Practical Tools for Managing Stormwater Runoff

March 9, 2019
Land and Water Summit
Today’s Highlighted Resources
Highlighted Resources... Continued
So Why Are We Here Today?
Soil Erosion and Sediment Control Training

Rhode Island Stormwater Solutions

Soil Erosion and Sediment Control Online Training

Thank you to a partnership between URI Cooperative Extension and StormwaterONE, with funding from RIDOT and support from RIDE, we are pleased to offer an online soil erosion and sediment control (SESC) training program tailored to construction in RI.

The overall program and each of the four course options are detailed in fact sheets below.

Program Overview & Level 1: Awareness

Level 1 Enrollment Link

Level 2: Introduction

Level 2 Enrollment Link

Level 3: SESC Inspections

Level 3 Enrollment Link

Level 4: SESC Plan Preparation

Level 4 Enrollment Link
Rhode Island General Construction Stormwater Awareness Training
Soil Erosion and Sediment Control Training

**Action Items:**

- Advocate for this training.
- Suggest it be required for certain building permit applicants.
- Share with Land Trust members.
- Share with construction community.
Spotting Stormwater Violations
What’s Wrong With This Picture?

Notice: Erosion Control Stormwater Violations

Construct sites are required to install and maintain control measures that prevent soil erosion (runoff water, wind, or gravity move soil from one location to another). These erosion controls help keep local waters clean, and prevent flooding, soil loss, and other long-term consequences of erosion.

Look familiar? Contact your Stormwater Manager if you see anything from the “Make Report” column, as these are illegal discharge. Use the “All Good” column to learn about the best practices that control soil erosion.

Please Report

- Muddy water flowing from construction site at E11B discharge.
- Filter fabric on storm drain is a bad line of defense against sediment entering waterways. Please replace.
- Crushed stone has been placed at the construction site entrance, which reduces sediment being kicked up into the air. Please collect and remove regularly.
- Sediment trapped on the construction site must be collected and removed regularly.
- A small construction site with no visible erosion control measures. Mostly water going down the drain.

All Good!

- Muddy water is an illegal discharge and a violation of the SPCC plan.
- The dried concrete here is evidence that concrete pathways, which are highly toxic to aquatic life, were being moved by runoff into storm drains.
- Sediment trapped on the construction site must be collected and removed regularly.
- There are no visible erosion control measures on this small construction site. Plus, there is no erosion control equipment.
- The sediment in this roadway is a public safety hazard.

Stormwater Matching

The correct use of soil erosion and sediment control BMPs ensures public safety, keeps local waters clean, and prevents flooding, soil loss, and other long-term consequences of erosion. Try to match the violation in the “Bad” column to the best practice in the “Good” column... and match the description to each photo. The first one is done for you.

Bad

- Filter fabric on storm drain is a bad line of defense against sediment entering waterways. Please replace.
- Sediment trapped on the construction site entrance must be collected and removed regularly.
- The dried concrete here is evidence that concrete pathways, which are highly toxic to aquatic life, were being moved by runoff into storm drains.
- There are no visible erosion control measures on this small construction site. Plus, there is no erosion control equipment.
- The sediment in this roadway is a public safety hazard.

Good

- A well-maintained pad of crushed stone has been placed where construction vehicles pull into and out of site, reducing the tracking of sediment into roadways. Photo credit: Environmental Protection Agency.
- The use of a designated concrete washout area allows for management of water generated from washing out ready-mix trucks, drums, and pumps.
- Filter fabric on storm drain is a bad line of defense against sediment entering waterways. They must be cleaned regularly. Photo: US EPA.
- This filter sock is appropriately placed between construction and a wetland. The area is free of accumulated sediment.
- Straw mulching is an effective and low-cost way to prevent soil erosion. Photo credit: University of Missouri-Tech.

Produced by US Department of Agriculture with funding from the US Department of Transportation and support from the Oklahoma Department of Transportation and Management.
Spotting Stormwater Violations

Action Items:

- ✅ Think about sediment. Think about storm drains. Know what to report!
- ✅ Report violations.
- ✅ Share this information!
- ✅ Continue to report!
- ✅ Help organize an event.
Rain Garden Maintenance
Maintenance and Care of a Rain Garden

What is a Rain Garden?

Rain gardens are designed to capture stormwater runoff from nearby impervious areas like rooftops and driveways so that rainwater can soak into the ground below, where pollutants are gradually filtered out instead of entering waterways. Simple inlet and outlet structures made from pipe, stone, or both help water enter and leave the garden. Rain gardens can be planted with a variety of native plants and maintained to appear anywhere from manicured to naturalistic.

Healthy & Functional

Any landscaped area requires maintenance—rain gardens are no different. Along with basic steps for maintaining plant health such as watering and weeding, rain gardens also require some attention to how water moves in and out and keeping edges and berms intact to prevent erosion from taking place. Regular inspections and maintenance will keep your rain garden healthy and allow it to soak up and clean plenty of stormwater.

Maintenance Checklist

**WEEKLY**

- **Water** 1 inch per week including rainfall for the first 3 years. Water new trees and shrubs weekly until soil at depth of roots is moist. Water established rain gardens during summer droughts and unseasonably hot and dry periods.
- **Weed** regularly, before seeds can spread.*
- **Mow** lawn around rain garden and direct clippings away from the rain garden as they can cause clogging. **Do not mow rain garden plants** (unless garden is designed to be mowed).
- **Clean up** trash, organic debris, and pet waste from within and around garden.
- **Inspect** the rain garden bed for standing water lasting over 48 hours after a heavy rain. This indicates a clogged surface layer.*

**MONTHLY**, following heavy rain, or as needed.

- **Replace plants** that are not thriving with approved native plants to maintain ground cover. Annuals may also be used to maintain ground cover.
- **Remove sediment buildup** from inflow structure and any flow channels including gutters if they are directed toward (garden) and from bed of rain garden when it accumulates 1 inch of sediment.
- **Cut back perennials** and more tall grasses (removing clippings) in the fall, or leave until early spring for winter interest and to provide habitat for birds and other wildlife.
- **Prune** trees and shrubs to encourage growth in the spring or fall.
- **Repair galleys** and any other problems caused by soil erosion in or near the rain garden.*
- **Stabilize soil** if there is erosion on areas draining to the rain garden. Cover bare soil with mulch or reseed.
- **Fill animal burrows** and gently pack if there are any in or around rain gardens.
- **Replenish mulch** once per year to a depth of 3-5”, using shredded non-dyed hardwood mulch.
- **Never fertilize** rain garden, apply pesticides, or add compost. Fertilizer and compost add nutrients that are not needed.

*See the Troubleshooting page for more information and guidance.
Troubleshooting

At some point a rain garden may begin to exhibit signs of trouble. This is normal; in order to function optimally, rain gardens almost always require some adjustment over time, especially when newly installed. Make a habit of inspecting the rain garden regularly, especially during and after heavy rains.

Plants are not thriving/are dying... When plants die and leave voids in the garden they must be replaced. The cause of poor plant health should be diagnosed before the plants are replaced. For assistance, contact URF Master Gardeners Marsh – October, Monday – Thursday, 9:00 AM – 2:00 PM by phone (401) 874 - 4836 or by email gardener@warwick.edu.

The original rain garden plants are being joined or outcompeted by invading plants... For help identifying weeds refer to In the Weeds, a stormwater system weed identification guide available to print or use from your mobile device at www.earthworksri.com/in-the-weeds-a-guide/

It looks like soil is moving within, into, or out of the rain garden... Erosion within the system signals different problems depending upon location.
- Erosion throughout the garden in the form of rills and gullies means energy dissipators like stones must be adjusted or added in order to spread the flow of water more evenly over the garden.
- Erosion at the edge of the garden indicates that runoff is entering at other points in addition to the inlet area—check that edges are intact or construct a berm to connect this.
- Erosion near or past the overflow means the rain garden is too small to handle the amount of runoff that it is receiving. Enlarge the footprint of the garden.

Sediment is building up in the rain garden... When sediment is building up at the inflow structure or on top of the mulch in the bed of the rain garden, then erosion is likely taking place outside of the rain garden. Remove the sediment build-up in the garden and check the contributing area, stabilizing the soil there if needed. If gutters are connected to the rain garden, they should be cleaned out regularly.

The rain garden has standing water over 48 hours after a rain storm... Stormwater is meant to pool in the rain garden for some time before infiltrating, but water standing over 48 hours after a rainfall indicates that the rain garden is clogged. Sediment entering the garden can form a wickable crust that will prevent drainage. If this happens, remove about 2” of surface crust and mulch with a flat shovelful and replace with fresh soil mixture and shredded non-dyed hardwood mulch. If the standing water problem persists, amend the rain garden soil with coarse sand or adjust the overflow structure to let more water out during a rain storm.

The rain garden looks different than when it was first installed... Rain gardens will change overtime. Plants that are most adapted to the site may multiply while others die out, shrubs and trees may begin to dominate, and new plants may settle in (and attract native pollinators). This naturalized look does not affect the functioning of the rain garden. If a more manicured look is preferred it can be achieved with weeding and pruning.
SLATER PARK WATERFOWL BUFFER PLANTS PHOTO GUIDE

BUFFER A

SWEET FLAG
Acorus americanus

ARROW ARUM
Peltandra virginica

BUFFER B

TUSSOCK SEDGE
Carex striata

FOX SEDGE
Carex vulpinoidea

SLATER PARK WATERFOWL BUFFER PLANTING PLAN

SLATER POND

KEY

PLANTED BEDS

Biological name
Acorus americanus
Yellow Flag Iris

Common name
Sweet Flag
Arrow Arum

BUFFER A

Botanical name
Iris versicolor

Common name
Blue Flag Iris

 BUFFER B

Botanical name
Schoenoplectus lacustris

Common name
Tussock Sedge

 BUFFER C

Botanical name
Festuca gigantea

Common name
Fox Sedge

 BUFFER D

Botanical name
Lobelia cardinalis

Common name
Cardinal Flower

Prepared by the City of Taunton, Design by Fidelis de Leon, Inc. Drafting by Ray B. Textual Content: Taunton Waterfront LLC.
Rain Garden Maintenance

Action Items:

✓ Consider a rain garden... and a sign!
✓ Share with friends.
✓ Share with town staff and boards.
✓ Explore “adopting” a town BMP.
In The Weeds

Use your phone (or work with your neighbor) to search:

“In the Weeds RI”

Using that mobile guide, try to determine what your picture is.
In The Weeds

Action Items:

- Learn to spot species that can easily overtake vegetated stormwater systems.
- If you see town BMPs that are being overtaken, bring it to their attention!
- But share this resource.... so that only the invasives are removed.
Rhode Island General Construction Stormwater Awareness Training

Rhode Island General Construction Stormwater Awareness Training
Putting It All Together

LID Site Planning and Design Techniques: Municipality Self-Assessment

GOAL #1: Avoid the impacts of development to natural features and pre-development hydrology.

UNDISTURBED OPEN SPACE
Objective: Protect as much undisturbed open space as possible to maintain predevelopment hydrology and allow precipitation to naturally infiltrate into the ground.

1. Has Conservation Development, or other types of compact development that require the preservation of natural resources, been adopted to protect open space and predevelopment hydrology?
   - Yes, it is required unless proven infeasible
   - Yes, it is allowed
   - No
   - N/A to highly urban
   - To be revisited

2. Is it required to mark limits of disturbance on all construction plans with details?
   - Yes
   - No

3. Is it required to have limits of disturbance installed prior to site work?
   - Yes
   - No

4. Are there limits on lawn area for residential lots in order to protect undisturbed open space?
   - Yes
   - No
   - N/A to highly urban

LIMITS ON LAWN AREA

Too often entire lots are paved with native trees and shrubs replaced with extensive high-maintenance lawns. Limiting lawn area allows for smaller building envelopes and larger areas of natural vegetation that can intercept and infiltrate stormwater much more effectively than mowed lawns. Smaller lawns have many other LID benefits:

- maximize protection of wetland buffers;
- reduce fertilizers and pesticides washing off as runoff or seeping into groundwater supplies;
- direct stormwater to naturalized areas as "Qualified Previous Areas" for treatment instead of constructed BMPs;
- conserve water and minimize summer water shortages*;
- reduce development costs by avoiding the need to restore areas compacted by construction activities before seeding, as specified in the RISE Handbook and Topic K.

Recommendations: the RUID Guidance Manual recommends limiting lawn to the lesser of 20% of the overall lot size or 5,000 square feet.

* The Town of North Kingstown has found that in neighborhoods with large lawns, summer water use triples due to lawn watering, leading to seasonal water bans that affect all residents.

LEFT: Consider a 25 ft setback to be sufficient for building construction and maintenance, and RUID/Wetland BMP Manual notes that a little as 10-15 feet can be an adequate distance from a structure to a wetland buffer. CENTER: Low-maintenance gardens with native plants will better infiltrate and treat stormwater. RIGHT: Compare the lawn area to the 1 acre lot conservation development to achieve the same results.


Return to Question 4.
Where Can I Find All This Information?

www.uri.edu/riss

Lorraine Joubert
ljoubert@uri.edu
401.874.2138

Lisa DeProspo Philo
lphilo@uri.edu
401.874.5687

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