Rain Garden Design Workshop Train-the-Trainer

November 4, 2024 Live at the Rutgers EcoComplex

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water.rutgers.edu



AGENDA

- 1. Review of rain garden educational presentation
- 2. Instruction on how to deliver an in-person technical design workshop
 - a) Select rain garden location
 - b) Determine rain garden drainage area
 - c) Web soil survey
 - d) Rain garden sizing
 - e) Plant information
 - f) Sample designs
 - g) Maintenance guide

Review of Rain Garden Educational Presentation

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Rutgers Cooperative Extension

Rutgers Cooperative Extension (RCE) helps the diverse population of New Jersey adapt to a rapidly changing society and improves their lives through an educational process that uses science-based knowledge.





Water Resources Program Water Resources Program

WATER RESOURCES PROGRAM Integrating research, education, and extension Delivering solutions bāsed on sound science Working with various members of the community, including municipalities, NGOs, and individual residents Solving water resources issues in New Jersey

RESEARCH

Our mission is to identify and address water resources issues by engaging and empowering communities to employ practical science-based solutions to help create a more equitable and sustainable New Jersey.

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What happens to the rain in our watersheds?





What is stormwater?

Stormwater is the water from rain or melting snows that can become "runoff," flowing over the ground surface and returning to lakes and streams.



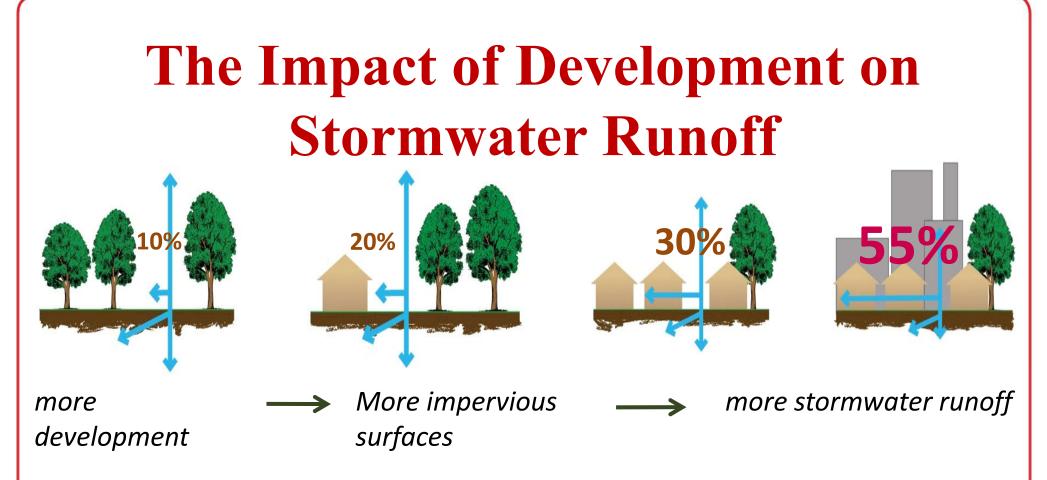


Examples of Nonpoint Source Pollution

- Oil and grease from cars
- Fertilizers
- Animal waste
- Grass clippings
- Septic systems

- Sewage leaks
- Household cleaning products
- Litter
- Agriculture
- Sediment





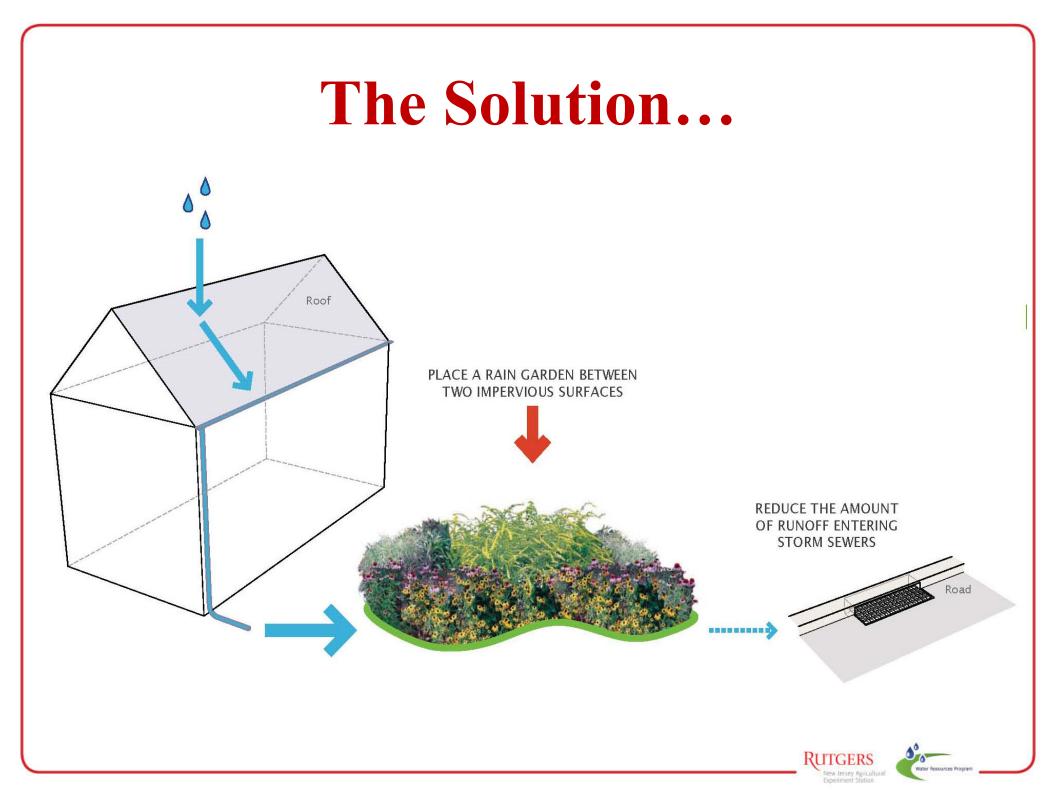




Connected or Disconnected?







Rain Gardens

A rain garden is a landscaped, shallow depression that is designed to intercept, treat, and infiltrate stormwater at the source before it becomes runoff. The plants used in the rain garden are native to the region and help retain pollutants that could otherwise harm nearby waterways.









PARTS OF A RAIN GARDEN

• 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 stomwater 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.

ORGANIC MATTER

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

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.

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.



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.



PLANNING YOUR RAIN GARDEN

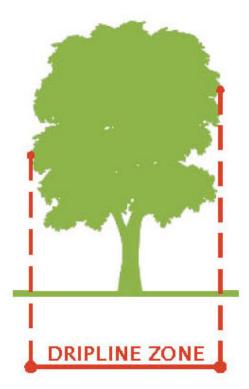
SITE SELECTION & DESIGN



p. 17

SITE SELECTION

- 1. Next to a building with a basement, rain garden should be located min. 10' from building; no basement: 2' from building
- 2. Do not place rain garden within 25' of a septic system
- 3. Do not situate rain garden in soggy places where water already ponds
- 4. Avoid seasonably-high water tables within 2' of rain garden depth
- 5. Consider flat areas first easier digging
- 6. Avoid placing rain garden within dripline of trees
- 7. Provide adequate space for rain garden







p. 18

CALL BEFORE YOU DIG

LOCATE YOUR UTILITY LINES!

Call BEFORE You Dig!

NJ One Call 1-800-272-1000

The different colors of the markout flags represent specific utilities.

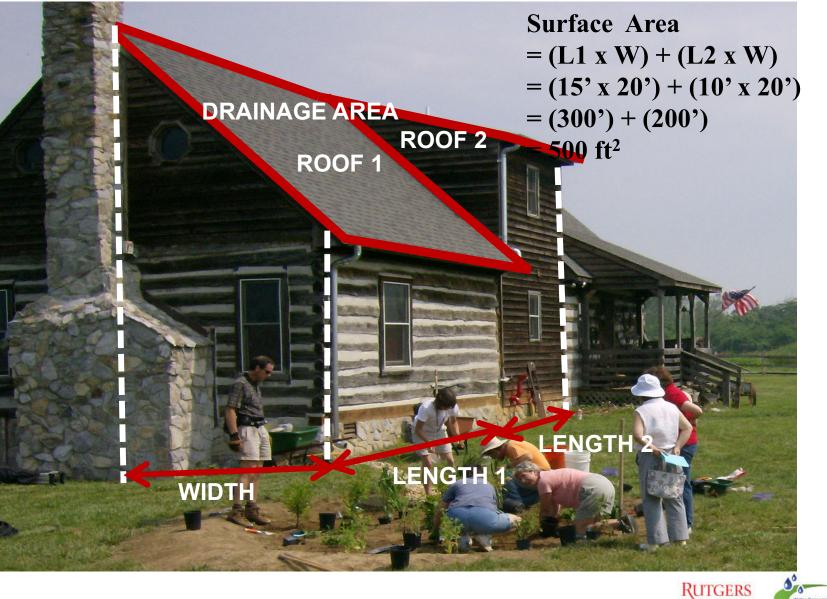


- NJ One Call: 1-800-272-1000
- Free markout of underground gas, water, sewer, cable, telephone, and electric utility lines
- Call at least 3 full working days, but not more than 10 days, prior to planned installation date
- Do not place rain garden within 5' horizontally and 1' vertically from any utilities





DRAINAGE AREA CALCULATION





CHECK YOUR SOIL

• Infiltration/Percolation Test

12"

- 1. Dig a hole in the proposed rain garden site (12" deep, 4-6" wide)
- 2. Fill with water to saturate soil and then let stand until all the water has drained into the soil
- 3. Once water has drained, refill the empty hole again with water so that the water level is about 1" from the top of the hole
- 4. Check depth of water with a ruler every hour for at least 4 hours
- 5. Calculate how many inches of water drained per hour



DETERMINING THE DEPTH OF THE RAIN GARDEN

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6" DEEP RAIN GARDEN - NO SOIL AMENDMENTS



3" DEEP RAIN GARDEN - SOIL AMENDMENTS



- Depth of rain garden is dependent upon the soil texture found at the site of the rain garden
- Depth is usually 3-8 inches

DETERMINING THE SIZE OF THE RAIN GARDEN

p. 25

• The size of the rain garden is dependent upon the amount of runoff entering the rain garden

Rain Garden Sizing Table

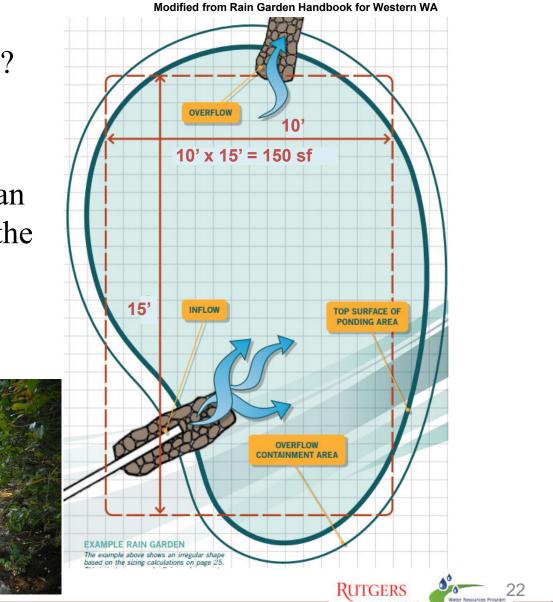
Based on New Jersey's Water Quality Design Storm (1.25" of rain over 2 hours)

Drainage Area	Size of 3" Deep Rain Garden CLAY SOIL*	Size of 6" Deep Rain Garden SILTY SOIL	Size of 8" Deep Rain Garden SANDY SOIL
500 ft ²	200 ft ²	100 ft ²	75 ft ²
750 ft ²	350 ft ²	150 ft ²	112 ft ²
1,000 ft ²	400 ft ²	200 ft ²	149 ft ²
1,500 ft ²	600 ft ²	300 ft ²	224 ft ²
2,000 ft ²	800 ft ²	400 ft ²	299 ft ²
•	*SOIL TEXTURE AMENDMENTS NEEDED	New Jersey Agricultural	

RAIN GARDENS Typical Size Modified from Rain Garden Ha

What is a typical rain garden size?

- Typically100-200 square feet.
- A 100 square feet rain garden will often receive water from an area 5 to 10 times larger than the rain garden..





SOIL AMENDMENTS

• Soil amendments improve the rain garden's infiltration rate and help the plants grow





DETERMINING THE INLET AND OVERFLOW

- Stormwater runoff enters the rain garden from an **inlet**
- Stormwater exits through the **overflow**





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PREVENTING EROSION

- Slope no greater than 3:1
- Slow down velocity of water flowing through rain garden
 - Add rocks to inlet area (River Stone)







DETERMINING MULCH QUANTITY







- Allow for a 3" depth mulch (triple-shredded hardwood with no dye) to be spread throughout the entire rain garden
- Every 100 square feet of rain garden needs 1 cubic yards (3" depth)





RAIN GARDEN DESIGN

SHAPING YOUR RAIN GARDEN

- Use a garden hose or rope to outline the desired shape of your rain garden on the ground
- Many rain gardens are in the shape of a circle or kidney bean, but your rain garden can take on whatever shape you prefer

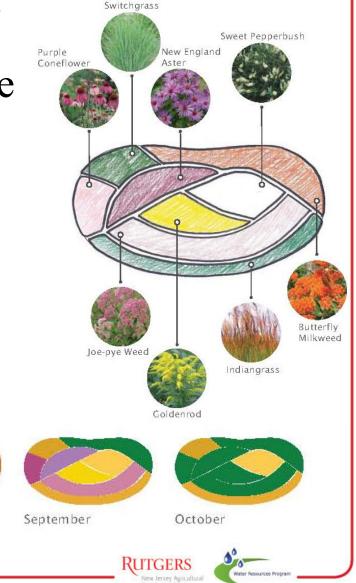
1ulv

August

lune

May

Butterfly Habitat Rain Garden: Planting Plan





THE FUN PART!

INSTALLING YOUR RAIN GARDEN



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



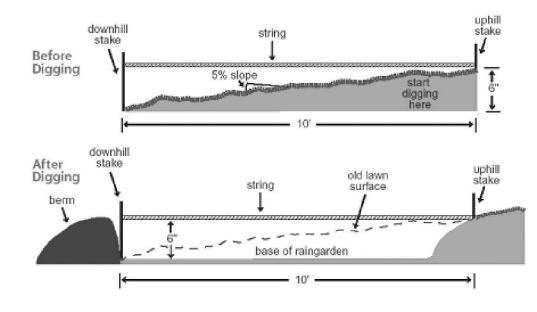
- Combine amendments with existing soil using shovels or rototiller
- Loosen and prepare soil for grading and planting



STEP FOUR

• Prepare the berm, if necessary











STEP FIVE

• Prepare the overflow



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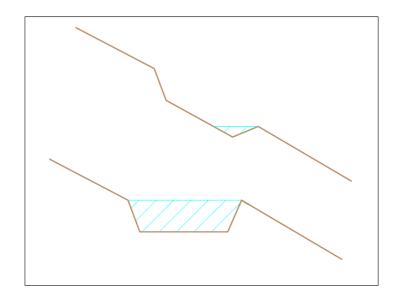
The inlet is the location where stormwater enters the rain garden. Stones are often used to slow down the water flow and prevent erosion.

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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



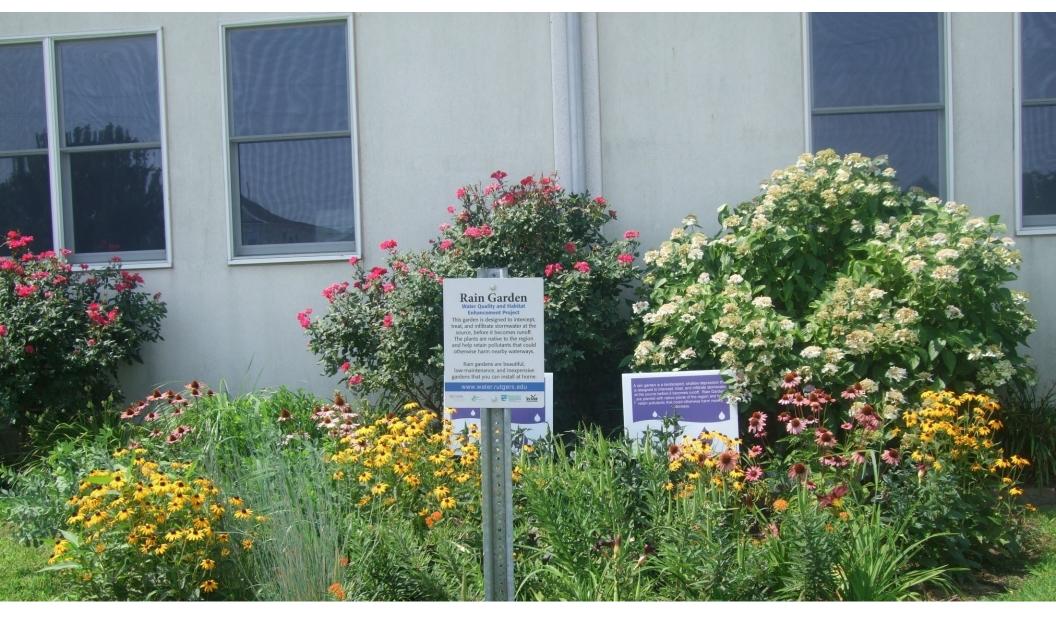


STEP TEN

• Appreciate a job well done







RAIN GARDEN PLANTING DESIGN

DESIGN AESTHETICS

- Formal or traditional design
 - Shrub bed
 - Perennial garden
 - Hedges
- Naturalized planting & design
 - Butterfly garden
 - Meadow (warm season grasses & wildflowers)
 - Buffer plantings





SITE CONSTRAINTS

- Sun vs. shade
- Exposure/wind
- Soil characteristics
- Hydrologic conditions
- Road salts
- Vehicle/pedestrian traffic

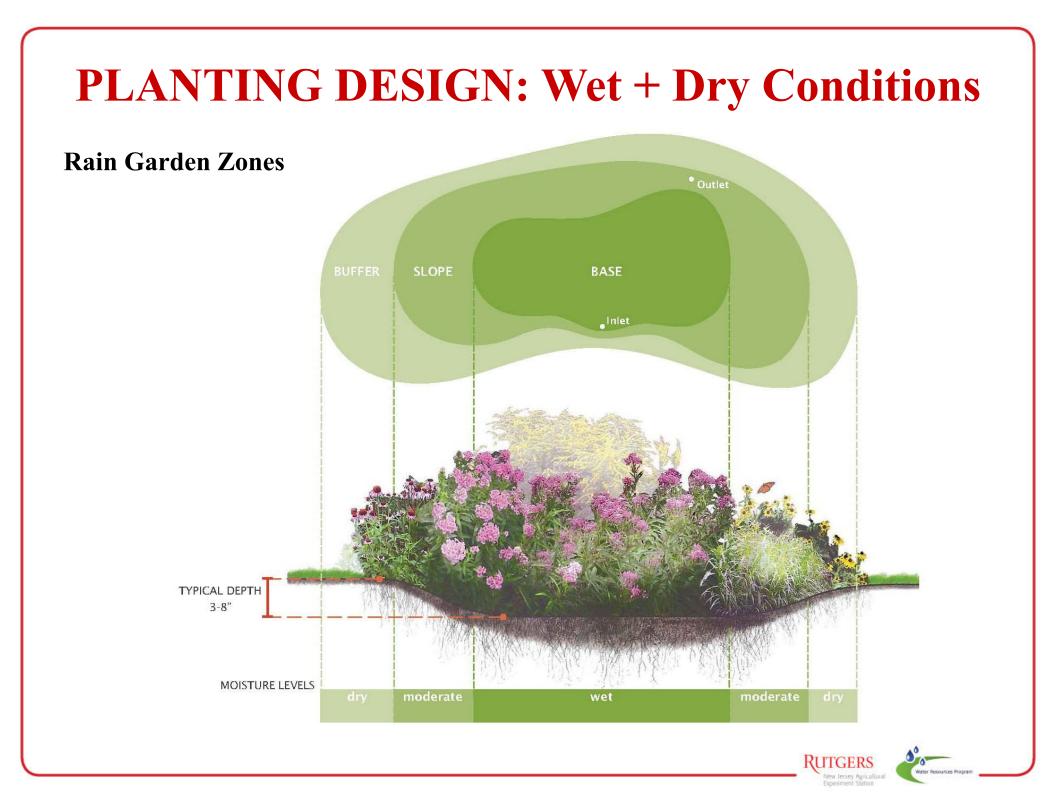


PLANTS IN THE RIGHT PLACE...



Courtesy of Pinelands Nursery & Supply





SELECTING PLANT SPECIES

- Mature plant size
 - Proximity to buildings and utility lines
 - Pruning and shaping
- Seasonal interest
 - Flowers
 - Fall color
 - Winter character
- Beneficial wildlife
 - Flowers for butterflies
 - Fruits for song birds



GRASSES & GROUND COVERS

FAC

BUFFER

DRY

- Broomsedge
- Bearberry
- Panic grass
- Switchgrass
- Little bluestem
- Indiangrass

BASE

FACU

- Big bluestem
- Virginia wild-rye
- Switchgrass
- Wool grass

SLOPE

• Bluejoint grass

WET

• Sedges

OBL

FACW

- Fowl mannagrass
- Softrush

RUTGERS



GRASSES & GROUND COVERS

Switchgrass (Panicum virgatum) - FAC

Woolgrass (Scirpus cyperinus) - FACW+

Tussock Sedge (Carex stricta) - OBL

Little Bluestem (Schizachyrium scoparium) - FACU



WILDFLOWERS & FERNS

FAC

BUFFER

• Butterfly milkweed

DRY

- Wild indigo
- Purple coneflower
- Beebalm
- Black-eyed susan

BASE

FACU

- New England aster
- New York aster
- Columbine
- Coreopsis
- Joe-pye weed
- Blazing star
- Sensitive fern
- Cinnamon fern
- Ironweed

SLOPE

OBL

FACW

- Swamp milkweed
- Marsh marigold

WFT

- Turtlehead
- Boneset
- Rosemallow/hibiscus
- Blueflag iris
- Cardinal flower
- Blue lobelia
- Monkey flower

WILDFLOWERS



Joe-Pye Weed (Eupatorium perfoliatum) - FAC Black-eyed Susan (Rudbeckia hirta) – FACU-

New England Aster (Aster novae-angliae) - FACW





TREES & SHRUBS

FAC

FACW

OBL



DRY

- Hackberry
- Red Bud
- Pepperbush
- American Holly
- Bayberry
- Witchhazel
- White Oak
- Red Oak
- Arrowwood Viburnum

BASE

FACU

- Red Maple
- Service Berry
- River Birch
- Silky Dogwood
- Red-twig Dogwood
- Inkberry Holly
- Winterberry
- Sweetbay Magnolia

SLOPE

• River Birch

WFT

- Buttonbush
- Silky Dogwood
- Green Ash
- Swamp White Oak
- Pin Oak
- Cranberrybush Viburnum



TREES & SHRUBS

Summersweet (Clethra alnifolia) - FAC+

River Birch (Betula nigra) - FACW Winterberry Holly (Ilex verticillata) - FACW+

Inkberry Holly (Ilex glabra) - FACW-





INSPECTION AND MAINTENANCE

MAINTAINING YOUR RAIN GARDEN



MAINTENANCE MEASURES

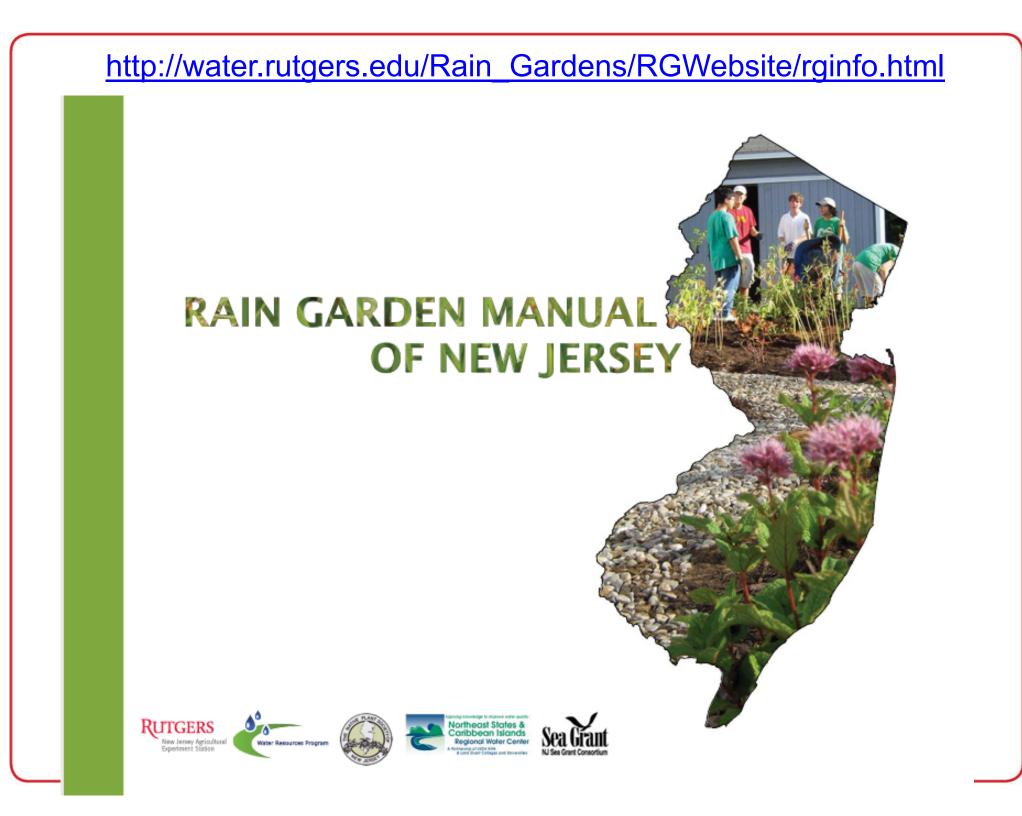
WEEKLY TASKS:

- 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)







Rain Garden 4+

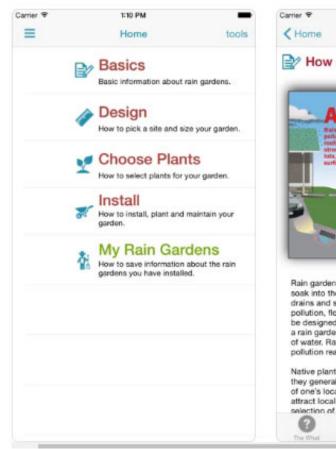
University of Connecticut

Designed for iPhone

★★★★★ 2.6 • 11 Ratings

Free

iPhone Screenshots





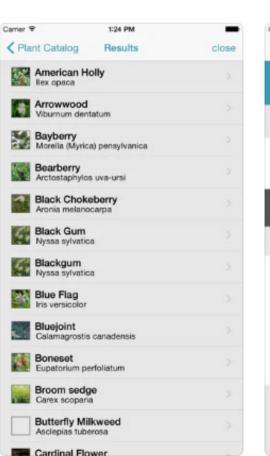
Rain gardens reduce rain runoff by allowing stormwater to soak into the ground (as opposed to flowing into storm drains and surface waters which causes erosion, water pollution, flooding, and diminished groundwater). They can be designed for specific soils and climates. The purpose of a rain garden is to improve water quality in nearby bodies of water. Rain gardens can cut down on the amount of pollution reaching creeks and streams.

Native plants are recommended for rain gardens because they generally do not require fertilizer and are more tolerant of one's local climate, soil, and water conditions, and attract local wildlife such as native birds. The plants — a selection of wetland edge vegetation, such as wildflowers.

2

The How

11



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Length	(ft.)	15	
DESIGN S	420 sq. ft Calculated surface are TORM & STORAGE DEPTH	⊌a (W ° L)	4
0	Storm Depth (in)	1.25	
	Storage Depth (in)	6	
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3. Instructions on how to deliver an in-person design workshop



Materials available sample designs

- 1. Posterboard of sample designs are available for workshops (10 posters)
- 2. Rain garden manual will be provided
- 3. Homeowner rain garden throughout the years Powerpoint presentation and booklet will be provided
- 4. Plant fact sheet books will be provided
- 5. Green infrastructure guidance manual will be provided



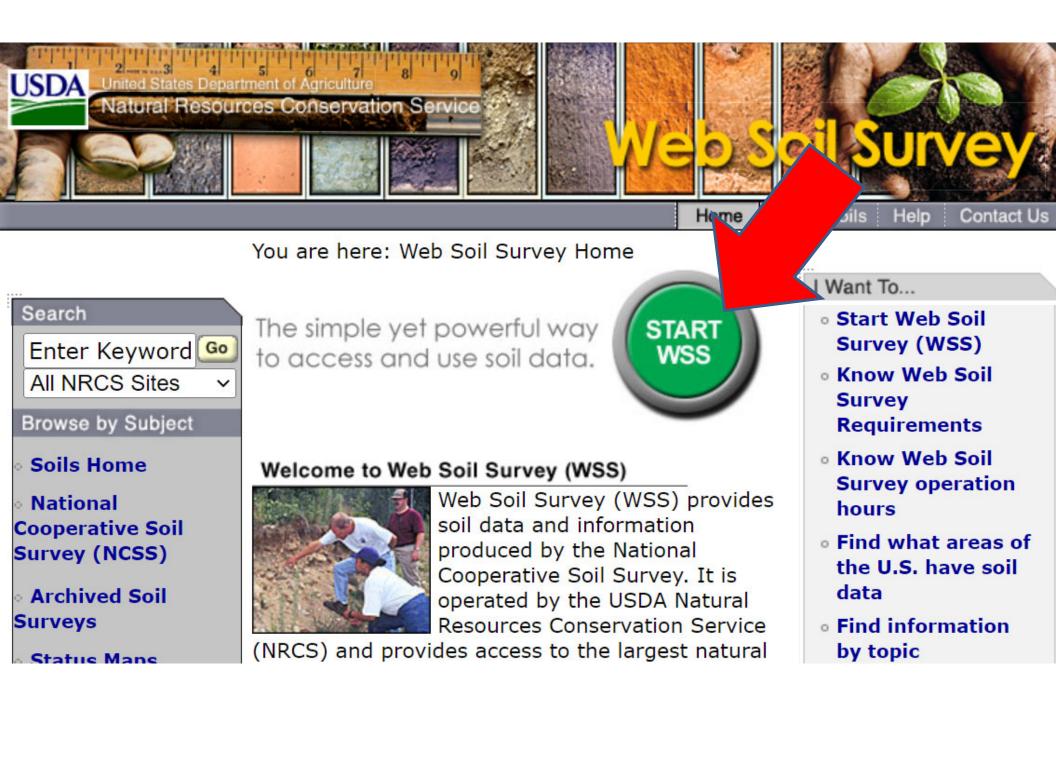
Steps to developing a design

- 1. Ask homeowner where they want the garden (google maps can be used to view the home to determine if this is an appropriate location)
- Determine the area that would drain to the garden (google maps' measure tool can be used to calculate the drainage area)
- 3. Use Web soil survey to identify soil type and infiltration test data to determine if the soils drain



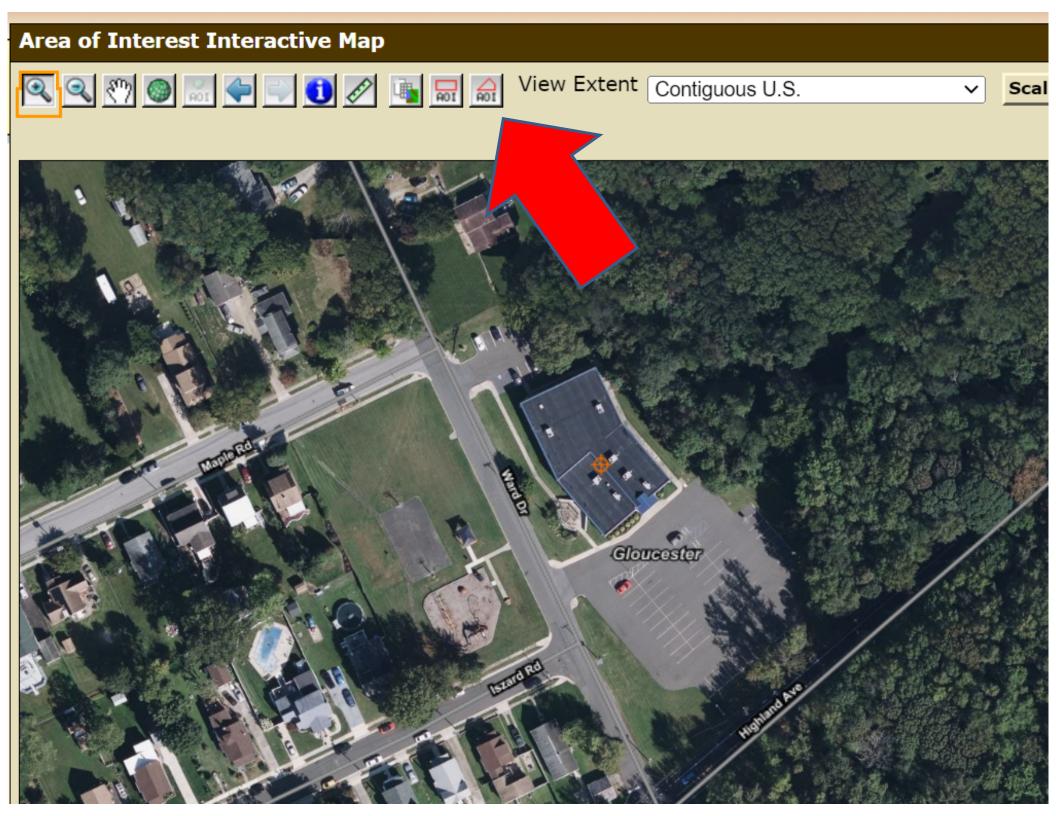
USDA online Web soil survey

https://websoilsurvey.nrcs.usda.gov/app/



USDA United States Department of Agriculture 7 8 9 Natural Resources Conservation Service	
Contact Us Subscribe 🔝 Archived Soil Surveys	Soil Survey Status Glossary Preferences Link Logout Help
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National Park Service	S C NV UT CO
Hydrologic Unit	

USDA United States Department of Natural Resources (Agriculture Conservation Service				
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Area of Interest Interactive Map







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СорВ	Collington-Urban land complex, 0 to 5 percent slopes	0.9	49.6%	
FrrB	Freehold-Urban land complex, 0 to 5 percent slopes	0.9	48.9%	

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County, New Jer	rsey (N	J015) 🚳		Map Unit Composition
	Acres	Percent of		Freehold and similar soils: 60 percent
Map Unit Name	in AOI	AOI		Urban land: 30 percent
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ollington-Urban	09	49.6%		Setting
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Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified Land capability classification (nonirrigated): 2s



Hydrologic Soil Group: B Hydric soil rating: No

Steps to developing a design

- 4. Select a rainfall total for the design
- 5. Use residential rain garden design form to determine rain garden size or
- 6. Use the spreadsheet to determine size of rain garden
- 7. If soil amendments are needed, use the spreadsheet to calculate quantities
- 8. Add dimensions to the rain garden cross-section of the rain garden design form



Steps to developing a design

2. Complete rain garden design program form

Date:
Time:



Residential Rain Garden Design Program

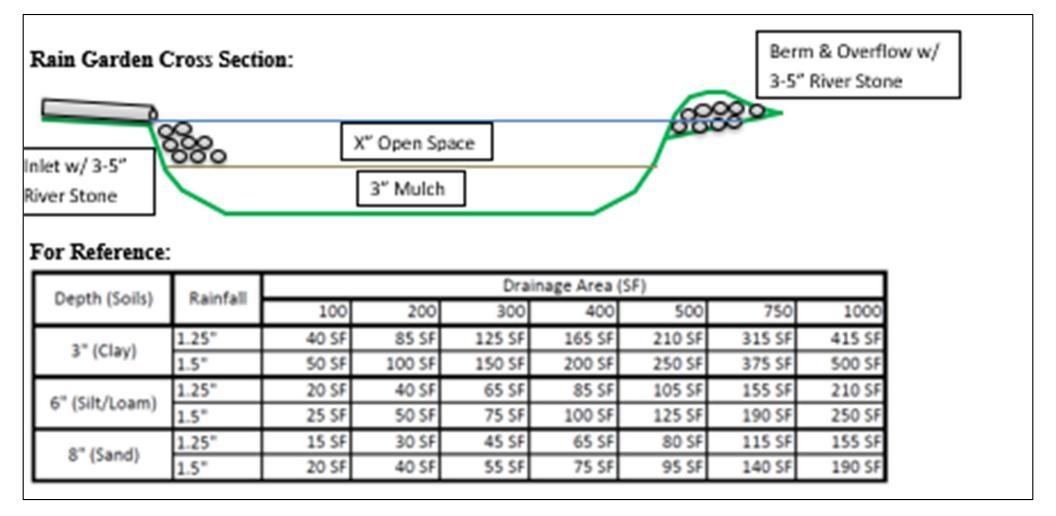
Name:	Address:
Impervious Cover Calculation:	Property Soil Type:
Rain Garden Size:	Amendments (if necessary):
Notes:	



For Reference:

Depth (Soils)	Deinfall.	Drainage Area (SF)						
	Rainfall	100	200	300	400	500	750	1000
3 (CL2V)	1.25"	40 SF	85 SF	125 SF	165 SF	210 SF	315 SF	415 SF
	1.5"	50 SF	100 SF	150 SF	200 SF	250 SF	375 SF	500 SF
6" (Silf/Loam)	1.25"	20 SF	40 SF	65 SF	85 SF	105 SF	155 SF	210 58
	1.5"	25 SF	50 SF	75 SF	100 SF	125 SF	190 SF	250 SF
	1.25"	15 SF	30 SF	45 SF	65 SF	80 SF	115 SF	155 SF
	1.5"	20 SF	40 SF	55 SF	75 SF	95 SF	140 SF	190 SF

Date: Time: Residential Ra	in Garden Design Program
Name:	Address:
Impervious Cover Calculation:	Property Soil Type:
Rain Garden Size:	Amendments (if necessary):
Notes:	



Input Cells		
Calculated Cells		
Name		
Address		
Drainage Area Size	<mark>C</mark>	
Rain Garden Sizing	WQ (Min) 1.25"	Suggested 1.5"
	storm	storm
RG (3" Ponding)	0 SF	
RG (6" Ponding)	0 SF	
RG (8" Ponding)	0 SF	0 SF
Proposed RG Size		SF
Rough Dimensions		
Length		FT
Width	#DIV/0!	FT
Mulch	0.00	СҮ
		Bags
Soil Amendments (clay soils)		
Depth of amendments	0.25	FT
bioretention media	0.0	CY
sand	0.0	CY
		Bags*
compost		CY
	0.0	Bags*
*Bags @ 2 CF/Bag		

Steps to developing a design

- 9. Use the spreadsheet to determine amount of mulch needed
- 10. Review piping needed to get water from impervious surface to rain garden
- 11. Discuss stone inlet/outlet/border



Steps to developing a design

12. Discuss with homeowner planting style

- a) Manicured or Natural
 - i. All shrubs
 - ii. Perennial and shrubs
 - iii. Deer tolerant
 - iv. Shade
 - v. All perennial



Let's Review Design Samples

Manicured or Natural

- i. All shrubs
- ii. Perennial and shrubs
- iii. Deer tolerant
- iv. Shade
- v. All perennial

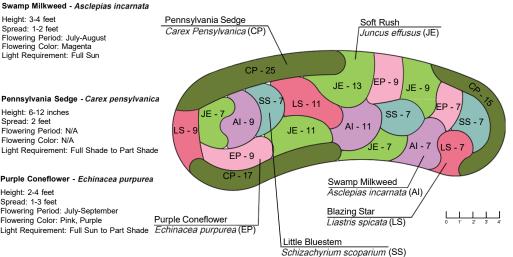


NATURALALL PERENNIAL GARDEN

Concept for a 200-sq.ft. rain garden

PLANT PALETTE:

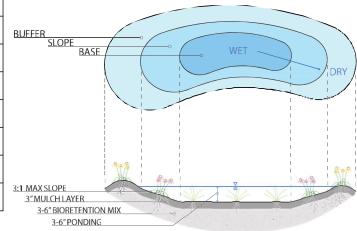
RAIN GARDEN PLAN:



RENDERING OF RAIN GARDEN:



PROFILE OF RAIN GARDEN:





Height: 6-12 inches Spread: 2 feet Flowering Period: N/A Flowering Color: N/A

Purple Coneflower - Echinacea purpurea

Height: 2-4 feet Spread: 1-3 feet Flowering Period: July-September Flowering Color: Pink, Purple Light Requirement: Full Sun to Part Shade Echinacea purpurea (EP)

Soft Rush - Juncus effusus

Height: 2-3 feet Spread: 2-3 feet Flowering Period: N/A Flowering Color: N/A Light Requirement: Full Sun

Blazing Star - Liastris spicata

Height: 3-4 feet Spread: 1-2 feet Flowering Period: July-August Flowering Color: Magenta Light Requirement: Full Sun

Little Bluestem - Schizachyrium scoparium

Height: 2-4 feet Spread: 1-2 feet Flowering Period: N/A Flowering Color: N/A Light Requirement: Full Sun

RAIN GARDEN						
SYMBOL	LATIN NAME Asclepias incarnata	COMMON NAME	QUANTITY	CONTAINER	SPACING	
AI	Carex pensylvanica	SWAMP MILKWEED	29	1 GAL	18-24"	
CP	Echinacea purpurea	PENNSYLVANIA SEDGE	57	1 QT	6-12"	
EP	Juncus effusus	PURPLE CONEFLOWER	25	1 GAL	18-24"	
JE	Liastris spicata	SOFT RUSH	47	1 GAL	9-12"	
LS	Schizachyrium	BLAZING STAR	25	1 GAL	12"-18"	
SS	scoparium	LITTLE BLUESTEM	21	1 GAL	18-24"	

DI ANTING SCHEDUI E EOD 200 SO ET

MANICURED ALL PERENNIAL GARDEN

IV-5

Blue Flag Iris

Iris versicolor (IV)

SS-5

Concept for a 200-sq.ft. rain garden

PLANT PALETTE:

RAIN GARDEN PLAN:

Wild Bergamot

Monarda fistulosa (MF)

LS-10

SS-5

Purple Coneflower

Echinacea purpurea (EP)

MF-20

FP-25

Little Bluestem

Schizachyrium scoparium (SS)



Purple Coneflower - Echinacea purpurea

Height: 2-4 feet Spread: 1-3 feet Blue Lobelia Flowering Period: July-September Lobelia siphilitica (LS) Flowering Color: Pink, Purple Light Requirement: Full Sun to Part Shade

Blue Flag Iris - Iris versicolor

Height: 2-2.5 feet Spread: 2-2.5 feet Flowering Period: May-June Flowering Color: Blue, Purple Light Requirement: Full Sun to Part Shade

Blue Lobelia - Lobelia siphilitica

Height: 2-3 feet Spread: 1-1.5 feet Flowering Period: July-September Flowering Color: Blue, Purple Light Requirement: Full Sun to Full Shade

Wild Bergamot - Monarda fistulosa Height: 2-4 feet

Spread: 2-3 feet Flowering Period: July-September Flowering Color: Purple, Pink, White Light Requirement: Full Sun to Part Shade

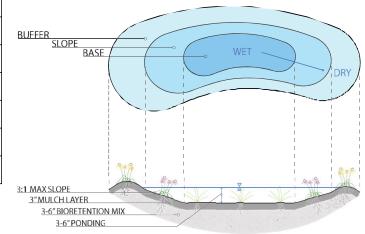
Height: 2-4 feet Spread: 1-2 feet Flowering Period: N/A Flowering Color: N/A Light Requirement: Full Sun

PLANTING SCHEDULE FOR 200-SQ.FT. Little Bluestem - Schizachyrium scoparium

RAIN GARDEN							
SYMBOL	LATIN NAME	COMMON NAME	QUANTITY	CONTAINER	SPACING		
EP	Irisversicolor	PURPLE CONEFLOWER	25	1 GAL	18-24"		
IV	Lobelia sinhilitica	BLUE FLAG IRIS	5	1 GAL	18-24"		
LS	Monarda.fitulosa	BLUE LOBELIA	10	1 GAL	12-18"		
MF	Schizachyrium	WILD BERGAMOT	20	1 GAL	12-24"		
SS	scoparium	LITTLE BLUESTEM	10	1 GAL	18-24"		

RENDERING OF RAIN GARDEN:





MANICURED ALL SHRUB GARDEN

Concept for a 200-sq.ft. rain garden

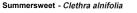
PLANT PALETTE:



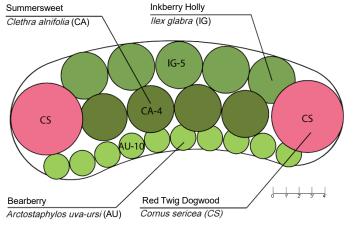


Bearberry - Arctostaphylos uva-ursi

Height: 6-12 inch Spread: 1-2 feet Flowering Period: April-May Flowering Color: Pink, White Light Requirement: Full Sun to Part Shade



Height: 4-8 feet Spread: 4-6 feet Flowering Period: July-August Flowering Color: White Light Requirement: Full Sun to Full Shade



Red Twig Dogwood - Cornus sericea

Height: Spread Floweri Floweri Light R

Height: 7-9 feet Spread: 5-10 feet Flowering Period: May-June Flowering Color: White Light Requirement: Full Sun to Part Shade

Inkberry Holly - *llex glabra*

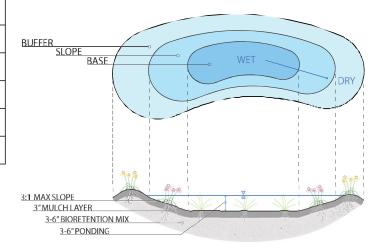
Height: 6-8 feet Spread: 8-10 feet Flowering Period: May-June Flowering Color: Green, White Light Requirement: Full Sun to Part Shade

PLANTING SCHEDULE FOR 200-SQ.FT.									
	RAIN GARDEN								
SYMBOL	LATIN NAME Arctostaphylos	COMMON NAME	QUANTITY	CONTAINER	SPACING				
AU	uva-ursi Clethra alnifolia	BEARBERRY	10	1 GAL	12-24"				
CA	Cornus sericea	SUMMERSWEET	4	3 GAL	24-36"				
CS	llex alabra	RED TWIG DOGWOOD	2	3 GAL	24-36"				
IG		INKBERRY HOLLY	5	3 GAL	24-36"				

ANTINO CONFRINCE FOR ANA OC FT

RENDERING OF RAIN GARDEN:





MANICURED PERENNIAL & SHRUB GARDEN

Concept for a 200-sq.ft. rain garden

PLANT PALETTE:



Butterfly Milkweed - Asclepias tuberosa

Height: 1.5-3 feet Spread: 1-2 feet Flowering Period: June-August Flowering Color: Orange Light Requirement: Full Sun

Rose Mallow - Hibiscus moscheutos

Height: 3-8 feet Spread: 1-2 feet Flowering Period: June-September Flowering Color: Pink, Red, White Light Requirement: Full Sun to Part Shade

Inkberry Holly - Ilex glabra

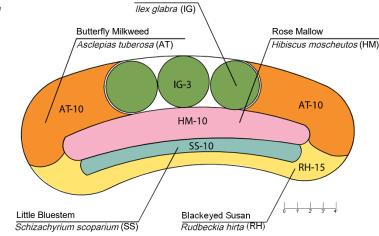
Height: 6-8 feet Spread: 8-10 feet Flowering Period: May-June Flowering Color: Green, White Light Requirement: Full Sun to Part Shade

Blackeyed Susan - *Rudbeckia hirta* Height: 2-3 feet

Spread: 1-2 feet Flowering Period: June-September Flowering Color: Yellow, Orange Light Requirement: Full Sun to Part Shade

Little Bluestem - Schizachyrium scoparium Height: 2-4 feet Spread: 1-2 feet

Flowering Period: N/A Flowering Color: N/A Light Requirement: Full Sun



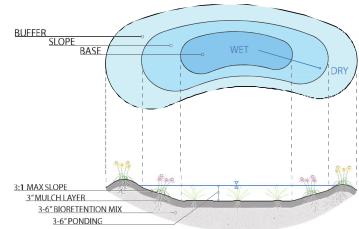
Inkberry Holly

RAIN GARDEN PLAN:



RENDERING OF RAIN GARDEN:





MANICURED DEER TOLERANT GARDEN

Concept for a 200-sq.ft. rain garden

PLANT PALETTE:



Blue Flag Iris - Iris versicolor

Height: 2-2.5 feet Spread: 2-2.5 feet Flowering Period: May-June Flowering Color: Purple, Blue Light Requirement: Full Sun to Part Shade

Wild Bergamot - Monarda fistulosa

Height: 2-4 feet Spread: 2-3 feet Flowering Period: July-September Flowering Color: Purple, Pink Light Requirement: Full Sun to Full Shade

Mountainmint - Pycnanthemum muticum

Height: 1-3 feet Spread: 1-3 feet Flowering Period: July-September Flowering Color: White Light Requirement: Full Sun to Part Shade

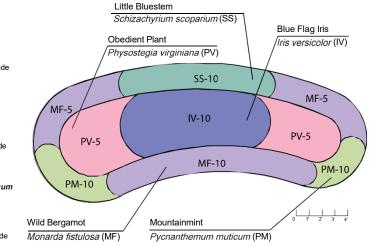
1.Sile and	Obedient Plant - Physostegia virginiana
	Height: 3-4 feet Spread: 2-3 feet Flowering Period: August-October
	Flowering Color: Pink Light Requirement: Full Sun to Part Shade



August-October ink Full Sun to Part Shade

Little Bluestem - Schizachyrium scoparium Height: 2-4 feet Spread: 1-2 feet Flowering Period: N/A Flowering Color: N/A Light Requirement: Full Sun

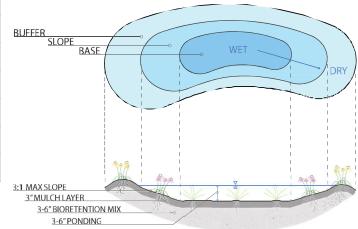
RAIN GARDEN PLAN:



	PLANTING SCHEDULE FOR 200-SQ.FT.						
		RAIN GARDE	N				
SYMBOL	LATIN NAME	COMMON NAME	QUANTITY	CONTAINER	SPACING		
IV	Monarda fitulosa	BLUE FLAG IRIS	10	1 GAL	18-24"		
MF	Pvcpanthemum muticum	WILD BERGAMOT	20	1 GAL	12-24"		
PM	Physostegia virginiana	MOUNTAINMINT	20	1 GAL	12-24"		
PV	Schizachvrium scoparium.	OBEDIENT PLANT	10	1 GAL	12-24"		
SS		LITTLE BLUESTEM	10	1 GAL	18-24"		

RENDERING OF RAIN GARDEN:





NATURAL SHADE RAIN GARDEN

MV-5

PB-5

Virginia Bluebells

CG-5

PD-25

1' 2' 3' 4

Mertensia virginica (MV)

Concept for a 200-sq.ft. rain garden

PLANT PALETTE:

RAIN GARDEN PLAN:

Carex amphibola (CA)

PD-25

CG-5

CA-10

Solomon's Seal

Polygonatum biflorum (PB)

DI ANTING SCHEDUI E EOD 200 SO ET

Woodland Phlox

Phlox divaricata (PD)

Creek Sedae

PB-5

GM-20

Turtlehead

Spotted Geranium



Creek Sedge - Carex amphobola Height: 1-1.5 feet Spread: 1-1.5 feet Flowering Period: N/A Flowering Color: N/A Light Requirement: Full Shade to Part Shade Chelone glabra (CG)

Turtlehead - Chelone glabra Height: 2-3 feet Spread: 1.5-2.5 feet Flowering Period: August-October Flowering Color: Pink, White Light Requirement: Full Sun to Full Shade

Spotted Geranium - Geranium maculatum

Height: 1.5-2 feet Spread: 1-1.5 feet Flowering Period: April-May Flowering Color: Pink, Purple Light Requirement: Full Sun to Part Shade Geranium maculatum (GM)

Virginia Bluebells - Mertensia virginica



Height: 1-2 feet Spread: 1-2 feet Flowering Period: March-April Flowering Color: Blue, Purple Light Requirement: Full Shade to Part Shade

Solomon's Seal - Polygonatum biflorum Height: 2-3 feet

Spread: 1-2 feet Flowering Period: April-May Flowering Color: Green, White Light Requirement: Full Shade to Part Shade

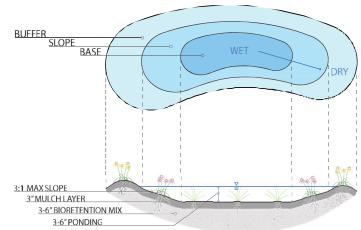
Woodland Phlox - Phlox divaricata Height: 12-15 inches Spread: 9-12 inches

Flowering Period: April-May Flowering Color: Blue, Purple Light Requirement: Full Shade to Part Shade

PLANTING SCHEDULE FOR 200-SQ.FT.							
	RAIN GARDEN						
SYMBOL	LATIN NAME Carex amphibola	COMMON NAME	QUANTITY	CONTAINER	SPACING		
CA	Chelone alabra	CREEK SEDGE	10	1 QT	12-24"		
CG	Geranium maculatum	TURTLEHEAD	10	1 GAL	12-36"		
GM	Mertensia virginica	SPOTTED GERANIUM	20	1 QT	12-18"		
MV	Polvaonatum biflorum	VIRGINIA BLUEBELLS	5	1 GAL	12-24"		
PB	Phlox divaricata	SOLOMON'S SEAL	10	1 GAL	12-24"		
PD		WOODLAND PHLOX	50	1 QT	12-18"		

RENDERING OF RAIN GARDEN:





NATURAL DEER TOLERANT GARDEN

Concept for a 200-sq.ft. rain garden

PLANT PALETTE:



Swamp Milkweed - Asclepias incarnata Height: 3-4 feet Spread: 1-2 feet Flowering Period: July-August Flowering Color: Magenta Light Requirement: Full Sun

False Indigo - Baptasia australis

Height: 3-4 feet Spread: 3-4 feet Flowering Period: May-June Flowering Color: Purple Light Requirement: Full Sun

Summersweet - Clethra alnifolia



Height: 4-8 feet Spread: 4-6 feet Flowering Period: July-August Flowering Color: White Light Requirement: Full Sun to Full Shade

Golden Ragwort - Packera aurea

Height: 1-2 feet Spread: 6-12 inches Flowering Period: March-April Flowering Color: Yellow Light Requirement: Full Sun to Full Shade

Mountainmint - Pycnanthemum muticum

Light Requirement: Full Sun to Part Shade

Obedient Plant - Physostegia virginiana

Light Requirement: Full Sun to Part Shade

Flowering Period: July-September Flowering Color: White

Flowering Period: August-October

Height: 1-3 feet

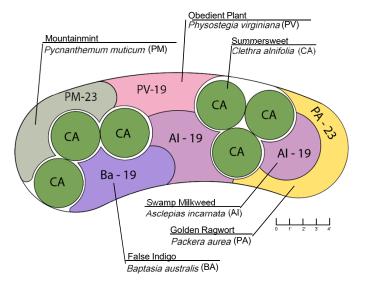
Height: 3-4 feet Spread: 2-3 feet

Flowering Color: Pink

Spread: 1-3 feet



RAIN GARDEN PLAN:

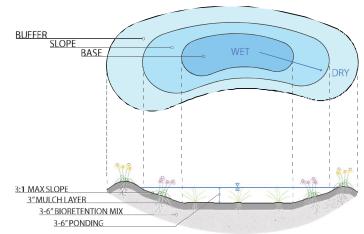


	RAIN GARDEN						
SYMBOL	LATIN NAME Asclepias incarnata	COMMON NAME	QUANTITY	CONTAINER	SPACING		
AI	Baptasia australis	SWAMP MILKWEED	38	1 GAL	18-24"		
BA	Clethra alnifolia	FALSE INDIGO	19	1 GAL	24-36"		
CA	Packera aurea	SUMMERSWEET	6	3 GAL	24-36"		
PA	Pycnanthemum	GOLDEN RAGWORT	23	1 GAL	12-24"		
PM	muticum Physostegia	MOUNTAINMINT	23	1 GAL	12-24"		
PV	virginiana	OBEDIENT PLANT	19	1 GAL	12-24"		

PLANTING SCHEDULE FOR 200-SQ. FT.

RENDERING OF RAIN GARDEN:





NATURAL ALL SHRUBS GARDEN

Concept for a 200-sq.ft. rain garden

PLANT PALETTE:

RAIN GARDEN PLAN:



Black Chokeberry - Aronia melancarpa Height: 3-6 feet Spread: 2-6 feet Flowering Period: May-June Flowering Color: White Light Requirement: Full Sun to Part Shade

Bearberry - Arctostaphylos uva-ursi Height: 6-12 inch

Height: 6-12 inch Spread: 1-2 feet Flowering Period: April-May Flowering Color: Pink, White Light Requirement: Full Sun to Part Shade

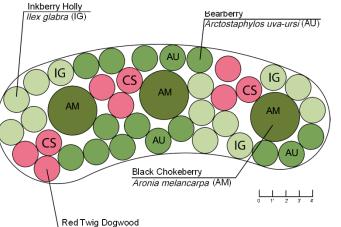
Red Twig Dogwood - Cornus serica Height: 7-9 feet

Flowering Color: White Light Requirement: Full Sun to Part Shade



Inkberry Holly - Ilex glabra

Height: 6-8 feet Spread: 8-10 feet Flowering Period: May-June Flowering Color: Green, White Light Requirement: Full Sun to Part Shade

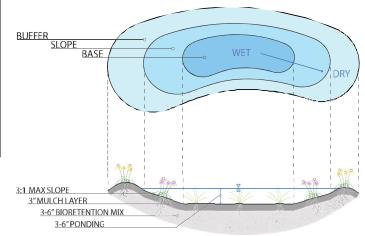


Cornus serica (CS)

PLANTING SCHEDULE FOR 200-SQ. FT.						
		RAIN GARDE	EN			
SYMBOL	LATIN NAME	COMMON NAME	QUANTITY	CONTAINER	SPACING	
AM	Arctostaphylos	BLACK CHOKEBERRY	3	3 GAL	24-36"	
AU	uva-ursi Cornus serica	BEARBERRY	15	1 GAL	12-24"	
CS	llex diabra	RED TWIG DOGWOOD	9	3 GAL	24-36"	
IG		INKBERRY HOLLY	13	3 GAL	24-36"	

RENDERING OF RAIN GARDEN:





NATURAL PERENNIAL & SHRUB GARDEN

Concept for a 200-sq.ft. rain garden

PLANT PALETTE:



Swamp Milkweed - Asclepias incarnata Height: 3-4 feet Spread: 1-2 feet Flowering Period: July-August Flowering Color: Magenta Light Requirement: Full Sun

Summersweet - Clethra alnifolia

Height: 4-8 feet Spread: 4-6 feet Flowering Period: July-August Flowering Color: White Light Requirement: Full Sun to Full Shade

Pennsylvania Sedge - Carex pensylvanica



Pennsylvania sedge - Carex pensylvanica Height: 6-12 inch Spread: 2 feet Flowering Period: N/A Flowering Color: N/A Light Requirement: Full Shade to Part Shade

Inkberry Holly - *llex glabra*

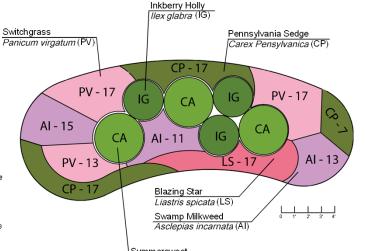
Height: 6-8 feet Spread: 8-10 feet Flowering Period: May-June Flowering Color: Green, White Light Requirement: Full Sun to Part Shade

Blazing Star - Liastris spicata

Height: 3-4 feet Spread: 1-2 feet Flowering Period: July-August Flowering Color: Magenta Light Requirement: Full Sun

Switchgrass - Panicum virgatum

Height: 3-6 feet Spread: 3 feet Flowering Period: August-October Flowering Color: Pink Light Requirement: Full Sun to Part Shade



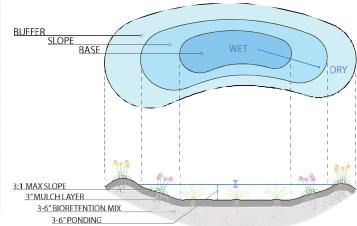
RAIN GARDEN PLAN:

Summersweet Clethra alnifolia (CA)



RENDERING OF RAIN GARDEN:





MANICURED SHADE GARDEN

Concept for a 200-sq.ft. rain garden

PLANT PALETTE:

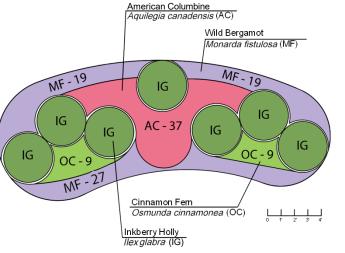
RAIN GARDEN PLAN:



American Columbine - Aquilegia canadensis Height: 1-2 feet Spread: 1-2 feet Flowering Period: March-June Flowering Color: Red Light Requirement: Full Shade to Part Shade

Wild Bergamot - Monarda fistulosa

Height: 2-4 feet Spread: 2-3 feet Flowering Period: July-September Flowering Color: Purple, Pink, White Light Requirement: Full Sun to Part Shade



RENDERING OF RAIN GARDEN:



Inkberry Holly - *llex glabra*

Height: 1-6 feet Spread: 2-4 feet Flowering Period: N/A Flowering Color: N/A

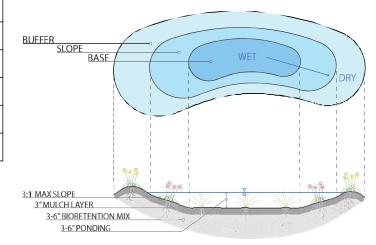
Height: 6-10 feet Spread: 5-8 feet Flowering Period: June-July Flowering Color: Green, White Light Requirement: Full Sun to Part Shade

Cinnamon Fern - Osmunda cinnamomea

Light Requirement: Full Shade to Part Shade

RAIN GARDEN							
GYMBOL	LATIN NAME Aquilegia canadensis	COMMON NAME	QUANTITY	CONTAINER	SPACING		
AC	Monarda Eistulosa	AMERICAN COLUMBINE	37	1 GAL	12-18"		
MF	llex alabra	WILD BERGAMOT	65	1 GAL	12-24"		
IG	Osmunda	INKBERRY HOLLY	7	3 GAL	24-36"		
OC	cinnamonea	CINNAMON FERN	18	1 GAL	18-36"		

PLANTING SCHEDULE FOR 200-SQ. FT.



Maintenance

Weekly:

- 1. Watering
- 2. Weeding
- 3. Inspecting

Annual:

- 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)



Maintenance Guide

(all available on the RCE Website)

- 1. General guide
- 2. One-pager



Discussion and Questions



