



A Local Solution to Stormwater Pollution



As rain water travels off rooftops, down driveways, along roads and through parking lots, it collects pollutants that are carried into our streams and bays.

*What can you do to help keep it off the streets?
Plant a rain garden!*

What is a rain garden?

A garden with a mission!

Rain gardens are low-lying, vegetated depressions, generally 4"– 8" deep, that have absorbent soils to collect stormwater runoff from impervious surfaces and allow the water to slowly percolate into the soil.

Rain gardens keep rain where it falls...and keep it off the streets!

Our Inland Bays, including our fishing waters and bathing beaches, are fouled when rainwater and snow melt wash over city streets, parking lots, and suburban lawns and pick up pollutants like gas and oil, salt, fertilizer, pesticides, pet waste, disease-causing organisms, sediment and trash.

This problem is called stormwater pollution.

Why create a rain garden?

Rain is natural; stormwater isn't.

Studies have shown that stormwater is a major source of pollution in our streams, ponds and bays.

- Rain gardens help prevent flooding in communities by reducing stream flow and storm drain overflow
- Keep pollutants out of our water
- Provide habitat for native birds, butterflies and other beneficial insects
- Re-charge groundwater



A single house with a 1,000 sq. ft. roof yields 600 gallons of water from a 1" rainstorm.



What is the difference between a rain garden and other gardens?

- **LOCATION** Rain gardens are placed in a location where they can collect runoff from impervious surfaces (any surface that rain water cannot penetrate) such as roofs, driveways, sidewalks or parking lots.
- **DESIGN** Rain gardens are contoured like a flat-bottomed saucer, with a berm on the downhill side if necessary, so that they collect water.
- **DRAINAGE** Rain gardens are designed to drain quickly so that they can handle a lot of water. Soil is loosened and, if necessary amended with organic material and sand or gravel to promote drainage.
- **PLANTS** Rain Gardens are planted with deep-rooted native plants; perennial grasses, ferns, flowers, and shrubs and sometimes small trees.
- **MAINTENANCE** Once they are established, rain gardens should not need watering or fertilizer.



Rain gardens absorb 30% more water than the same size area of lawn!

How to Create Your Own Rain Garden



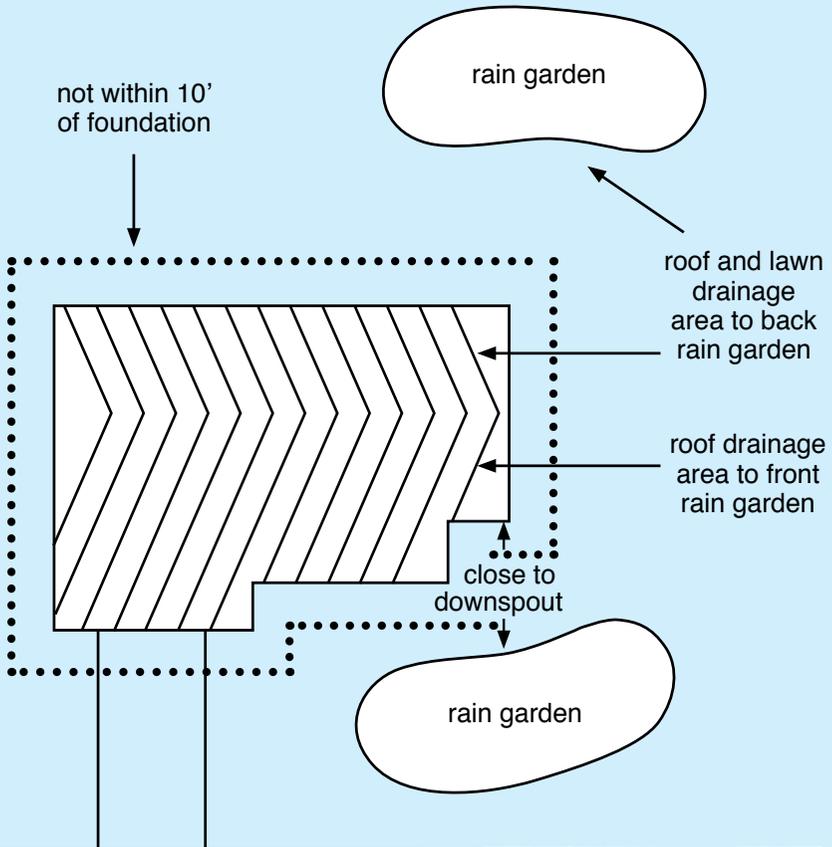
1, Choose a Location

The goal of a rain garden is to collect water that is running off your property. Rain gardens can be small and informal or large and complex.

If you have wet patches or areas that ‘pond’ on your property, those areas are already collecting water. You may want to plant some shrubs and trees in those areas to improve water absorption, but choose a different site for your rain garden.

- Select a place where you can direct water into it from a downspout, driveway runoff or other paved area through a pipe, rock-filled ditch or swale.
- Choose a fairly level location.
- Find a big enough area—free of big tree roots or utilities.
- Position your rain garden at least 10 feet away from building foundations, underground utilities, and septic system drainfields. If you’re not sure about the location of utilities on your property “Call before you dig!” Miss Utility of Delmarva at 800-282-8555.

This diagram shows some location suggestions.





2. Layout Your Garden

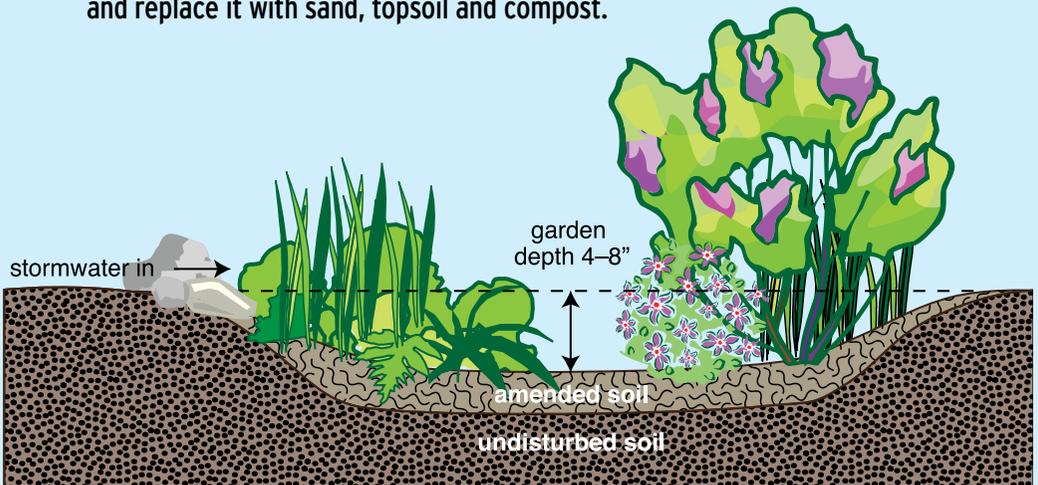
A typical rain garden captures the runoff from one downspout, or about 1/4 of the roof area. The rain garden should be wide enough for the water to spread evenly over the whole bottom and provide space for a variety of plants. Rain barrels can be incorporated into your rain garden plans. They can be set to store some rainwater for later use, and the overflow can be directed to your rain garden.

3. Check the Drainage

Remember! Rain gardens are not ponds. The idea is to get the water into the ground and keep it off the streets. It is important that your rain garden drains quickly. If you have very compacted soil or a lot of clay, you will have to loosen and amend it. (see #4)

4. Prepare Your Soil

In many places in our watershed soil is sandy, which is good because all you will need to do is loosen it to a depth of about 1 foot and amend it; the ideal soil is a mix of two parts sand, one part topsoil (no clay), and one part compost. But if your soil is mostly clay, you will have to remove the clay and replace it with sand, topsoil and compost.



5. Choose Your Plants

Select a variety of native flowers, ferns, grasses and shrubs that will provide color and interest throughout the seasons. Depending on the size of your rain garden you may include one or two small trees. Because they are adapted to our soils and climatic conditions, native plants will be easier to establish and maintain, and will also attract native wildlife (see the native plant list on page 8 and 9).



Aronia melanocarpa Black chokeberry



Asclepias tuberosa Butterfly milkweed

6. Begin Construction

- Lay out a rope or garden hose in the shape desired as a guide for digging.
- Loosen and amend the soil. You may need to remove some soil to maintain the concave, saucer shape. On a slope, the soil from digging may be used to create a berm on the downhill side.
- The depth of the depression may vary from 4-8". For best infiltration, the bottom of the garden should be level.
- Use splash rocks to keep soil from washing away near the downspout or swale where the water is entering the rain garden.
- Group the plants together for the most impact, and estimate one small plant per square foot.
- You can use natural mulch to discourage weeds and add nutrients.

7. Maintenance

- Like any new planting, the rain garden will need frequent watering for the first few weeks until the plants are established.
- Rain gardens are low-maintenance. Once established, they require no fertilizer, watering, or mowing. At the end of the growing season, you can leave the seed heads and stems for winter interest, cover for wildlife and food for birds. In spring when the new growth emerges, cut back dead vegetation, prune plants that are too big, and remove any invasive species. Re-mulch if needed.

Species Name	Common Name	Shade Tolerance	Height	Water Tolerance
HERBACEOUS PLANTS				
<i>Acorus americanus</i>	sweet flag		2'-3'	RI (0''- 6'')
<i>Aquilegia canadensis</i>	Red columbine		1'-3'	II, U
<i>Asclepias incarnata</i>	swamp milkweed		up to 6'	SI
<i>Aster novi-belgii</i>	New York aster		1'-3'	II, U
<i>Carex stricta</i>	tussock sedge		2'-4'	RI
<i>Eupatorium dubium</i>	joe-pye weed		2'-5'	SI, U
<i>Eupatorium perfoliatum</i>	boneset		2'-5'	II, U
<i>Iris versicolor</i>	blue flag		1'-3'	RI (0''- 6'')
<i>Lobelia cardinalis</i>	cardinal flower		up to 5'	II, U
<i>Mimulus ringens</i>	monkey flower		1.5'-4'	SI, RI
<i>Onoclea sensibilis</i>	sensitive fern		up to 3.5'	RI, PI
<i>Osmunda cinnamomea</i>	cinnamon fern		up to 5'	SI, RI
<i>Osmunda regalis</i>	royal fern		up to 6'	II, PI
<i>Panicum virgatum</i>	switch grass		2'-4'	II, U
<i>Rudbeckia hirta</i>	Black-eyed Susan		1'-3'	II, U
<i>Scirpus cyperinus</i>	woolgrass		4'-5'	SI
<i>Scirpus fluviatilis</i>	river bulrush		2'-7'	RI (0''- 6'')
<i>Scirpus tabernaemontani</i>	soft stem bulrush		6'-10'	PI (0''- 12'')
<i>Sisyrinchium angustifolium</i>	blue-eyed grass		4''-20''	II, U
<i>Solidago sempervirens</i>	Seaside goldenrod		3'-4'	II
<i>Verbena hastata</i>	blue vervain		up to 5'	II
<i>Vernonia noveboracensis</i>	New York ironweed		3'-7'	SI
SHRUBS				
<i>Aronia melanocarpa</i>	black chokeberry		6'-12'	II, SI
<i>Cephalanthus occidentalis</i>	buttonbush		6'-12'	PI (0''- 12'')
<i>Clethra alnifolia</i>	sweet pepperbush		6'-12'	SI, RI
<i>Cornus sericea</i>	redosier dogwood		6-12'	SI
<i>Ilex verticillata</i>	winterberry		6'-12'	SI
<i>Lindera benzoin</i>	spicebush		6'-12'	SI
<i>Magnolia virginiana</i>	sweet bay magnolia		12'-20'	SI, RI (0''- 3'')
<i>Morella cerifera</i>	wax myrtle		6'-15'	II
<i>Sambucus canadensis</i>	elderberry		6'-12'	SI
<i>Viburnum dentatum</i>	arrowwood		6'-12'	SI
TREES				
<i>Acer rubrum</i>	Red Maple		75'-100'	SI
<i>Betula nigra</i>	river birch		50'-75'	SI
<i>Chamaecyparis thyoides</i>	Atlantic White Cedar		40'-50'	II, PI
<i>Ilex opaca</i>	American Holly		60'	II, SI
<i>Taxodium distichum</i>	bald cypress		75'-100'	RI, PI

The plant list is provided by Environmental Concern and are all native to the Mid-Atlantic area. These plants are recommended for rain gardens based on their water tolerance. www.wetland.org

Attracts	Flowering Period	Color	Fall/Winter
	Apr. - May	green spathe	
H	Apr. - July	red	
P, B	June - Aug.	pink	fall seedpod
P, B	July - Oct.	violet	
S	May - Aug.	reddish purple	
S, P, B	July - Sept.	purple	
S, P, B	July - Oct.	white	late flowers
S, M, W	May - June	blue	
P, B, H	July - Oct.	red	late flowers
	June - Oct.	pink, blue	late flowers
S, M	June - Oct.	yellow	
S, M	Apr. - May	reddish	
S, M	Apr. - June	green	
S, M, W	July - Oct.	green	persistent
S, P, B	June - Oct.	yellow	Seeds
M, W	Aug. - Sept.	brown	persistent
	June - Sept.	green	
	June - Sept.	green	persistent seeds
	May - June	blue	
B, P, S, M	July - Nov.	yellow	late flowers
P, S, M, W	June - Oct.	violet	late flowers
P	Aug. - Sept.	purple	
S, M	Apr. - May	white, pink	fall berry
P, B, M, W	July - Aug.	white	persistent seeds
P, B, M, W, S	July - Aug.	white, pink	yellow fall color
S, W, M	May - June	white	red bark
S, W, M	June - July	greenish white	red winter berry
S, M, P	Mar. - May	yellow	yellow fall color
B, S, M	May - July	white	semi-evergreen
S	Mar.- June	yellowish green	evergreen
S, M	June - July	white	
S, M	May - June	white	
S, M	Mar. - Apr.	Red	red fall color
S	Apr. - May	dark brown	interesting bark
	Mar. - Apr.		evergreen
S	May - June	red berry	evergreen, berry
W	Mar. - Apr.	deep purple	

Plant Selection Guide

For local suppliers of native plants, go to our website www.inlandbays.org

Shade Tolerance Key

- = Requires Full Sun
- ◐ = Tolerates Partial Shade
- = Full Shade to Full Sun

Water Tolerance Key

- SI = Season Inundation
- II = Irregular Inundation
- U = Upland
- RI = Regular Inundation
- PI = Permanent Inundation

Attracts Key

- B = Beneficial insects
- H = Hummingbirds
- M = Mammals
- P = Pollinators
- S = Songbirds
- W = Waterfowl



How much will it cost?

- If you do it yourself, your basic costs will be for plants, material to amend the soil and for mulch. These costs will vary depending on the size of the garden and how much amending the soil requires.
- When buying plants, plan for about \$3-\$5 per square foot, more for shrubs and trees.

Where can I go for more information?

There is a wealth of information, on rain garden designs, plant selections, diagrams and booklets you can download and print off the internet.

PUBLICATIONS:

Rain Gardens: A How-to Manual for Homeowners

<http://clean-water.uwex.edu/pubs/pdf/home.rgmanual.pdf>

Rain Garden Manual for Homeowners

www.delawareswcd.org/index.php/water-qualitystormwater/rain-garden-manual-for-homeowners

Rainscaping with Rain Gardens

www.chesapeakeecologycenter.org/images/CECGardenBooklet_websm.pdf

Plants for a Liveable Delaware

<http://ag.udel.edu/extension/horticulture/pdf/PLD.pdf>

Liveable Plants for the Home Landscape (DE)

<http://ag.udel.edu/extension/horticulture/pdf/lowres18spreads.pdf>

5 Easy Steps to Make a Rain Barrel

<http://ag.udel.edu/extension/horticulture/pdf/Appoq%20RainBarrel%20Brochure.pdf>

For more links and local sources of native plants go to our website at www.inlandbays.org.

WEBSITES:

The Low Impact Development Center

www.lowimpactdevelopment.org/raingarden_design/whatisaraingarden.htm

Wiki How...to create a rain garden

www.wikihow.com/Create-a-Rain-Garden

The Rain Garden Network

www.raingardennetwork.com

Rain Gardens in Delaware

<http://ag.udel.edu/extension/horticulture/raingarden/>

Cephalanthus occidentalis buttonbush



Vaccinium corymbosum high bush blueberry

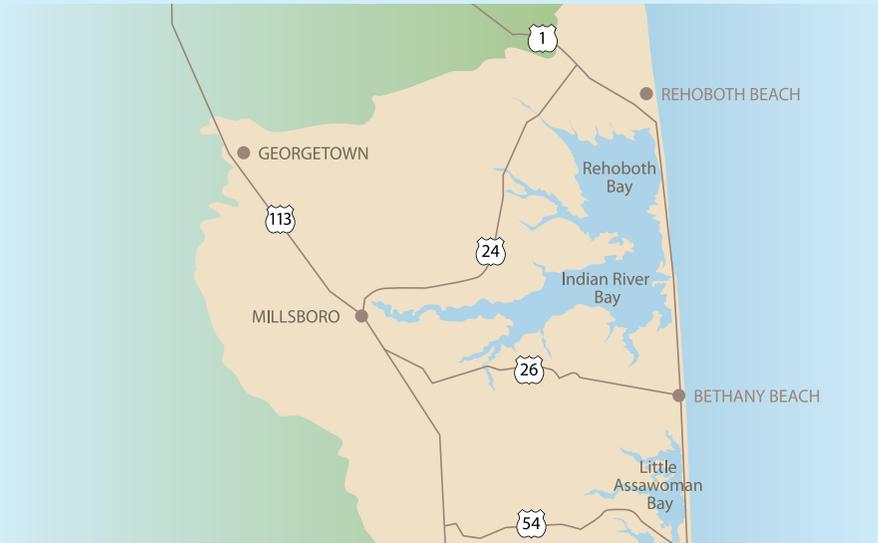


Lobelia cardinalis cardinal flower

Anyone can be 1 in a 1000:

- Homeowners in their yards
- Community and municipal leaders at town halls and libraries
- Students, Scouts, and environmental clubs at schools
- Garden Clubs as service projects
- Faith groups at their churches and synagogues
- Homeowner associations on their common areas

If you are 1 in a 1000, make sure your rain garden gets counted! Go to www.inlandbays.org to register your rain garden.



OUR PARTNERS:

US EPA Region 3 Office of State and Watershed Partnerships, Water Protection Division
DE Department of Natural Resources and Environmental Control, Non Point Source Program
DE Department of Natural Resources and Environmental Control, Watershed Assessment Division
Sussex County Conservation District



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CENTER FOR THE INLAND BAYS
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