

# stormwater



## The Water Resource Protection and Conservation Toolkit

This is one of a series of 12 fact sheets developed by the Northwestern Indiana Regional Planning Commission with funding from the Joyce Foundation for the Water Resources Protection and Conservation Toolkit. The toolkit provides background on, and methods to protect and conserve local water resources. These tools are intended to help citizens and local officials to manage and protect water resources for future generations.

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## What Tools Do Local Officials Have To Protect Local Waters From Stormwater Pollution?

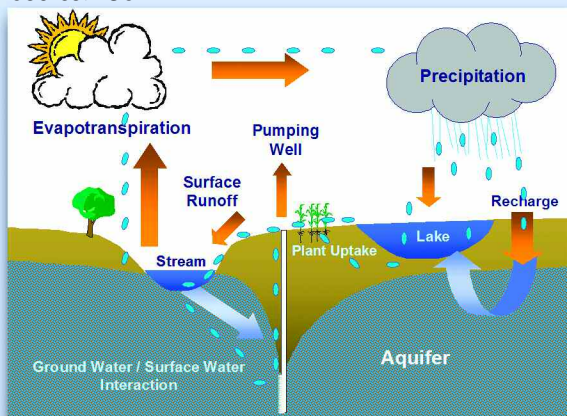
When it rains, stormwater goes into the ground and some goes into storm sewers. As more development occurs, more hard surfaces, such as rooftops and roadways are created, meaning there are fewer places where rain water can soak into the soil, nourish plants and remain part of the natural water cycle. **One inch of rainfall on a 1000 square foot roof will yield 623 gallons of storm water runoff!** Without greenspace to absorb it, sewer systems are forced to handle more water, increasing the risks of flooding. Stormwater sent to sewers is no longer available to irrigate lawns or recharge groundwater.

Further, stormwater runoff can gather pollutants such as oil and grease, chemicals, nutrients, metals, and bacteria as it flows across surfaces and transports it to destinations in groundwater, streams, rivers, lakes, and other water bodies. A planner or engineer needs to make informed decisions on managing stormwater and retrofitting existing systems to compensate for the changes in the water cycle caused by new and existing development.

The United States Environmental Protection Agency controls stormwater and sewer overflow discharges through its National Pollutant Discharge Elimination System (NPDES). NPDES provides guidance to permitting authorities on how to meet stormwater pollution control goals. Industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. Under the NPDES storm water program, operators of large, medium, and regulated small municipal separate storm sewer systems (MS4s) require authorization to discharge pollutants under an NPDES permit.



Source: USEPA



## Water Resources and The Natural Water (or Hydrologic) Cycle

Water resources can be significantly affected by development activities. Water resources move through the water cycle, sometimes called the hydrologic cycle. The water cycle is the continuous movement of water from ocean, lakes, rivers, and other water bodies to air and land then back to these water bodies through rain and snow in a cyclic pattern as water is used and re-used. Some water infiltrates (or seeps into) the ground or evaporates back into the atmosphere.



Parking bioswale

Source: Northeastern Illinois Planning Commission

## What are the Key Issues in Developing Stormwater Plans?

Stormwater can be managed through planning and the use of structural (constructed or engineered) and nonstructural (planning) activities. The Center for Watershed Protection outlines six key questions that managers need to address in developing a stormwater management plan.

1. What is the most effective mix of structural vs. non-structural stormwater management practices that can meet watershed goals?
2. Which variables of the natural water cycle do we want to manage in the subwatershed (*recharge, channel protection, flood reduction, etc*)?
3. What are the main stormwater pollutants that need to be addressed (*phosphorus, bacteria, sediment, metals, hydrocarbons, or trash and debris*)?
4. Which stormwater management practices should be used or avoided in the subwatershed because of their environmental impacts?
5. What is the most economical way to provide stormwater management?
6. Which stormwater management practices are the least burdensome to maintain within local budgets?

## What Should a Stormwater Management Ordinance Include?

Local governments have the opportunity to be leaders in protecting and rehabilitating local water resources for the community by enacting and enforcing critical stormwater management ordinances. The main goal of a stormwater management ordinance is to limit surface runoff rate and volumes and reduce water runoff pollution loadings. Such ordinances should reflect the primary goals of stormwater management. The primary goals are:

- Maintain groundwater recharge and quality.
- Reduce stormwater pollutant loads.
- Protect stream channels.
- Prevent flooding and move the water safely during big storms to reduce the danger of flooding.

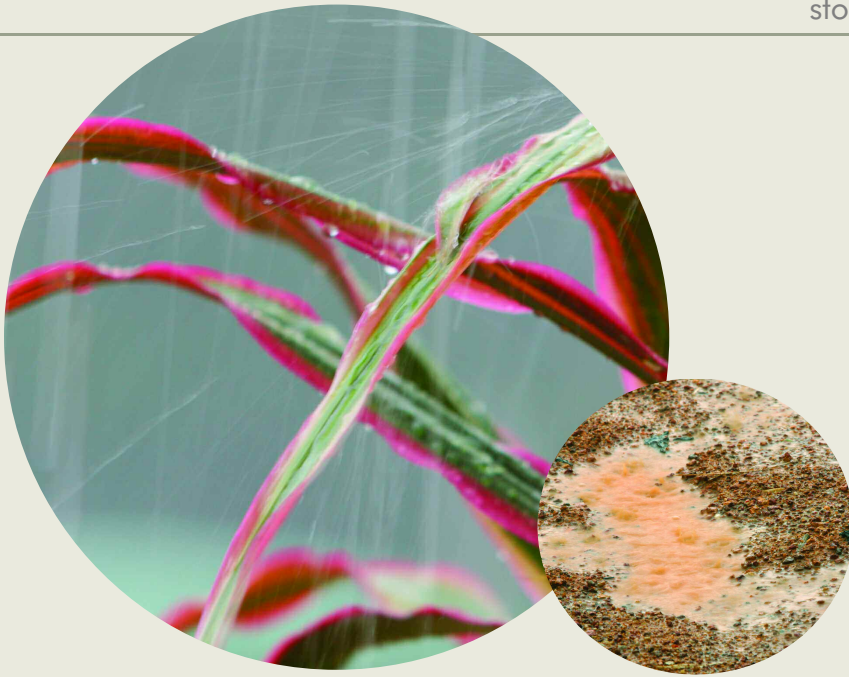
To create the most effective ordinance possible, the following should be included in a stormwater management ordinance:

1. **A guidance manual for Best Management Practices.** Best management practices are activities and site design elements that prevent pollution from moving from land into water sources after rain storms and snow melt. Rather than enacting BMPs in an ordinance, it is best to refer to a guidance that can be updated more easily to reflect changes in technology and practice.
2. **A requirement that all development projects include a construction and post-construction stormwater management plan.** Managing the site during and after construction protects topsoil and keeps pollution from washing into streams and rivers.



Source: Northeastern Illinois Planning Commission





Source: Northeastern Illinois Planning Commission

3. **Maintenance plans for stormwater BMPs.** Once completed, the BMPs must be maintained to make sure they do not stop working.
4. **Use of impact fees.** “Impact fees” are financial contributions (i.e., money, land, etc.) imposed by communities on developers or builders to pay for capital improvements within the community necessary to service/accommodate the new development such as long-term development and maintenance of community stormwater systems.
5. **Enforcement measures, including civil and criminal penalties.** Without enforcement measures, there would be little incentive for some developers to meet the requirements of the ordinance. Enforcement examples are fines and imprisonment.

Neighboring communities should work together through watershed management planning to ensure their stormwater management plans that include construction and post-construction ordinances are consistent with each other’s ordinances and watershed goals.

## What Are Examples of Good Stormwater Ordinances?

**Grand Traverse County, Michigan Soil Erosion and Stormwater Runoff Control Ordinance, including construction and post-construction runoff control.**

[www.stormwatercenter.net/Model%20Ordinances/Post%20Construction%20Stormwater%20Management/grand\\_traverse\\_county\\_soil\\_erosi.htm](http://www.stormwatercenter.net/Model%20Ordinances/Post%20Construction%20Stormwater%20Management/grand_traverse_county_soil_erosi.htm)

**Model Stormwater Management Ordinance and Guidance, Northwestern Indiana Regional Planning Commission,**

[www.nirpc.org](http://www.nirpc.org)

**Operation and Maintenance Criteria for Stormwater Practices,**

[www.stormwatercenter.net/Model%20Ordinances/Operation%20&%20Maintenance.htm](http://www.stormwatercenter.net/Model%20Ordinances/Operation%20&%20Maintenance.htm)

**Post-Construction Stormwater Management Ordinances, USEPA**

[www.epa.gov/owow/nps/ordinance/postcons.htm](http://www.epa.gov/owow/nps/ordinance/postcons.htm)

**Post-Construction Stormwater Management Ordinances, Stormwater Center,**

[www.stormwatercenter.net/Model%20Ordinances/Post%20Construction%20Stormwater%20Management/post\\_construction\\_runoff\\_control.htm](http://www.stormwatercenter.net/Model%20Ordinances/Post%20Construction%20Stormwater%20Management/post_construction_runoff_control.htm)

**Stormwater Manual Builder,**

[www.stormwatercenter.net](http://www.stormwatercenter.net)

**Stormwater Ordinances,**

[www.stormwatercenter.net](http://www.stormwatercenter.net)

**Watershed Development Ordinance, Lake County Illinois,**

[www.co.lake.il.us/smc/regulatory/wdo/default.asp](http://www.co.lake.il.us/smc/regulatory/wdo/default.asp)



**Permeable parking lot**

Source: Northeastern Illinois Planning Commission

## What are Some Good Ways to Protect Stormwater?

### Catching the Rain: a Great Lakes Resource Guide for Natural Stormwater Management, American Rivers

[www.americanrivers.org/site/DocServer/CatchingTheRain.pdf?docID=163](http://www.americanrivers.org/site/DocServer/CatchingTheRain.pdf?docID=163)

A report by American Rivers offers an easy reference to a variety of natural stormwater management approaches suitable for the Great Lakes region.

### An Eight-Step Approach to Stormwater Retrofitting: How to Get Them Implemented, Center for Watershed Protection,

[www.cwp.org/retrofit\\_article.htm](http://www.cwp.org/retrofit_article.htm)

### Lake County Stormwater Management Commission Technical Reference Manual, Lake County, Illinois,

[www.co.lake.il.us/smc/regulatory/tac/refmanual.asp](http://www.co.lake.il.us/smc/regulatory/tac/refmanual.asp)

### Stormwater BMP Design Supplement for Cold Climates, Center for Watershed Protection,

[www.cwp.org/cold-climates.htm](http://www.cwp.org/cold-climates.htm)

### Watershed-Based National Pollutant Discharge Elimination System Permitting Implementation Guidance, USEPA

[www.epa.gov/npdes/pubs/watershedpermitting\\_finalguidance.pdf](http://www.epa.gov/npdes/pubs/watershedpermitting_finalguidance.pdf)

For more information, please contact:

Northwestern Indiana Regional Planning Commission

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## General Resources

**Planning with Power,**  
[www.planningwithpower.org](http://www.planningwithpower.org)

**Stormwater Best Practice Database.**  
A database of stormwater best management practices with information on how well the BMPs work.  
[www.bmpdatabase.org](http://www.bmpdatabase.org)

**The Stormwater Management Resource Center web page,**  
[www.stormwatercenter.net/](http://www.stormwatercenter.net/)

A website designed specifically for local government officials. It includes information on building a stormwater manual, model ordinances, monitoring and assessment tools, public outreach tools, and presentations.

**USEPA NPDES website.**  
[http://cfpub.epa.gov/npdes/home.cfm?program\\_id=6](http://cfpub.epa.gov/npdes/home.cfm?program_id=6)

**USEPA Stormwater Page**  
[www.epa.gov/ebtpages/watestormwater.html](http://www.epa.gov/ebtpages/watestormwater.html)

This site provides information on EPA stormwater management requirements and resources on developing and managing effective stormwater management plans.

