

# RAIN GARDEN TRAINING

## RAIN GARDEN INSTALLATION AND MAINTENANCE

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*Fall 2015*

**RUTGERS**  
New Jersey Agricultural  
Experiment Station





THE FUN PART!

# INSTALLING YOUR RAIN GARDEN





# GETTING STARTED

- It is most effective to start the actual construction of the rain garden in the spring when the abundant rains will allow for best plant establishment and easier digging
- Summer/autumn start will also work, but the plants may need more watering until they become established



# INSTALLATION STEPS

1. Remove existing grass
2. Excavate to desired elevation and grade
3. Add soil amendments





# INSTALLATION STEPS

4. Prepare berm  
(if necessary)
5. Prepare  
overflow
6. Level the base  
(lowest area)



# INSTALLATION STEPS

**7.** Plant native species

**8.** Apply mulch

**9.** Water plants

**10.** Appreciate a job  
well done





# TOOLS & MATERIALS NEEDED



- Rakes and shovels
- Rototiller
- Wheelbarrow
- String level or survey equipment
- Measuring tape
- Triple-shredded hardwood mulch
- Plants

- Soil amendments, if necessary: fertilizer, pH adjustments (lime), coarse sand
- Optional: decorative stone, signage, seating, pipe extensions, pavers for path
- Work crew (friends, neighbors, and family)

# STEP ONE

- Delineate rain garden area



- Remove existing grass with a shovel or machinery





# STEP TWO

- Excavate to design depth based on necessary storage and soil amendment requirements



# STEP THREE

- Add soil amendments, if necessary

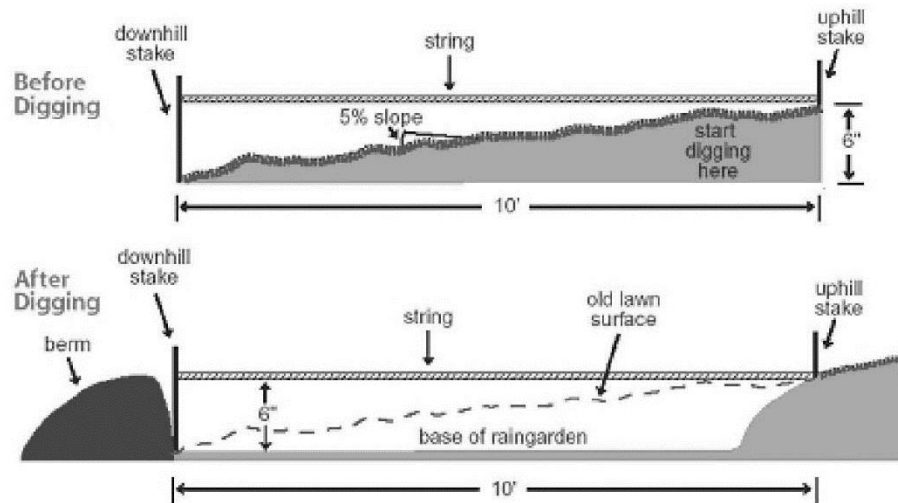


- Combine amendments with existing soil using shovels or rototiller
- Loosen and prepare soil for grading and planting



# STEP FOUR

- Prepare the berm, if necessary



# STEP FIVE

- Prepare the overflow



### BUFFER

The buffer, or outer edge, of the rain garden slows down the flow of water, filters out sediment, and provides absorption of the pollutants in stormwater runoff. Plants located in this area of the rain garden tolerate and thrive in dry soil.

### SLOPE

The slope of the rain garden pitches downward and connects the buffer of the rain garden to the base. It creates a holding area to store runoff awaiting treatment and infiltration. Plants situated in this area should tolerate both wet and dry soils equally.

### BASE

The bottom area is the flat, deepest visible area of the rain garden and is planted with plant species that prefer wet soil. The base should be level so that the maximum amount of water can be filtered and infiltrated. It is very important that this area drains within 24 hours to avoid problems with stagnant water that can become a mosquito breeding habitat.

### SAND BED

If drainage is a problem, a sand bed may be necessary to improve drainage. Adding a layer of coarse sand (also known as bank run sand or concrete sand) will increase air space and promote infiltration. It is important that sand used in the rain garden is not play box sand or mason sand as these fine sands are not coarse enough to improve soil infiltration and may impede drainage.

### ORGANIC MATTER

Below the base is the organic matter, such as compost and a 3" layer of triple shredded hardwood mulch. The mulch acts as a filter and provides a home to microorganisms that break down pollutants.

### PLANTING SOIL LAYER

This layer is usually native soil. It is best to conduct a soil test of the area checking the nutrient levels and pH to ensure adequate plant growth.

### INLET

The inlet is the location where stormwater enters the rain garden. Stones are often used to slow down the water flow and prevent erosion.

### BERM

The berm is a constructed mound, or bank of earth, that acts as a barrier to control, slowdown, and contain the stormwater in the rain garden. The berm can be vegetated and/or mulched.

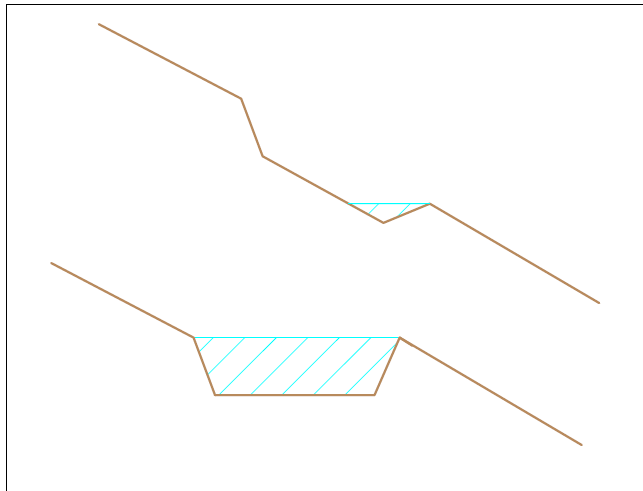
### OVERFLOW

The overflow (outlet) area serves as a way for stormwater to exit the rain garden during larger rain events. An overflow notch can be used as a way to direct the stormwater exiting the rain garden to a particular area surrounding the rain garden.



# STEP SIX

- Level the rain garden base



# STEP SEVEN

- Plant native species





# STEP EIGHT

- Apply mulch



- Allow for a 3" depth mulch (triple-shredded hardwood with no dye) to be spread throughout the entire rain garden
- For every 100 square feet of rain garden, you will need about 1 cubic yard of mulch (3" depth)

# STEP NINE

- Water Plants





# STEP TEN

- Appreciate a job well done



# INSTALLATION SUMMARY

Delineate the rain garden, using either spray paint, a rope, or a garden hose.



Remove existing grass with either a shovel or machinery. If using machinery, the heavy weight of the machinery can compact the soil. Be sure to only run the machinery along the edge of the rain garden, not directly on top of it.



Dig the rain garden to its appropriate depth based upon the soil infiltration test.





# INSTALLATION SUMMARY

Add soil amendments if necessary. Use a rototiller or shovel to combine amendments with existing soil. Loosen and prepare the soil.



Shape the rain garden bed. Create a berm and an overflow area (outlet) for the water.



Level the base (lowest area) of the rain garden to prevent ponding. Use a ruler, two stakes, and something level to check for an even surface. If the base is not level, use a rake and shovel to smooth it out.





# INSTALLATION SUMMARY

Before planting, place each plant in the desired locations. Dig a hole of equal depth, but slightly wider, to the size of the container. Take the plant out of the container, loosen the roots, and plant.



Use empty plant containers to protect small plants. Apply two to three inches of mulch throughout the rain garden.



Water plants, either by installing a soaker hose or watering manually.





# INSTALLATION SUMMARY

At time of installation



First growing season



Second growing season

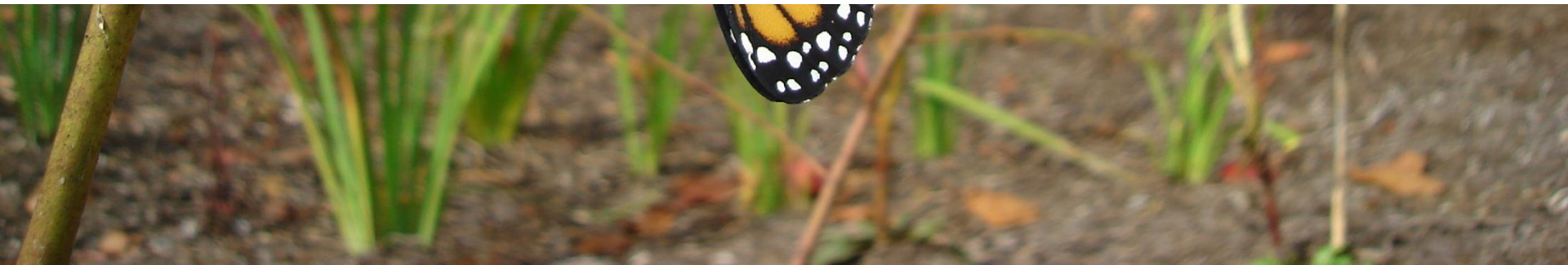


Photos courtesy of: United States Department of Agriculture and Madeline Flahive DiNardo



INSPECTION AND MAINTENANCE

# **MAINTAINING YOUR RAIN GARDEN**





# MAINTENANCE MEASURES

## *WEEKLY TASKS:*

1. Watering
2. Weeding
3. Inspecting

## *ANNUAL TASKS:*

1. Mulching
2. Pruning
3. Re-planting
4. Removing sediment
5. Soil Testing
6. Harvesting Plants
7. Cleaning of Gutters
8. Replacing materials  
(stone, landscape fabric)

# WEEKLY MAINTENANCE: WATERING

- Water plants regularly – particularly during the first 1-2 growing seasons
- Be careful that the plants don't get too wet or too dry





# WEEKLY MAINTENANCE: WEEDING

- During the first few years, you will need to weed often during the growing season
- You will need to weed less and less as the plants grow and surpass the weeds
- Watch out for aggressive invasive species



# INVASIVE PLANTS IN NEW JERSEY



<http://www.invasivespeciesinfo.gov/unitedstates/nj.shtml>



# WEEKLY MAINTENANCE: INSPECTING

- What am I inspecting for?
  - Invasive plants
  - Plant health
  - Excessive sediment
  - Movement of sediment within the rain garden



# WEEKLY MAINTENANCE: INSPECTING

- Observe the rain garden during rain events and note any successes



**Success:** Stormwater runoff picks up oil and grease from the parking lot, flows through a curb cut, and into a rain garden. The rain garden traps the nonpoint source pollutants before they reach the nearby lake.





# WEEKLY MAINTENANCE: INSPECTING

- Observe the rain garden during rain events and note any problems



**Problem:** Gullying after rain event



**Solution:** Add a berm, more plants, river rocks, and/or more mulch

# WEEKLY MAINTENANCE: INSPECTING

- Observe the rain garden during rain events and note any problems



**Problem:** Rain garden is not infiltrating within 24 hours



**Solution:** Add sand wicks, preferably 1' deep if possible, and fill with pockets of coarse sand



# MAINTENANCE MEASURES

## *WEEKLY TASKS:*

1. Watering
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## *ANNUAL TASKS:*

1. Mulching
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(stone, landscape fabric)

# ANNUAL MAINTENANCE: MULCHING

- Add mulch every spring to maintain a three inch mulch layer in your rain garden





# ANNUAL MAINTENANCE: PRUNING

- Cut back dead vegetation, flowers, and tattered or unwieldy plants



# ANNUAL MAINTENANCE: PRUNING

- Directs plant growth
- Improves plant health
- Increases production of flowers + fruit





# HOW DOES PRUNING A RAIN GARDEN DIFFER FROM OTHER GARDENS?

- In a rain garden, dense shrub growth is encouraged to provide an increase in filtering capacity



# TYPES OF PRUNING

- **THINNING:** This type of pruning removes entire branches back to the main trunk or major branches to the ground.

Expected result: large, open shrub

- **HEADING (HEADING BACK):** This type of pruning removes only part of a branch.

Expected result: growth of multiple branches in place of single branch, thus a more dense shrub.

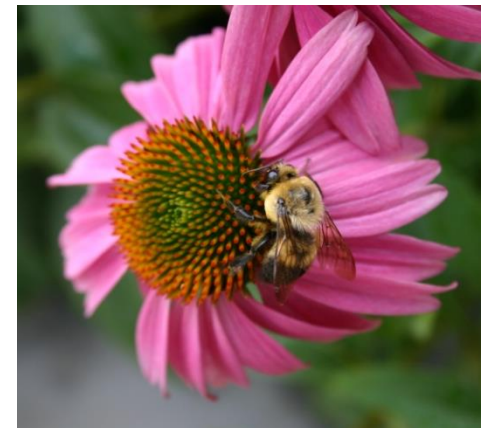
- **DEADHEADING:** This type of pruning removes the spent flowers of an herbaceous plant.

Expected result: increased blooming throughout the season.



# WHEN TO PRUNE?

- Prune summer and fall flowering trees and shrubs in the dormant season (late winter/early spring)
- Prune spring flowering trees and shrubs soon after their flowers fade
- **SPECIAL NOTE!** Plants such as hydrangeas and roses - some of these flower in spring, some in summer or fall, some flower repeatedly
- **BE CAREFUL!** Avoid pruning plants between July 15<sup>th</sup> – October 15<sup>th</sup>, as it stimulates new growth that may not be able to withstand the hard frosts in October



# ANNUAL MAINTENANCE: REMOVING SEDIMENT

- Since the rain garden serves the purpose of catchment and filtering runoff, sediment will tend to accumulate within the garden. This sediment would have otherwise run directly into the local waterways.





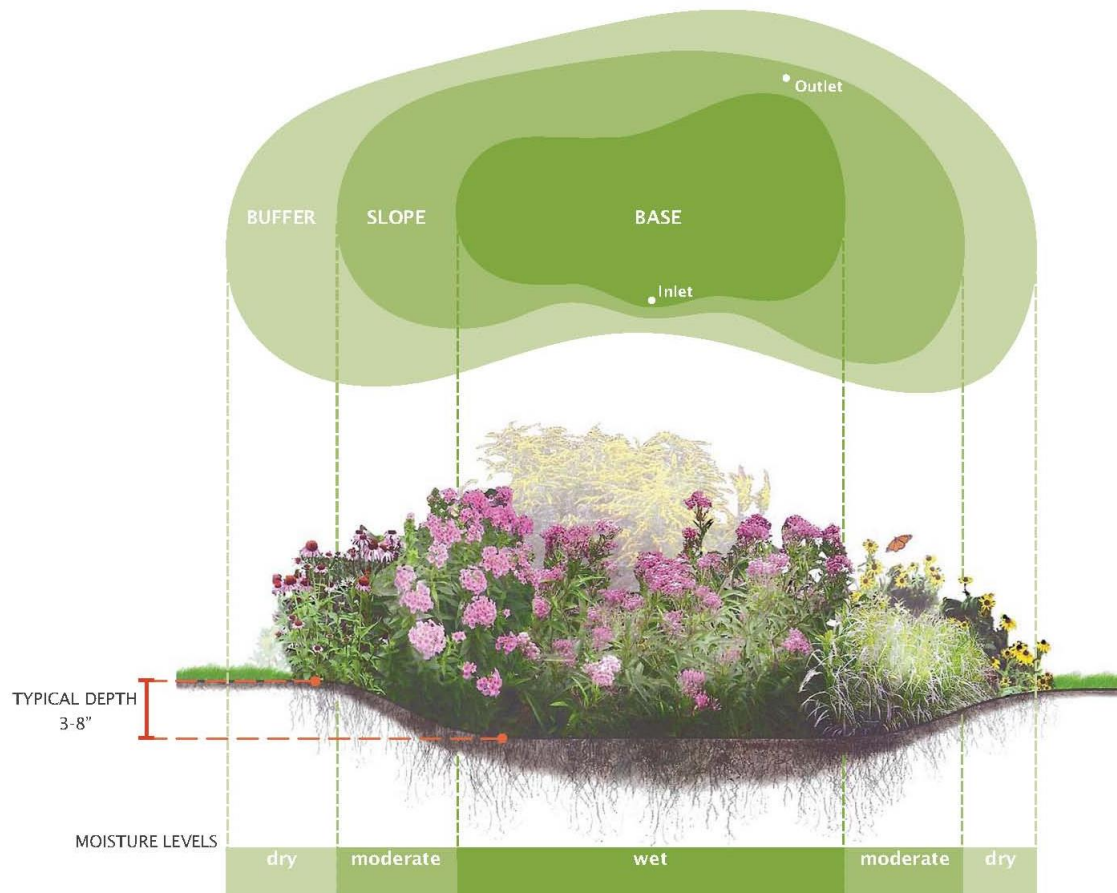
# ANNUAL MAINTENANCE: REMOVING SEDIMENT

- With a flat shovel, remove soil that has accumulated in the basin. Avoid the vegetation!
- There is no exact schedule for when this should be done. Try to monitor sediment accumulation, especially after all heavy storm events.
- Be sure that sediment is not churning up from exposed areas of the rain garden. Flow should be dissipated to avoid these situations, which are likely to occur in the early stages of stabilization.
- Core aerate or cultivate bare areas annually if surface becomes clogged with fine sediments.



# ANNUAL MAINTENANCE: REPLANTING

- Remove or replace plant material that did not thrive





# ANNUAL MAINTENANCE: SOIL TESTING

- Soil should be tested every 3 years
- pH should be in the acidic range
  - If pH is  $<5.2$ , apply limestone
  - If pH is  $>7.0$  to  $8.0$ , add aluminum sulfate or sulfur to reduce pH according to recommendations
- Soil amendments should only be added when no storms are expected
- Do not fertilize the rain garden unless soil test results show a serious nutrient deficiency

**RUTGERS**  
New Jersey Agricultural  
Experiment Station

Soil Testing Laboratory  
Rutgers, The State University  
P.O. Box 902  
Milltown, NJ 08850-0902  
Phone: (732) 932-9295

**Soil Test Report**  
Lab No: 2008-7162

Name: Rutgers University, Env. Science  
Chris Okropka/Gregory Rusciano  
Address: 14 College Farm Road  
New Brunswick, NJ 08901  
Phone: (732) 932-2739  
Fax: (732) 932-8644  
Referred To: Rutgers Cooperative Ext.

Date Received: 10/02/2008  
Date Reported: 10/09/2008  
Serial No: -  
Sample ID: Dorset.

**Crop or Plant**  
New Perennial - Mixed Perennial

**Soil Tests and Interpretation**

pH: 5.90 Medium acidic; pH is slightly low for the growth of most crops except for acid-loving plants.

**Lime Requirement Index:** 7.85  
Adams-Evans LRI is a measure of the soil's buffering capacity (resistance to change in pH).  
It is used to determine liming rate, when necessary.

**Macronutrients (pounds/acre)**

Phosphorus:	607	(Above Optimum)
Potassium:	176	(Optimum)
Magnesium:	138	(Below Optimum)
Calcium:	698	(Below Optimum)

by Mehlich 3 extraction

P	Below Optimum	Optimum	Above Optimum
K	Below Optimum	Optimum	Above Optimum
Mg	Below Optimum	Optimum	Above Optimum
Ca	Below Optimum	Optimum	Above Optimum

**Micronutrients (parts per million)**

Zinc:	Copper:	Manganese:	Boron:	Iron:
4.6 (Adequate)	1.6 (Adequate)	7.5 (Adequate)	5.9 (Adequate)	211 (High)

**Special Tests and Results**  
No special tests requested.

**Lime Recommendation**  
The soil test indicates a moderately acidic soil; the pH is below the best range for the growth of most Perennial. This soil should be treated with 15 pounds/1000 sq. ft. of limestone. Spread uniformly on the surface, then mix thoroughly to a 6 inch depth by shovel or by tilling.

Soil Test Report for Lab No. 2008-7162



# ANNUAL MAINTENANCE: HARVESTING PLANTS

- Take cuttings, divide, and/or collect seeds from successful plants in the rain garden and use them in other parts of your landscape





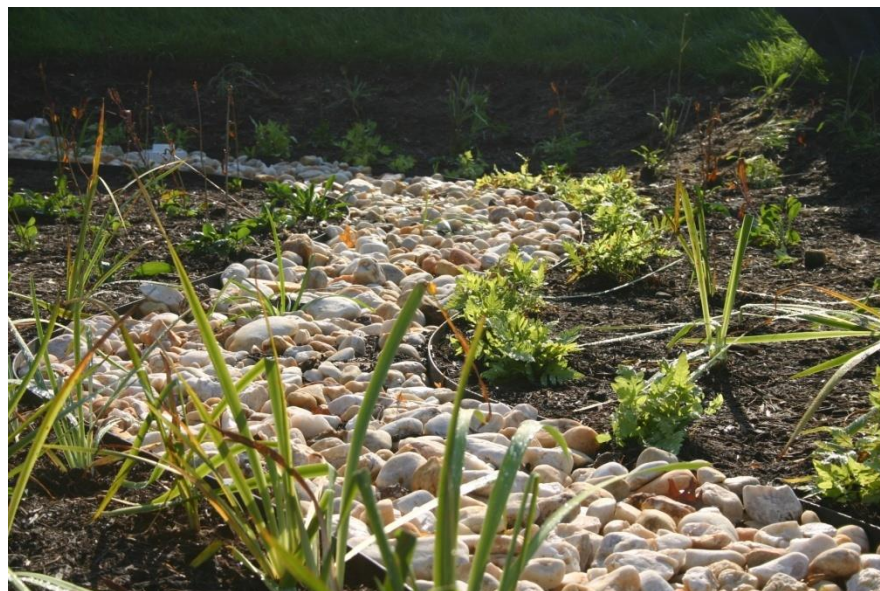
# ANNUAL MAINTENANCE: CLEANING GUTTERS

- At least once a year, make sure that any gutters connected to the rain garden are clear of debris
- You may have to clean the gutters more frequently if you have large trees in close proximity



# ANNUAL MAINTENANCE: REPLACING MATERIALS

- Add more river rocks, if necessary
- Re-position river rocks that may be diverting rainwater flow
- Landscape fabric (used only in strategic locations) will need to be replaced after about 10 years
- Add mulch
- Re-seed the berm if there are areas of exposed soil





# BEFORE and AFTER MAINTENANCE



**BEFORE**



**AFTER**

# A RAIN GARDEN OVER TIME



At time of installation

Springfield Township Municipal Annex Building  
Springfield, NJ



First growing season



Second growing season



Third growing season



Fourth growing season





**REMEMBER:** rain gardens are **LOW** maintenance gardens, not **NO** maintenance gardens!