Why Stormwater Matters

From Runoff to Renewal: Tools for Municipalities in the United States

Stormwater is now known to be a primary contributor to water quality problems across the country. The top three pollutants found in our impaired waters are suspended solids, pathogens, and nutrients - all major constituents of stormwater! Stormwater occurs when rain or snowmelt flows over hard surfaces such as roofs, roads, and parking lots and collects oils, pesticides and fertilizers, road salt, bacteria, trash, etc. Under natural conditions, rain soaks into the soil, is filtered and absorbed by plants, replenishes aquifers, and enters surface water gradually as clean, cool groundwater.

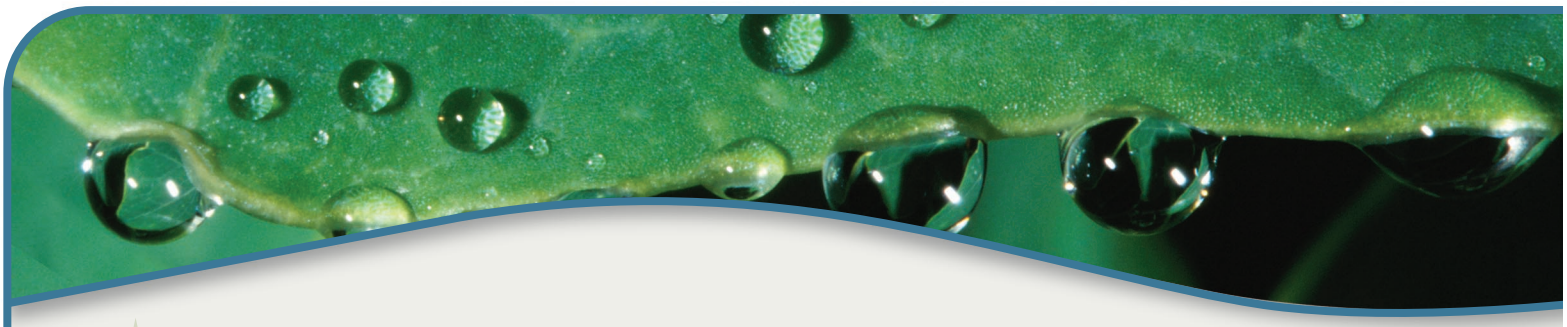
Make the Connection To Stormwater in Your Municipality

- Contaminated stormwater is one of the single largest pollution sources to watershed creeks, rivers or lakes.
- In places with combined sewer systems carrying both stormwater and sewage to treatment plants, heavy rains often exceed carrying capacity of sewers resulting in bypasses and overflows of untreated sewage into rivers and lakes.
- Contaminated stormwater is responsible for bacterial contamination leading to beach closings and nutrient enrichment of large and small lakes including the Great Lakes, extensive damage to natural habitat and can threaten the drinking water security of rural water supplies.

Turn Stormwater into a Resource!

Innovative stormwater management uses a variety of techniques to manage stormwater through maintaining or mimicking natural systems. Practicing innovative stormwater management takes careful planning and creative thinking, but in the long run provides great benefits to your local economy, environment, and quality of life. Additional benefits can be realized by integrating stormwater management with smart growth initiatives and watershed planning to promote regional planning and coordination.

- **Financial Savings**
  - Reduce or avoid the costs of mitigation, repair, and/or reconstruction required by damages from flooding, erosion, and combined sewer overflows.
  - Reduce or avoid the costs associated with expanding wastewater infrastructures.
  - Reduce or avoid the costs of construction site preparation and infrastructures for new developments.
- **Comply with State and Federal Laws**
- **Improved Quality of Life:** Clean, restored waters improve and expand recreational opportunities, contribute to healthier citizens and community, and help build local tourism.



Low Impact Development

While traditional development treats stormwater as a waste product, all development creates more runoff by removing native vegetation, and covering the natural landscape with concrete, asphalt and buildings that make the ground less able to absorb water and filter pollution. Low impact development (LID) techniques are used to make the built environment function like the natural environment. It involves low-cost practices to use stormwater as a resource via techniques that infiltrate, filter, detain, evaporate and reuse stormwater at its source. LID also involves site planning and design to consider on-site natural features to maintain or mimic an area's predevelopment hydrology.

The main principles of LID include:

- Conservation – maintain tree canopy and infiltration
- Minimization – reduce hard surfaces wherever possible
- Strategic Timing – keep rain and runoff out of the storm sewer system
- Integrated management practices – combine a variety of approaches to achieve infiltration and storage
- Pollution prevention – limit the application of known pollutants and dispose of pollutants properly

LID techniques for capture, treatment, and pollution prevention:

- Rain harvesting through barrels or cisterns
- Rain gardens
- Vegetated swales
- Green roofs
- Permeable pavement

LID site planning and design considerations:

- Preserving natural vegetation and utilizing native plants
- Clustering development & preserving open space
- Designing buildings and roads to minimize impervious surface cover

Is LID difficult to implement?

LID is versatile and easiest to apply to new developments. LID takes a bit more planning and organization to implement in retrofits and redevelopment/revitalization projects, but is absolutely possible.

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Create a Stormwater Master Plan

Important components of a stormwater master plan include:

- Detecting and eliminating illicit discharges (e.g. floor drains that send gray water to water treatment facilities)
- Encouraging wetland and/or riparian zones
- Preventing erosion
- Reducing stormwater pollutants and volume of stormwater runoff
- Creating visible demonstration projects around town
- Encouraging LID practices and engaging the community to become involved and invested in saving and using stormwater

Pass a Stormwater Ordinance

The key features of a stormwater ordinance should include:

- A standard of no net runoff from new development
- Flexibility for developers to use a wide range of non-structural low-impact development (LID) techniques to achieve the standard (See sidebar for more information on LID)
- Revision of outdated requirements, such as excessively wide streets, large setbacks, excessive parking, or traditional stormwater infrastructure
- Appropriate language to craft an ordinance for your particular conditions (see ***www.stormwater.net*** or **www.epa.gov/nps/ordinance/stormwater.htm** for examples of model ordinances)

Incorporate Stormwater into Local Zoning Ordinances

Amend zoning to include innovative stormwater management and land use practices, and use suitable language to craft an ordinance for your particular conditions (see websites above).

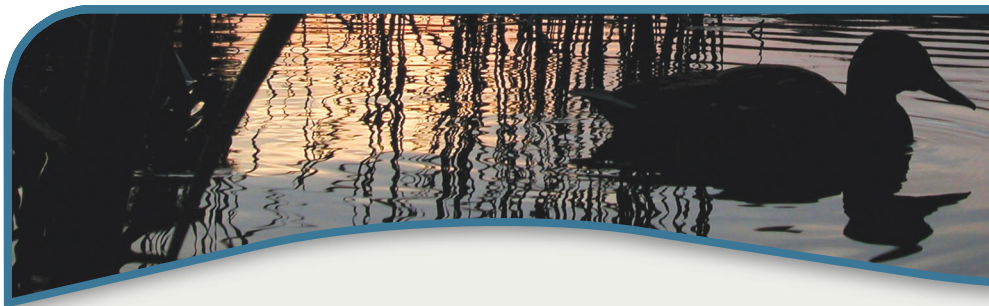
These conditions may include:

- Establishing special districts and uses, such as zoning overlay districts and special districts to place conditions on certain uses in sensitive areas
- Approving code revisions to allow slightly smaller driving aisles and parking stalls to reduce costs and amount of impervious surface
- Adopting local ordinances to restrict land use near water bodies and control stormwater runoff into water bodies by establishing floodplain regulations, wetland protection laws, open space protections, ground water protections, soil erosion control measures, illicit detection and elimination measures, and stream buffer protections

Integrate Sound Stormwater Management Practices

Implement a system of stormwater best management practices (BMPs) in your community such as:

- Oil and grit separators
- Sand filters
- Street sweeping
- Chemical-free landscaping and lawn maintenance
- Proper vehicle and equipment maintenance paints, etc.
- Catch basin inserts
- Infiltration basins
- Salt alternative deicers
- Proper disposal of pollutants such as oils, fuels, cleaners,
- LID techniques



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Make the rain work for your community and achieve great benefits!

Economic Benefits:

- Reduce damages from flooding, erosion, and sewage overflows
- Reduce the load on the current stormwater infrastructure, and potentially eliminate the necessity and cost of replacing that system
- Reduce stormwater infrastructure and save costs on construction, site preparation, clearing, grading, pipes, ponds, inlets, curbs and paving
- Save money by using harvested rainwater vs. treated city water for landscape maintenance
- Reduce pollution to your local waterways and sustain and encourage tourism

Environmental Benefits:

- Improve ground water recharge to protect the drinking water resource
- Protect and improve water quality of local waterways
- Prevent exposure to harmful pollutants
- Ensure the viability of fish, wildlife, and other aquatic life in lakes, rivers, and streams

Quality of Life:

- Maintain or restore natural areas and open space to create a positive sense of place for community members and appeal to visitors
- Maintain and improve community aesthetics
- Protect recreational opportunities such as fishing, swimming, and boating
- Preserve water quality and protect the resource for future generations to enjoy

Resources

There are a number of excellent resources on Integrated Stormwater Management and Low Impact Design. Please see Runoff to Renewal Resources on the web: www.glhabitat.org.

This is one of several tools developed by the Great Lakes Aquatic Habitat Network and Fund, Inc. with the help of various other organizations. Designed to help grassroots advocates and municipal leaders creatively address stormwater in their communities, we encourage you to pursue this conversation with others.

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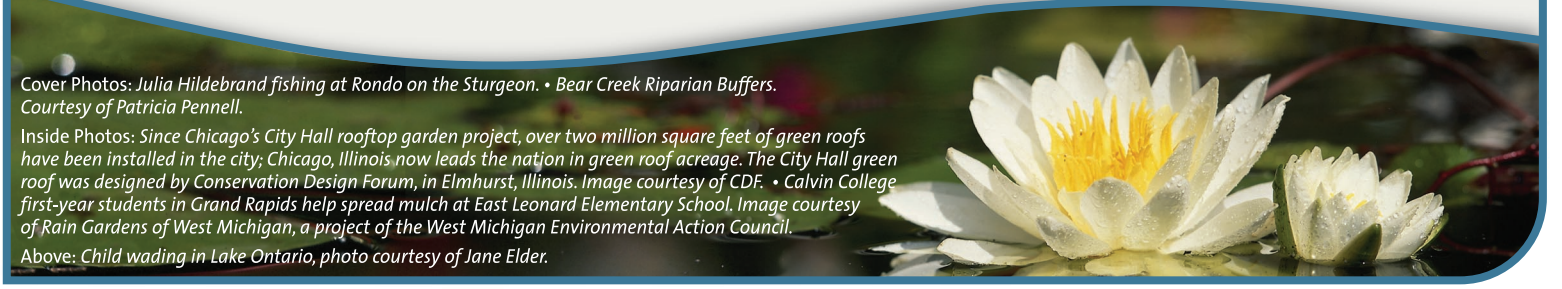

Cover Photos: *Julia Hildebrand fishing at Rondo on the Sturgeon. • Bear Creek Riparian Buffers. Courtesy of Patricia Pennell.*

Inside Photos: *Since Chicago's City Hall rooftop garden project, over two million square feet of green roofs have been installed in the city; Chicago, Illinois now leads the nation in green roof acreage. The City Hall green roof was designed by Conservation Design Forum, in Elmhurst, Illinois. Image courtesy of CDF. • Calvin College first-year students in Grand Rapids help spread mulch at East Leonard Elementary School. Image courtesy of Rain Gardens of West Michigan, a project of the West Michigan Environmental Action Council.*

Above: *Child wading in Lake Ontario, photo courtesy of Jane Elder.*