

Identify and Prioritize Treatment Solutions

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Overview

- What is Stormwater?
- Stormwater Challenges
- Treatment Mechanisms
- Prioritize Solutions
- Assessment
- Conclusions



Photo Courtesy: A. Erickson



What is Stormwater?

- Stormwater runoff is the water that flows over the ground surface or into conduits as a result of rain storms, snowmelt, or both. (Gulliver et al., 2009)



Photo Courtesy: A. Erickson



Stormwater Challenges

- Storm water runs off...
 - from a variety of land uses: roads, roofs, lawns, parking lots, parks, etc.
 - with many pollutants, both particulate and dissolved, at varying concentration
 - at varying flow rate, volume, and duration
 - all at the same time!



Treatment Mechanisms

- Settling: good for particles





Treatment Mechanisms

- Filtration: Better for particles





Treatment Mechanisms

- Infiltration: Good for reducing runoff volume





Treatment Mechanisms

- Chemical or Biological: Good for dissolved





Prioritize Solutions

- To select the best treatment practice, consider:
 - What's in the stormwater runoff?
 - What's in your watershed?
 - What space do you have available?
 - What's downstream (receiving waters)?
 - What's the most cost-effective solution?



But how well does it work?

- After installation, there's more to do!
 - How well is it working?
 - What maintenance does it need?
 - When does it need maintenance?
 - When should it be replaced?
- These questions are answered with **Assessment!**



Level 1: Visual Inspection



*Visual Inspection of rain gardens in
Maplewood, MN*

Non-functional Rain garden.

Rain garden that may be functional.




*Photos courtesy of B. Asleson & R.
Nesting*



Visual Inspection Checklists

- Inspector's Name (s)
- Date of Inspection
- Site Information
- Rainfall Information
- Pretreatment
- Access
- Inlet structures
- Vegetation
- Bank erosion
- Sediment accumulation
- Outlet structures
- Recommendations
- Schedule Maintenance!

Biologically Enhanced Practices



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**Stormwater Treatment:
 Assessment and Maintenance**

**Field Data Sheet for Level 1 Assessment: Visual Inspection
 Bioretention Practices (including Rain Gardens)**

Inspector's Name(s): _____
 Date of Inspection: _____
 Location of the bioretention practice: _____
 Address or Intersection: _____
 Latitude, Longitude: _____
 Date the bioretention practice began operation: _____
 Bioretention practice area (ft. x ft.): _____
 Time since last rainfall (hr): _____
 Quantity of last rainfall (in): _____
 Rainfall Measurement Location: _____

Site Sketch (include inlets, outlets, north arrow)

Based on visual assessment of the site, answer the following questions and make photographic or video-graphic documents:

- Has visual inspection been conducted at this location before? Yes No I don't know
 - If yes, enter date: _____
 - Based on previous visual inspections, have any corrective actions been taken? Yes No I don't know (If yes, describe actions in comments box)
- Has it rained within the last 48 hours at this location? Yes No I don't know
- Does this bioretention practice utilize pretreatment practices upstream? Yes No I don't know (If yes, describe pretreatment practices in comment box)

Bioretention practice is: unobstructed Mostly obstructed Inaccessible
 Access restriction is (choose and provide comments): _____
 temporary **and** no action needed **or** action needed
 permanent **and** _____ before or during installation **or** _____ now since installation

To download FREE checklists, visit:
<http://stormwaterbook.safl.umn.edu/>



What to Look for



Photos courtesy of B. Asleson



Infiltration Testing





Conclusions

- Treatment practices must be chosen with the watershed in mind
- There are many solutions, but few are best
- Don't forget to maintain it!
- Use visual inspection to determine when and what to do for maintenance

Stormwater Treatment: Assessment and Maintenance



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Stormwater Treatment: Assessment and Maintenance

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Introduction

This website is an online manual that has been developed to help users assess the performance of and schedule maintenance for stormwater treatment practices. It is intended as a supplement to the *Minnesota Stormwater Manual*, which provides guidance for the design and installation of stormwater treatment practices.

This online manual provides a standardized methodology for the assessment and maintenance of stormwater treatment practices. It creates guidelines for assessing performance, reporting results, and scheduling maintenance which allows for comparison across geography, stormwater treatment practice type, season, and watershed.



Existing and developing communities are installing a wide variety of urban stormwater treatment practices in order to protect or rehabilitate receiving waters. These efforts incur costs while their environmental effectiveness is still in question, and the many variables involved (e.g., seasons, geology, topography, storm events, etc.) have made it historically difficult to compare results (Wiese et al. 2007). After assessment results are compared with stormwater management goals, users are able to proceed more effectively with their maintenance actions. To meet the needs of existing and developing communities, "Stormwater Treatment: Assessment and Maintenance" provides guidance on:

- The steps necessary to develop an assessment program including establishing a monitoring program
- Four levels of assessment ranging from visual inspection to more advanced methods
- More accurate methods for flow measurement in stormwater collection systems
- Advanced sampling methodologies that will help minimize potential sources of bias

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Stormwater Assessment and Maintenance Project

Having trouble viewing this email? [Click here](#)

You're receiving this email because of your interest in stormwater management, assessment (including monitoring), and maintenance research at St. Anthony Falls Laboratory and the University of Minnesota.

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Stormwater Assessment and Maintenance
UPDATES

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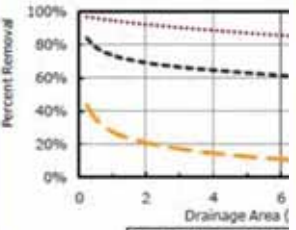
SPOTLIGHT ARTICLES

- Importance of Particle Settling
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Maintenance of Stormwater Treatment Practices



Welcome!

Thank you for reading our newsletter! Our purpose is to create opportunities for partnerships which are crucial to our quest for improving the methods for assessment and maintenance of stormwater treatment practices.

For past newsletters, publications, presentations and more information:

Towards a Temperature TMDL for Miller Creek

Contributed by [William Hays](#), Trinity Erickson, and Heide Stefan, University of Minnesota, St. Anthony Falls Lab.

Miller Creek is a trout stream which originates near Duluth International Airport, flows through the cities of Hermantown and Duluth, MN and discharges into Lake Superior (Figure 1). Despite a highly urbanized watershed (23% impervious surfaces), Miller Creek has a naturally reproducing Brook Trout fishery. Miller Creek is temperature impaired and was recently put on the list of impaired waters by the Minnesota Pollution Control Agency (MPCA). In support of the temperature TMDL for Miller Creek. [\[read more\]](#)

Fielded by Minnesota Pollution Control Agency Urban Stormwater Program

Events Calendar

Questions?

<http://stormwaterbook.safl.umn.edu/>