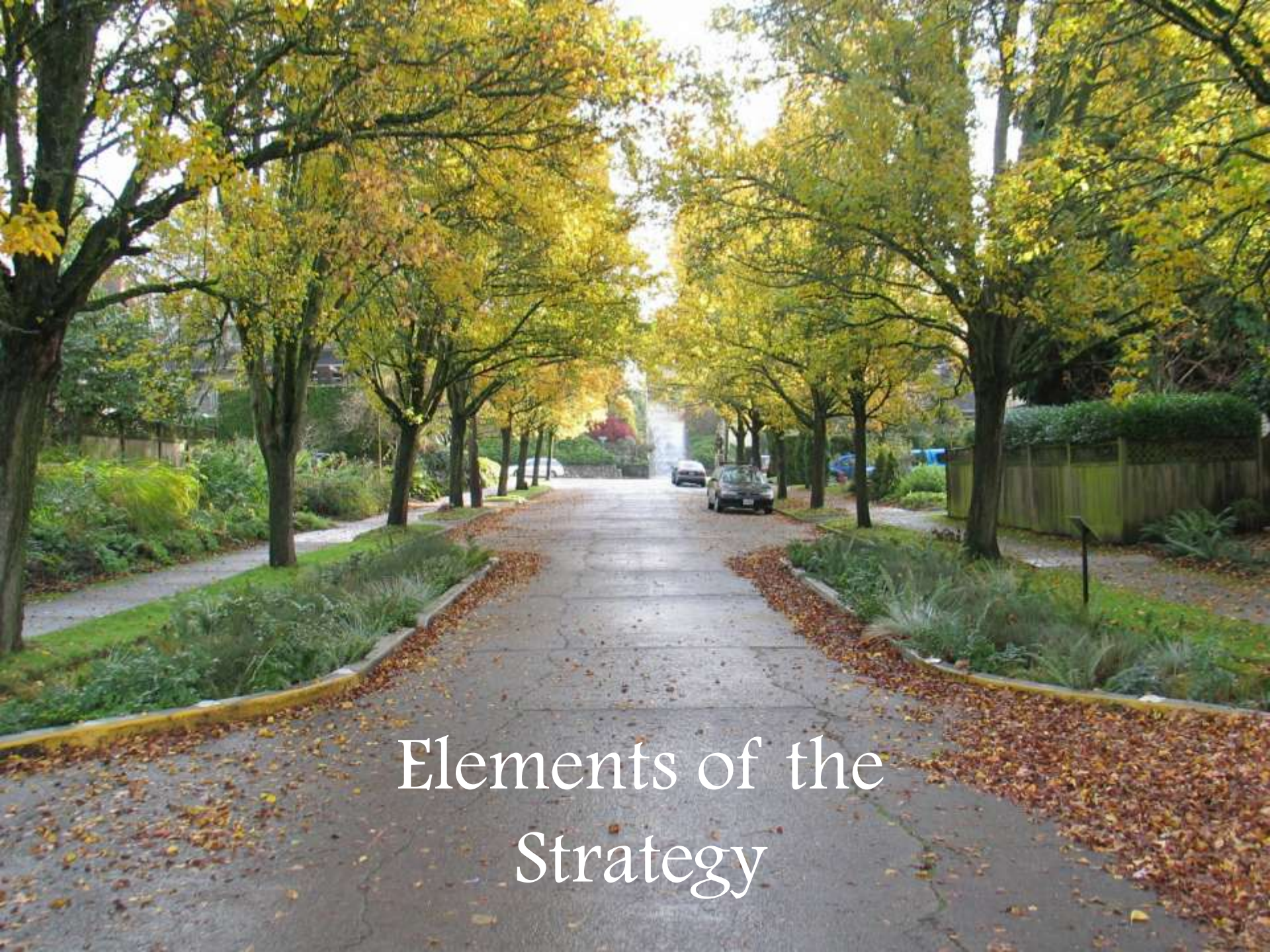


Infiltration – Evapotranspiration ~ Reuse

Green Infrastructure Implementation Strategy

- Developed in conjunction with partners
- Includes tasks, projects, initiatives to bring green infrastructure into the mainstream of water management.





Elements of the Strategy

Performance & Effectiveness

- Need better understandings of management practices performances, not just in terms of water quality and quantity, but also other benefits such as energy savings, carbon sequestration, and urban heat island reduction
- Need performance comparisons to standard infrastructure approaches.
- Need to understand performance over time, and with respect to varying O&M regimes.
- Need to understand effectiveness of green infrastructure management measures.
- Need standard protocols for evaluating performance and effectiveness.



Models & Calculators

- Need ‘green infrastructure’ components for standard models used for predictive and design purposes.
- Need ‘green infrastructure’ performance-cost-benefit calculators.



Guidance, Assistance & Education

- Establish a web-based Green Infrastructure resource center.
- Develop a decision tree on selecting practices.
- Compile guidance for municipalities on planning and design review specifications, O&M, codes & ordinances, incentives and funding, tracking & evaluation protocols.
- Develop training & certification for installers.



Clean Water Act Regulatory Support

- Provide clarification that green infrastructure approaches are with federal statutes regulations.
- Develop MS4 permit language.
- Develop LTCP language and/or guidance.
- Develop injunctive relief guidance.
- Compile examples of permits, LTCPs and settlements (injunctive relief & SEPs) utilizing green infrastructure.



Document Economic Viability

- Document costs of green infrastructure practices, especially in light of multiple benefits, both in terms of new construction and retrofits.
- Document capital expenditures and life cycle costs. Compare to gray infrastructure.
- Establish collaborations with banking & loan industry, insurance providers, etc. to ensure that there are no barriers.



Demonstrations & Recognition

- Compile a catalog of green infrastructure projects (building on *Rooftops to Rivers*).
- Identify new & support existing pilot projects from which performance, effectiveness, cost & other data can be gleaned.
- Recognize innovation through awards and recognition programs.



Partnerships & Promotion

- Expand partnership through Statement of Support.
- Develop targeted partnerships for pivotal areas of implementation.
- Work with other federal agencies to develop federal procurement standards a/o policies.
- Establish retail establishment specifications.
- Use existing conferences/meetings and plan new ones to promote and inform about green infrastructure.





Green Infrastructure for Wet Weather

◆ New Activities ◆



Performance & Effectiveness

- Compiling cost and performance information on green infrastructure technologies and approaches, to include: capital and life cycle costs, water quality/quantity-related performance, and performance with respect to other benefits such as energy savings, carbon sequestration, urban heat island reduction, air quality and property values. Will also include a methodology for co-assessment of other benefits, and a side-by-side comparison of green infrastructure approaches costs with traditional infrastructure approaches.
- Planning to convene a forum on green infrastructure related research to identify research gaps, and discuss how to bring those research needs to fruition.

Models & Calculators

- Development of technical support document on integrating green infrastructure technologies into commonly used models used to plan and design wet weather controls.
- Expand the Washington, D.C. green build-out model (GBOM) to include other green infrastructure or LID practices including use of pervious or permeable pavement, rain gardens, and other vegetated solutions for volume and pollution reduction estimates, specifically those practices that infiltrate, reuse and evapotranspire stormwater. This work involves research, method development and application. Methodology will be transferable.

Guidance, Assistance & Education

- Web-based Green Infrastructure Resource Center. This website is planned as a portal to ‘everything green infrastructure for wet weather’. What we cannot link to we will create. Initial page is live (www.epa.gov/npdes/greeninfrastructure).
- Compiling information on existing certification programs for installers of different green infrastructure technologies, e.g., porous concrete.

Clean Water Act Regulatory Support

- Draft memo to regional and state NPDES directors clarifying that the use of green infrastructure in permits and settlements is entirely appropriate in many cases, provisions subject to the same requirements as any other type of technology.
- Development of support document is underway providing additional explanation on considerations for green infrastructure in permits, long-term control plans and settlements.
- Pilot project with West Virginia DEP underway to develop language in small general MS4 permit to advance infiltration, reuse and evapotranspiration concepts in municipal stormwater programs.
- Developing a workshop for municipal operators, scheduled for September 19, 2007 in Cincinnati, on using green infrastructure approaches in CSO control programs.



Green Infrastructure for Wet Weather

