Municipal And Parcel-Scale Best Management Practices (BMPs)

►Green Infrastructure

OVERVIEW

Urbanization leads to an increase in impervious surface area. Impervious surfaces allow stormwater runoff to run (or sheet flow) over the surface rather than infiltrating into the ground. Examples of impervious surfaces include roads, roofs, parking lots, and sidewalks. Since impervious surfaces do not allow infiltration, they can transport pollutants such as heavy metals, fecal bacteria, nutrients, solids and other debris into nearby stormwater inlets during rainfall or snowmelt events.

Photo credit: Wisconsin DNR

Photo credit: Wisconsin DNR

At the same time, surface runoff over impervious surfaces delivers water into the storm sewer system at a much faster rate.

While rainfall events are a significant source of stormwater runoff, runoff from excessively watering vegetation can also transport pollutants during dry weather conditions. Excessively running lawn sprinklers or watering vegetation with a garden hose are examples of dry-weather runoff activities.

What Is Green Infrastructure?

Green infrastructure refers to systems that can absorb or filter stormwater or slow the flow of water into storm sewers or waterways. Applying various green infrastructure practices disconnects impervious surfaces, directs polluted stormwater away from stormwater inlets and helps filter potential pollutants before they enter waterways.

COMMON MUNICIPAL-SCALE GREEN INFRASTRUCTURE PRACTICES

Bioretention (Bioretention Basins, Rain Gardens And Bioswales)

A bioretention device is a filtration and/or infiltration device consisting of an excavated area that is backfilled with engineered soil, covered with a mulch layer and planted with a diversity of woody and herbaceous vegetation. Storm water directed to the device percolates through the mulch and engineered soil, where it is treated by a variety of physical, chemical and biological processes before discharging to the surface through an underdrain and/or infiltrating into the native soil. Bioretention basins, rain gardens, and bioswales are a few examples.

Photo credit: Wisconsin DNR

- Requires routine maintenance, including cleaning inlets and outlets, weeding, replanting or slope stabilization to maintain proper drainage and aesthetics while preventing erosion.

- Effectiveness also depends on the type of vegetation planted. Generally, deep-rooted plants reduce pollution in biofiltration systems.

- This system also provides habitat for wildlife.

Permeable Pavement

Permeable pavement is an alternative to conventional pavement types (e.g., asphalt, concrete). Permeable pavement can filter and infiltrate storm water that would otherwise run off conventional pavement types. Examples include permeable pavers, permeable asphalt and porous concrete.

Photo credit: Wisconsin DNR

- Requires routine surface cleaning maintenance to prevent clogging.
- Permeable pavement has been found to reduce total suspended solids while reducing storm water volume, which helps prevent flooding and combined sewer overflows (CSOs).

Curb Cuts

Curb cuts are breaks in roadway curbs that direct storm water to green infrastructure practices such as rain gardens or bioretention basins. These practices reduce the amount of polluted storm water entering storm water inlets. Curb cuts require relatively little maintenance to remove debris impeding flow.

Riparian Buffers Around Waterways

Planting vegetation along streams can help capture fecal bacteria from surface runoff before it enters the waterway.

- Maintaining native vegetation requires plans to manage invasives. The city of Fitchburg has a comprehensive guide on implementing and maintaining vegetation around storm water ponds and channels.
- Reduces peak flow and storm water volume, which helps prevent flooding and CSOs.
- Could be relatively easy to implement in municipal areas. For waters on private land, this would require education or incentive programs to encourage the implementation of riparian buffers.

- Planting tall vegetation around ponds also discourages wildlife from congregating around surface water, a source of fecal bacteria.

COMMON PARCEL-SCALE GREEN INFRASTRUCTURE PRACTICES

Encourage Residents, Businesses And Schools To Disconnect Downspouts

Disconnect gutters and divert water to rain gardens, rain barrels or other pervious surfaces instead of sending water from gutters to impervious surfaces near storm water inlets during significant rain events.

- It is recommended to have at least a 20 feet flow path across a vegetated area to provide infiltration.
- Consideration should be given to where the flow path goes and may not be appropriate for certain areas. For example, if water flows to a sidewalk, this can ice over in the winter.
- Requires relatively low maintenance to ensure gutters are clean and working properly and there isn't significant erosion where water is let out.
- Encouraging individuals requires education or incentive programs.
- Effects of this action have been shown to significantly reduce runoff volume, which helps reduce flooding and CSOs.

Install Rain Barrels

Rain barrels capture water from downspouts and allow residents to use rainwater for gardening. At the same time, it reduces the influx of water into the storm sewer system during rain events. Some examples of municipal programs include rain barrel workshops or distribution programs.

- Relatively low maintenance.
- For rain barrels to be effective, rain barrels should be used or drained between rainstorms.

- Ideal to use for irrigation purposes.
- Encouraging individuals requires education or incentive programs like providing discounted rain barrels or educational workshops.
- Has been shown to reduce runoff volume, which helps reduce flooding and CSOs.

Adopt Local Ordinances On Planting Native Vegetation

Photo credit: Wisconsin DNR

Create and adopt an ordinance that encourages native plantings, such as prairie vegetation, on private and municipal property. Some example ordinances allow plants over a certain height and do not declare them weedy or noxious if they are native.

Some ordinances also declare properly maintained structures such as rain gardens or riparian buffers are acceptable forms of vegetation.

- This allows residents to plant deep-rooted native plants without being considered weedy by city officials or homeowner's associations (HOAs).
- Municipalities should educate their staff on when not to issue a weedy or noxious violation if they are tall native plants.
- The ordinance needs to define the difference between native plantings and weeds. Additionally, it should define required maintenance so native plantings do not become weedy.
- These plants do not need to be watered often, which decreases the runoff that could occur while watering the vegetation (e.g., hose, sprinkler system, etc.).

ADDITIONAL RESOURCES

General

- Overcoming Barriers to Green Infrastructure | US EPA
- Five Types of Green Infrastructure Incentive Programs - Stormwater Report (wef.org)
- Green Infrastructure Funding Opportunities | US EPA
- Urban Nonpoint Source & Storm Water Management Grant Program | | Wisconsin DNR
- Low Impact Development Toolkit (Includes Case Studies of Successful Green Infrastructure Project – City of Mesa

Permeable Pavement

- Permeable Pavement Technical Standard - Wisconsin DNR
- Pervious Concrete Pavement Maintenance and Operations Guide - National Ready Mix Concrete Association
- Permeable Pavement Maintenance Plan for Private Landowners – City of Puyallup
- Permeable Pavement Maintenance – Wisconsin DNR

Rain Gardens

- Rain Garden Technical Standard - Wisconsin DNR
- Rain gardens: a beautiful way to reduce runoff pollution! - Wisconsin DNR

Curb Cuts

- Curb cut Information and Maintenance - Stormwater Partners

Riparian Buffer Strips

- Standard Filter Strip Technical Standard - USDA

- **Riparian Forest Buffer Technical Standard - USDA**
- **City of Fitchburg Stormwater Pond Vegetation Recommendations - City of Fitchburg**
- **Aquatic Plantings - Wisconsin Lake & Pond**

Rain Barrels/Disconnecting Downspouts

- **Starting a Municipal Rain Barrel Program - Rain Water Solutions Inc.**
- **Municipal Rain Barrel Sales – City of Lafayette**
- **Downspout Disconnection, General Information, Maintenance, and Example Programs – Pioneer Valley Planning Commission**

Native Plantings Ordinance Example

- **Native Landscaping Ordinance Examples.pdf (state.mn.us)**

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Disclaimer: This fact sheet is intended to be used for informational purposes only. These examples and references are not intended to be comprehensive and do not preclude the use of other technically sound practices.

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