



# Rain Gardens and Landscaping for Stormwater Management

## Stormwater Runoff: An Introduction



### I. What is *stormwater*?

- Stormwater is water that results from rainstorms or melting snow.
- This water is important in replenishing our surface and groundwater.
- Groundwater is essential in feeding local streams, maintaining flow, regulating water temperature and sustaining aquatic life. It is why our streams do not dry up even in the driest of times.

### II. What is *stormwater runoff*, or *polluted runoff*?

- In our cities, rain falls on roads, parking lots, roofs and other hard surfaces. It runs off into storm drains or ditches instead of soaking into the ground. This causes flooding problems.
- Stormwater also causes water quality problems. Stormwater runoff can contain:
  - gasoline, motor oil, salt and car wash water
  - household products and paints
  - pesticides, herbicides, fertilizer
  - grass clippings, yard and pet waste
  - construction materials, soil and trash
- The main pollutant concerns are:
  - soil (Wisconsin's number one stormwater pollutant)
  - bacteria from manure, feces and sewage
  - fertilizer
  - trash
- Eventually polluted runoff goes into our rivers and lakes and is a major cause of pollution in our waterways.



### III. Why is polluted stormwater a problem?

- Water quantity problems—flooding
- Water quality problems—pollution
  - Pollution makes water unsafe for human use.
  - Pollution makes water unsafe for drinking.
  - Excessive algae growth makes boating, fishing and swimming unpleasant and negatively affects recreation and tourism.
  - Pollution harms aquatic life.

### IV. What is the solution to stormwater runoff?

- Historically, stormwater has been managed by engineering detention ponds
  - This is expensive and can have aesthetic problems.
- A better solution is to make urban areas act more like natural areas
  - Traditionally, buildings have been designed to collect and concentrate water, and convey water off properties as quickly as possible.
  - Instead, we need to get rainwater from our properties to infiltrate into the ground, and not runoff into sewers and rivers.
  - Rain gardens are one way to increase rainwater infiltration.

## Rain Gardens: Landscaping to Decrease Polluted Stormwater Runoff



### I. What is a *rain garden*?

- A rain garden is a slightly depressed garden located where it can catch water from a roof, downspout, driveway or yard, thus promoting slow infiltration of water rather than polluted runoff.
- Rain gardens generally infiltrate 30% more water into the ground than conventional lawns.
- Typically, a rain garden is:
  - Planted with native perennial plants that can withstand both wet and dry conditions.
  - Dug 4-6 inches deep with a flat bottom.
  - In a low area that usually accumulates rainwater but is not permanently wet.
  - Located near the down slope of a building's downspout, or wherever the rain garden will catch water coming from a yard or building via gravity.
  - At least 10 feet from any foundation (to avoid basement drainage).
  - Either formal or informal in design depending on the desired look.

### II. Benefits of rain gardens

- Allow rainwater to soak in and replenish groundwater, thus protecting and restoring natural hydrology, and maintaining natural river levels and flows throughout the year.
- Minimize runoff that causes increased water levels and flooding during strong rain events.
- Attractive addition to property and enhance the beauty of any city or communal space (libraries, schools, city halls, etc.).
- Create wildlife habitat.

### III. The value of using native plants, either in a rain garden or individually throughout a lawn

- Native plants provide a vegetative buffer that filters pollutants and prevents them from entering waterways.
- Deeper root systems absorb more storm water.
- Native plants are already adapted to their native habitat, so they require little to no fertilizer and pesticides.
- After being established, they require no watering.
- After the first several years, native plants require little to no maintenance.

### IV. Rain garden basics:

- Places to use rain gardens:
  - down slope of any lawn area
  - parkways, swales, storm ditches
  - parking lots, industrial locations
  - storm drain buffer
  - green roofs
- Considerations for selecting the best spot for a Rain Garden:
  - It is a good idea to check with a city engineer to make sure there are not ordinances against disconnecting a downspout or other factors in creating a rain garden.
  - Rain garden should be at least 10 feet from any foundation (to avoid drainage into basement).
  - Rain garden should not be located over a septic system.
  - Garden should not be located where water permanently exists.
  - Sunny or partly sunny locations are best, but a shade garden is possible.
  - The flatter the site the better: less than 12% slope.
- Rain garden depth and size are determined by balancing these considerations:
  - size of drainage area (The larger the drainage area, the larger the garden should be.)
  - slope of garden (Steeper gardens might need terracing or need to be deeper.)
  - soil permeability (Sand-like soils are more permeable and allow for smaller gardens; clay-like soils are less permeable and require larger gardens.)
  - desired garden size to ensure garden integrates with other landscaping



## Rain Barrels: An Environmentally Friendly Addition to any Lawn or Garden



### I. What are *rain barrels*?

- Rain barrels collect and store rainwater, which results in less stormwater runoff and more infiltration.
- Commonly, a plastic 50-gallon barrel or container of similar capacity is of adequate size.
- To order a rain barrel:
  - Every Drop Counts <<http://www.everydrop.org/rainbarrel.php>>
  - Keep Greater Milwaukee Beautiful (KGMB) 414-272-KGMB <<http://www.kgmb.org>>
  - Milwaukee Metropolitan Sewerage District (MMSD) <<http://www.mmsd.com>>
- If you don't purchase a rain barrel, try a bucket!

### II. Benefits of rain barrels

- Can be set to save water for later use or slowly release it into the ground.
- Reduce the need for irrigation by directing rain barrel water to gardens or ornamental plants.
- Natural rainwater is much better for plants than city water because it is not chlorinated and only mildly acidic.
- Help lower water costs.
- Reduce polluted stormwater runoff by keeping runoff on property rather than enabling it to carry pollutants into storm drains, rivers and lakes.
- Reduce stress on sewers that can cause raw sewage overflows.
- Help prevent flooding after a strong rain event.
- Reduce erosion, sedimentation and pollution by reducing amount of water rushing off property.

### In Conclusion: Actions Everyone Can Take to Prevent Polluted Stormwater Runoff



- Plant rain gardens and green roofs.
- Disconnect downspouts and install rain barrels.
- Minimize use of fertilizers and other lawn chemicals.
- Properly manage yard waste.
- Minimize salt use.
- Go to commercial car washes.
- Properly dispose of household hazardous waste.
- Choose not to litter.
- Clean up pet waste.

## Additional Resources

Friends of Milwaukee's Rivers. <<http://www.mkeriverkeeper.org>>

Wisconsin DNR-Rain Gardens. "Rain Gardens Infiltrating Wisconsin!"  
<<http://www.dnr.state.wi.us/org/water/wm/nps/rg/index.htm>>

UW-Extension ERC Natural Resources Education Publications. "Home and Garden Clean Water Practices." <<http://clean-water.uwex.edu/pubs/home.htm>>

United States Department of Agriculture, Natural Resources Conservation Service. "Backyard Conservation" <<http://www.nrcs.usda.gov/feature/backyard>>

Healthy Communities Project. <<http://www.healthycommunitiesproject.org>>

Lesslawn.com. <<http://www.lesslawn.com>>

Greater Madison Healthy Lawn Team, Inc. <<http://www.healthylawnteam.org/home.htm>>

Bayer, David. University of Wisconsin Extension. "Lawn Care Facts."  
<<http://www.uwex.edu/CES/cty/Outagamie/hort/documents/LawnCareTips.pdf>>

Larson, Barb. University of Wisconsin Extension. "Wisconsin Lawn Care Calendar."  
<<http://wihort.uwex.edu/gardenfacts/XHT1147.pdf>>

University of Wisconsin-Madison. "Soil & Plant Analysis Lab."  
<<http://uwlab.soils.wisc.edu/madison/>>

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- Keep Greater Milwaukee Beautiful. <<http://www.kgmb.org>>
- Milwaukee Metropolitan Sewerage District. <<http://www.mmsd.com>>

