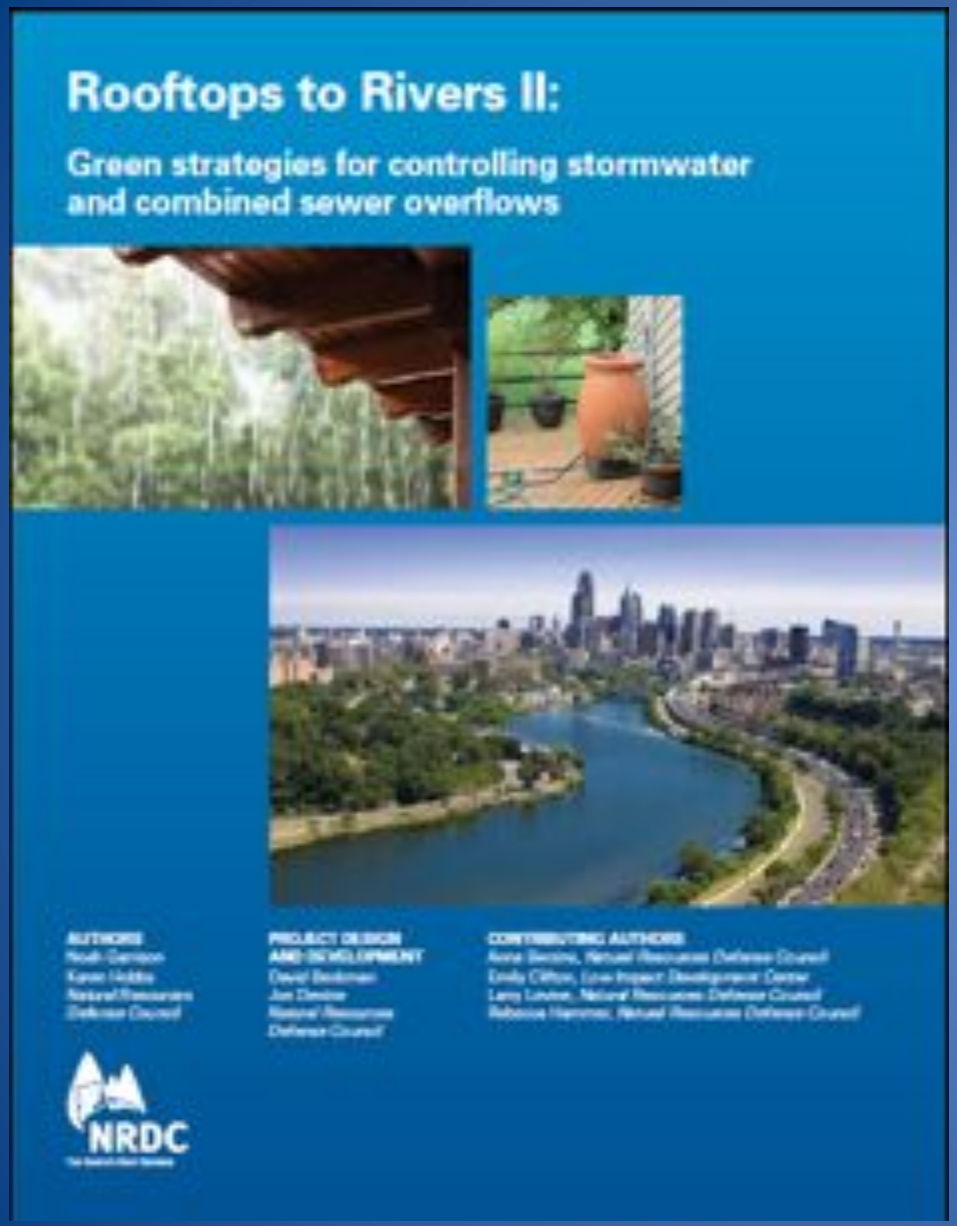


Rooftops to Rivers II:

Green strategies for controlling stormwater and combined sewer overflows

Larry Levine - NRDC

Report available at:

www.NRDC.org/stormwater

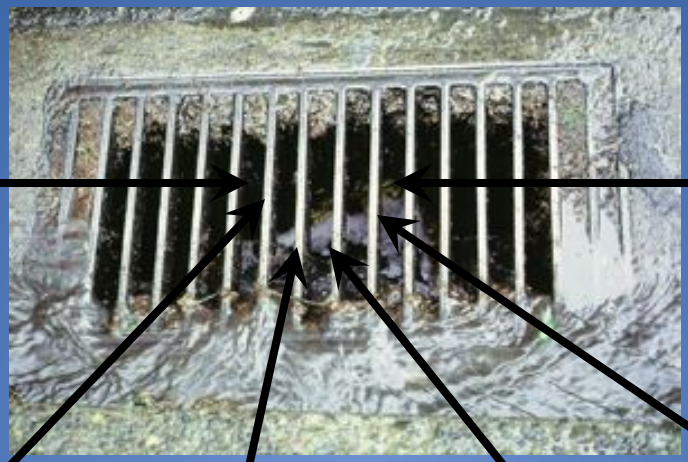
Overview: Rooftops to Rivers II

- NRDC's report demonstrates how cities use green infrastructure to improve stormwater management and achieve multiple benefits. The report includes:
  - Economic benefits of green infrastructure
  - Financing options for green infrastructure
  - Case studies on 14 cities
  - Encouragement for EPA to learn from the work of these cities and advance these solutions nationwide
- Rooftops to Rivers II is an update from NRDC's original Rooftops to Rivers (2006)
  - Our understanding of the multiple benefits and cost-effectiveness of GI has grown significantly

Developed Conditions

- Development Increases:
  - Stormwater volume
  - Stormwater velocity
  - Pollutant loads
  - Stream channel erosion
- Development Decreases:
  - Health and safety of receiving waters
  - Groundwater recharge
  - Baseflow
  - Stream habitat

Urban Stormwater Runoff: Pollutants



Green Infrastructure as a solution:

What is Green Infrastructure?

- Green infrastructure is a set of design strategies that mimic natural hydrology and capture rain where it falls.

Portland streetscape.
Photo courtesy of Martina Keefe

Navy Yard Bioretention.
Photo courtesy of LID Center

Portland's stormwater street planters. *Photo courtesy of the Portland Bureau of Environmental Services.*

Permeable Paverment, City of Portland, BES

NRDC, *Stormwater Strategies*

Chicago City Hall Green Roof. *Photo courtesy of Roofscapes, Inc.*

Green Infrastructure as a solution:

Other non-water benefits

- Reduced energy use
- Increased property values
- Improved air quality
- Lower air temperature
- Reduced urban heat island effect
- Conservation of water

Emerald City Metric

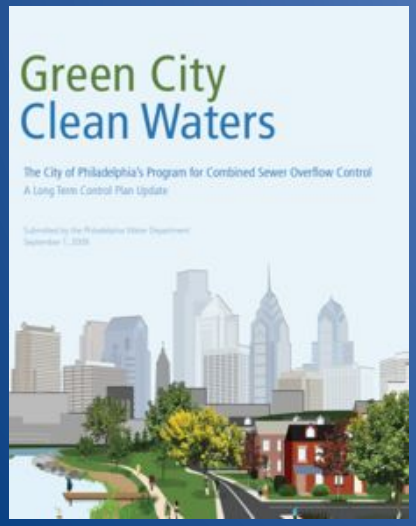
- 6 ways to maximize GI investment
  1) A long term green Infrastructure Plan
  2) A retention standard
  3) A requirement to reduce existing impervious surfaces using green infrastructure
  4) Incentives for private-party actions
  5) Guidance or other assistance in developing green infrastructure
  6) Dedicated funding source

Table ES-1: "Emerald Cities," listed darkest to lightest by the number of key green infrastructure actions taken

City	Long-term green infrastructure (GI) plan	Retention standard	Requirement to use GI to reduce some portion of the existing impervious surfaces	Incentives for private-party actions	Guidance or other affirmative assistance to accomplish GI within city	Dedicated funding source for GI
Philadelphia, PA	★	★	★	★	★	★
Milwaukee, WI		★	★	★	★	★
New York, NY	★		★	★	★	★
Portland, OR		★	★	★	★	★
Syracuse, NY	★		★	★	★	★
Washington, D.C.		★	★	★	★	★
Aurora, IL	★	★			★	★
Toronto, Ontario, Canada	★	★		★	★	
Chicago, IL		★		★	★	
Kansas City, MO				★	★	★
Nashville, TN	★				★	★
Seattle, WA				★	★	★
Pittsburgh, PA		★				
Rouge River Watershed, MI					★	

Philadelphia

- Green City, Clean Waters plan – creating an urban network of GI over the next 25 years




NRDC
The Earth's Best Defense

New York

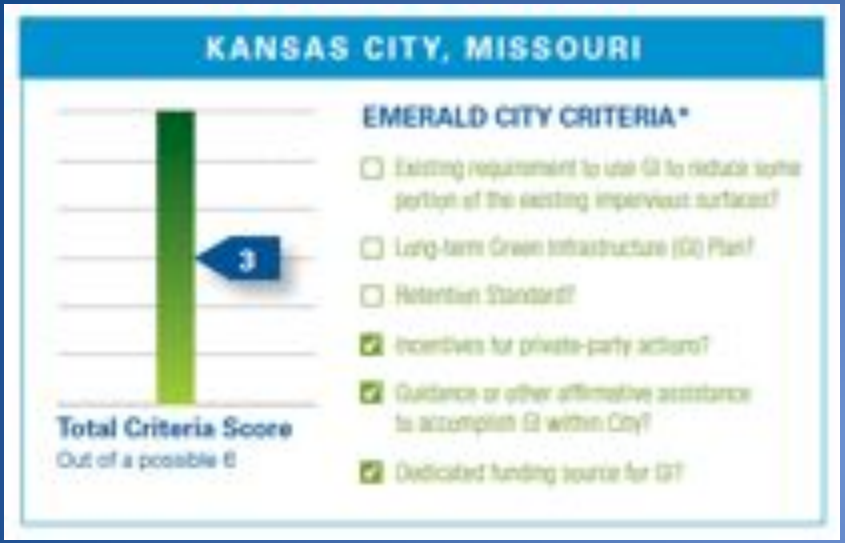
- Long-term sustainability plan – PlaNYC 2030

Syracuse

http://www.youtube.com/watch?v=9iIcshGZDpE&feature=youtu.be

- 1st community in the US to have a legal requirement to reduce sewage overflows with GI

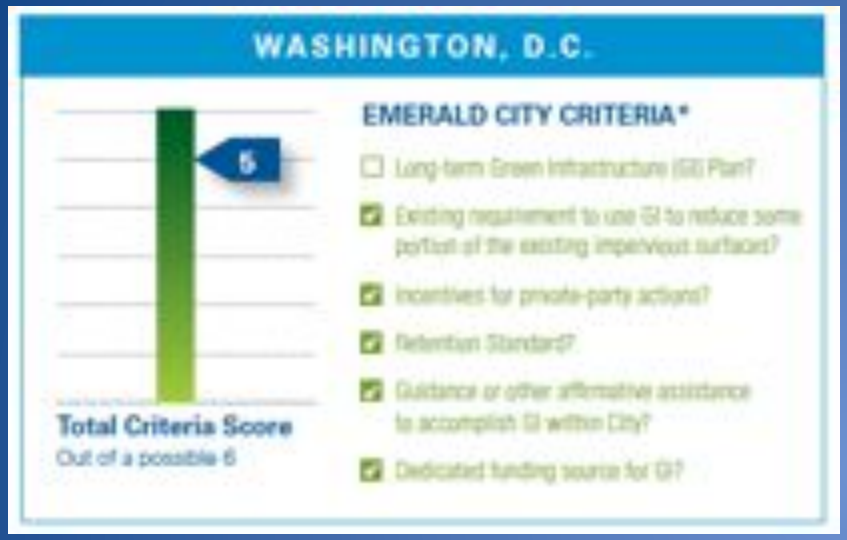
Kansas City

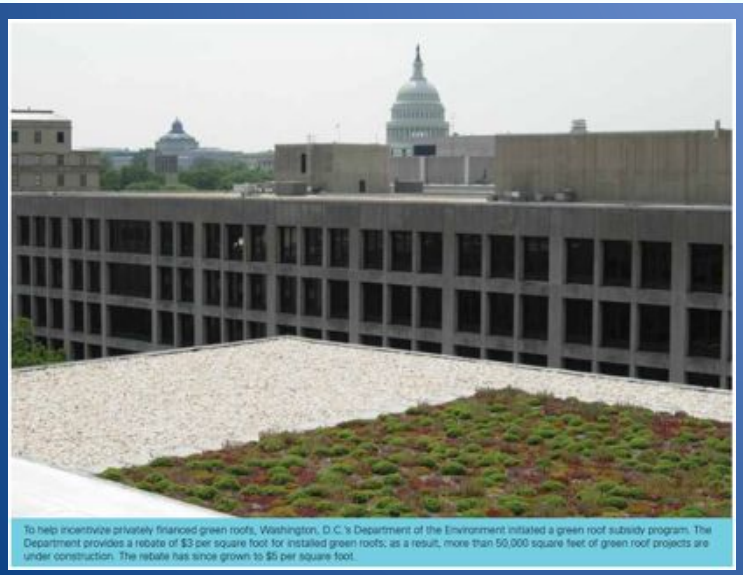


- Middle Blue River Basin Green Solutions Pilot Project (June 2011)


Kansas City's 10,000 Rain Gardens initiative began in 2005 to address existing stormwater and overflow control problems; its goal is to install 10,000 rain gardens, vegetated swales, and rain barrels in the greater metropolitan area.

Washington, D.C.




To help incentivize privately financed green roofs, Washington, D.C.'s Department of the Environment initiated a green roof subsidy program. The Department provides a rebate of $3 per square foot for installed green roofs; as a result, more than 50,000 square feet of green roof projects are under construction. The rebate has since grown to $5 per square foot.

- Green Build-Out Model
- Low-Impact development at the Navy Yard
- Green roofs and buildings
- RiverSmart Homes
- Stormwater fee & Impervious Area Charge

Milwaukee


Installation of porous pavers at the Energy Exchange (November 2009).

- MMSD stormwater management manual – impervious surface reduction requirements for both new construction and redevelopment

Economics of Green Infrastructure

- Benefits:
  - Reduces costs of stormwater system construction and management
  - Can reduce costs of stormwater management in new and existing development
  - Can be integrated cost-effectively into the designs of other infrastructure projects
  - Reduces energy costs, flooding risk, and long-term maintenance expenditures

- Cities are increasingly updating stormwater plans, ordinances, building codes and design manuals to include green infrastructure

EPA / Policy Solutions

- Once in a generation opportunity to reform the minimal requirements applicable to urban and suburban runoff sources
- EPA Proposed Rule
  - updating the requirements that apply to long-term runoff from developed sites
    - December 2011 (finalized November 2012)
  - EPA must adopt performance requirements for control of runoff volume from new development and redevelopment sites
  - EPA should require retrofits in already-developed areas and as part of infrastructure reconstruction projects

Who can help?

- Congress – by fully funding EPA's Clean Water Revolving Fund
- Local cities and states – undertake comprehensive GI planning, ensure permitting programs drive the use of GI, and eliminate hurdles to ensure GI is easy and practical to implement

* These policy recommendations and others are detailed fully in chapter 4 of the report

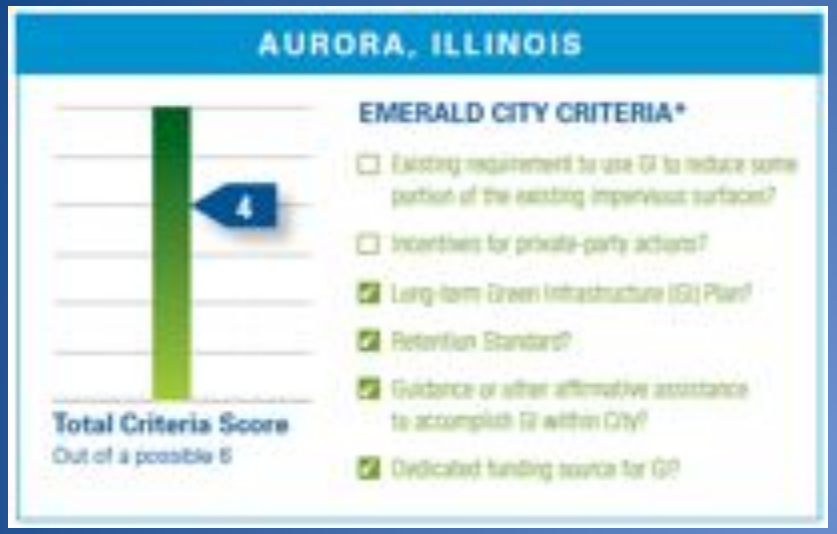
Questions?

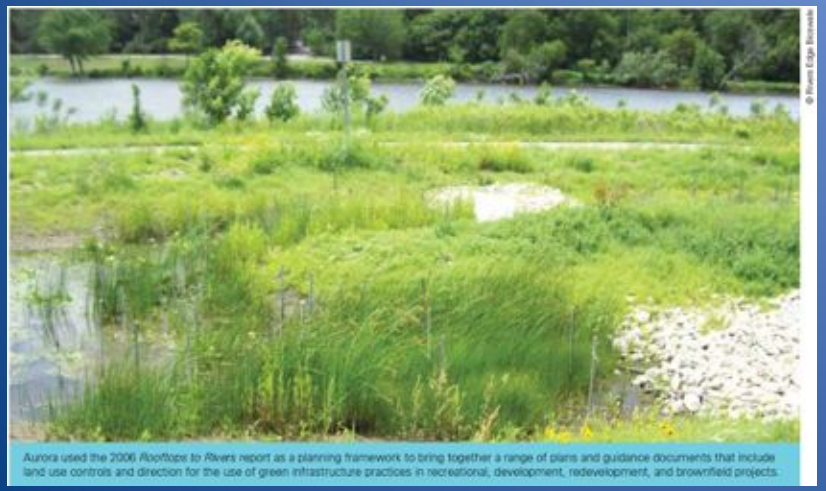
www.nrdc.org/stormwater

switchboard.nrdc.org – search: “green infrastructure”

Larry Levine – llevine@nrdc.org

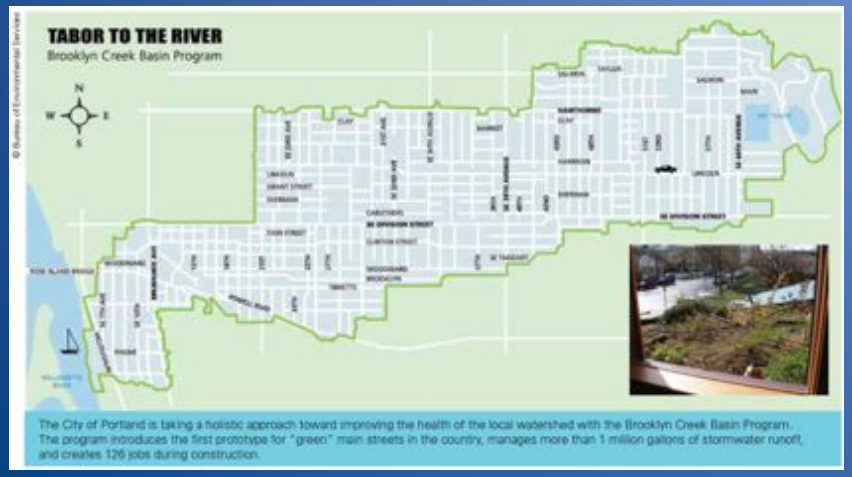
Aurora




Aurora used the 2006 *Rooftops to Rivers* report as a planning framework to bring together a range of plans and guidance documents that include land use controls and direction for the use of green infrastructure practices in recreational, development, redevelopment, and brownfield projects.

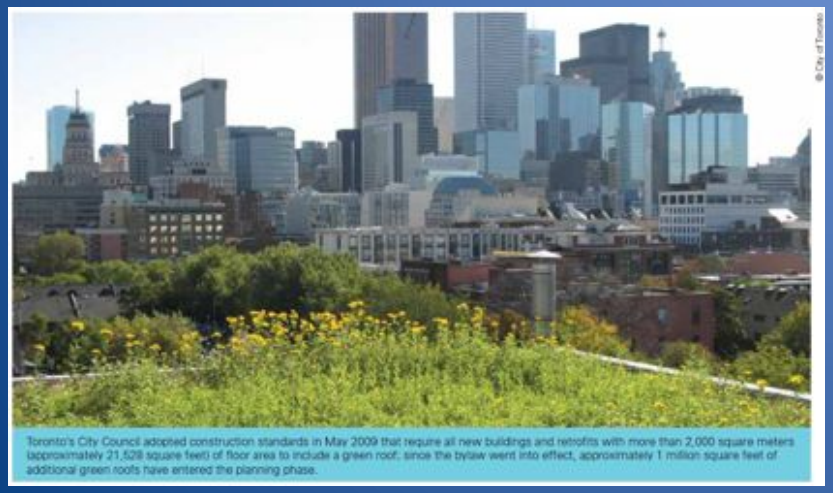
- Long-term planning including land use controls and direction incorporating GI practices into recreational, development, redevelopment, and brownfields
- GI intended to reduce stormwater overflows into the Fox River

Portland



- Retention standard – January 2011
- Requirement to reduce impervious surfaces
- new development and redevelopment projects must capture and treat 80% of the average annual runoff volume on site

Toronto


Toronto's City Council adopted construction standards in May 2009 that require all new buildings and retrofits with more than 2,000 square meters (approximately 21,528 square feet) of floor area to include a green roof. since the bylaw went into effect, approximately 1 million square feet of additional green roofs have entered the planning phase.

- Wet Weather Flow Master Plan
- Toronto Green Standard
  - Building certification program
- Provides extensive information, resources and guidance to developers and property owners