

YOU CAN Capture Rainwater in a Garden

RAIN GARDEN



DESCRIPTION: A depressed landscape bed that uses mulch, soil mix, clean stone and deep rooted native plants to capture, absorb and infiltrate stormwater.

HOW DOES IT WORK: For more information read 'A Quick Look - Rain Garden Fact Sheet'.



TIME/COMPLEXITY: 2 to 3 days, moderate to complex



COST: variable, depending on rain garden size and plant choices



TOOLS/MATERIALS: shovel or small excavator, wheelbarrow, string and string level, measuring tape, saw, drill, 4" perforated and 4" and 6" solid PVC pipe, 4" cap, 4"tee, 4" to 6" adapter, 6" basket grate, clean gravel, straw, soil mix, plants, mulch

STEPS:

- 1. LOCATION:** a rain garden should be located below a source of stormwater runoff like a downspout or a driveway, on level to gently sloping ground, at least 10 feet away from a foundation wall, and away from utility lines and septic fields. Perform a ONE CALL* prior to digging and contact your municipality to see if any permits are required.

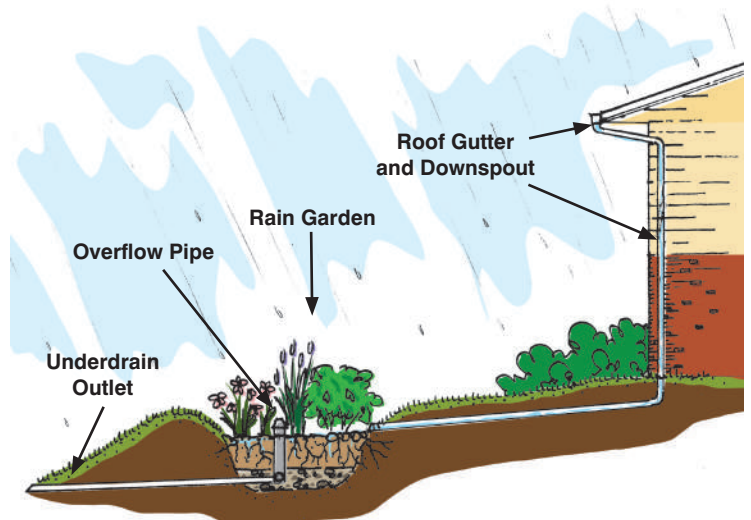


Perform a ONE CALL* to locate underground utilities to avoid.

- 2. DRAINAGE AREA:** Determine where the stormwater runoff to feed the rain garden will be coming from: a roof, a driveway or other impermeable surface. Measure the square foot area that will be collected by the rain garden. From a roof downspout, measure the length (L) and width (W) of the part of the house that feeds the downspout. From a driveway or other hard surface, measure the average length (L) and width (W) of the area.

$$L \times W = A \text{ (area in square feet of runoff).}$$

- 3. DESIGN:** The rain garden should be at least $\frac{1}{4}$ the size of the area (A) draining to it. For a 15' x 40', or 600 square foot roof, the rain garden should be about 150 square feet or 10' x 15'. The rain garden can be any shape, as long as the surface area measures the same square footage.



Try to fit the rain garden in and around your existing landscape so it complements the house. The depth of the rain garden should be 1' for the surface depression, at least 2' of soil and about 1' of stone for a total of 4'. These layers can vary a bit, depending on existing soil conditions and plant selection.

$$\text{Rain garden size} = \frac{1}{4} \times A$$

- 4. PLANT SELECTION:** There are many choices in size, color, texture, blooming or fruiting trees, shrubs, perennials and grasses that can be used in a rain garden. Plants should be chosen not only for their beauty, but for their ability to thrive in dry and wet conditions, and whether the rain garden will be in full sun or partial shade. Refer to the 'Rain Garden Plant Selection and Care' fact sheets.
- 5. LAYOUT:** Verify you are avoiding any underground utilities. Use a measuring tape, and string, flexible hose, or marking



Mark the rain garden location with paint or even a garden hose.

paint to layout the edges of the rain garden to meet your size requirement. Mark where the water will enter the garden and which direction an underdrain can safely outlet from the garden. Strip the grass sod or other surface material from the area.

6. EXCAVATION: Begin digging by hand or with a small excavator to reach the required depth (about 4'). On sloping ground, the excavated material can be used to create a berm around the lower sides of the rain garden and placed level with the upper side where the ground is undisturbed. By building up the lower side of the rain garden, there will be less digging to meet the required depth needed.



Excavate the rain garden using the soil to create the downhill barrier.

7. DRAINAGE LAYERS: An underdrain is always a good idea if you are not sure the soils surrounding the rain garden will be able to soak up the excess water. Many of our soils have a high clay content and take a long time to soak up water, and an underdrain with a perforated pipe allows the system to slowly drain down when the rain garden is over saturated.

- a. Cover the bottom of the excavated hole with a 4" layer of straw on the bottom to prevent the underlying soil from mixing with the stone layer. It will compact to an inch or so with the subsequent layers on top of it.
- b. Place the clean stone drainage layer and the perforated pipe underdrain concurrently over the straw. Install a cap at the upper end, and a tee at the lower end of the pipe. A 6" solid pipe should extend above the surface of the rain garden for an emergency overflow with a basket grate, and a 4" solid pipe should extend from the tee to a safe outlet point. Make sure no dirt or debris gets into the pipes while you are working, and contact your municipality for an approved outlet location.
- c. When the underdrain pipe is covered over with the clean stone layer, place another 4 inches of straw to keep the upper soil layer from filtering into the stone layer.



A straw layer is added over the stone to separate it from the soil.

8. SOIL MIX: A soil mix that combines topsoil with sand and compost creates a mix that will promote water to soak into the rain garden, allow excess water to drain through, and provide the nutrients for healthy plants. Place 18-36" of 50-30-20 topsoil-sand-compost soil mix over the layer of straw and stone underdrain. This soil should be lightly compacted to prevent excessive settlement after the rain garden is completed. The surface of the soil should create a ponding area to capture the rain water.

9. PLANTING: Layout the locations of the plants in the rain garden for the best view and space them to allow each plant sufficient room to grow to their mature size. Do not under-plant the garden as this may encourage weeds to grow. The plants should be removed from their containers or wrappings then placed in pre-dug holes in the garden so they are planted at the same level they were in their container.



Space rain garden plants to fill the rain garden.



Stone protects flow from the downspout to the overflow pipe.

10. FINISHING TOUCHES:

- a. Install a basket grate over the exposed end of the 6" riser pipe. The top of the pipe should be approximately 6" above the surface of the soil mix, and 6" below the berm of the rain garden. Secure the basket grate to the pipe with (2) 1-1/2" screws through pilot holes drilled into the side of each.
- b. Place large decorative gravel where water enters the garden and where water exits the underdrain outlet to slow the water down and spread it out to prevent erosion.
- c. The rain garden surface should be covered with a layer of mulch or seeded with a cover crop of low groundcover plants. This helps keep the weeds down and the soil moist and loose to encourage infiltration each time it rains.

11. MAINTENANCE:

For maintenance of your rain garden refer to the 'Rain Garden Maintenance' fact sheet.

Produced by	With Funding from
	
Phone: 724-837-5271	
www.wcdpa.com	

Rain Garden Maintenance

First Season:

Caring for your garden the first season after planting is critical to its success. The most important tasks during the first year are watering and weeding. Young establishing plants need about an inch of rainfall or water per week.

Long-term Watering:

By the second or third season, your plants should be fairly well established and most of the plants will be able to handle short periods of drought. During longer periods, you may need to water your garden, as you would any other landscape bed. Plants need moisture well into the fall, especially shrubs and trees.



Watering Tips:

The best way to water is to use a hose to water around the base of each plant, preferably in the morning. This is a more time-consuming method of watering, but it is best for the plant (keeps foliage dry which helps prevent disease) and for the environment (wastes the least amount of water).

Weeds and Mulch:

Plants compete with each other for nutrients, light, water and space.

Weeds, when given a chance, will almost always win. If weeds are rampant in your garden, your ornamental plants will suffer and your garden will look messy and unkempt. The easiest solution to control weeds is to maintain a 3 inch layer of mulch. Shredded bark mulch is the best mulch for rain gardens.



Mulching Tips:

It is important to use a shredded bark mulch because it will knit together and stay in place when the garden fills with rainfall, whereas wood chips tend to float and clog the overflow drain.

Shredded bark mulch does break down and will need to be replaced every year or two, but as your plants grow and fill in, less mulch will be necessary to keep weeds down.

Fertilizing and Compost:

The plants selected for your rain garden do not require rich, fertile soil or lots of fertilizer to grow. You may not need to fertilize, but if growth appears poor, or if plants are yellowing or discolored, you may want to consider fertilizing.

To use a fertilizer:

1. Test the soil. Ideally, a fertilizer should be chosen to match whatever may be deficient in the soil. The Penn State Extension Service provides a testing kit for a minimal cost. Their phone number in Westmoreland County is 724-837-1402.
2. Select the right fertilizer. A soil test will tell you what nutrients need to be added and in what quantities.
 - a. Nitrogen rich fertilizers should be applied in the spring when plant growth starts for maximum effectiveness.
 - b. Phosphorus and potassium can be applied in the spring or fall.
 - c. Slow-release fertilizers, which release nutrients over a period of weeks

or months, are best for shrubs and perennials to reduce the risk of 'burning' your plants.

- d. Well-composted yard waste, applied regularly, can add nutrients and structure to soil, and may be adequate for fertilization.
3. Apply fertilizer properly. Always read and follow labels properly when using fertilizers to prevent over application. Using too much fertilizer or applying it incorrectly can damage plants and degrade the environment.

Fertilizer Tips:

The nutrients plants need in the greatest quantities are nitrogen (N), phosphorus (P) and potassium (K). A bag of fertilizer will have 3 numbers on it which relate to the percentage of each nutrient in the mix. For instance, 20-10-15 indicates 20% nitrogen, 10% phosphorus and 15% potassium.



Compost Tips:

There are a variety of methods that can be used to recycle your yard waste into healthy compost that can be used to add nutrients back into your garden. Westmoreland Cleanways, a non-profit corporation, provides programs and assistance with composting. They can be contacted by phone at 724-879-4020, or through their website www.westmorelandcleanways.org.

Leaf Litter:

Leaves are a natural mulch and are good for your rain garden in limited quantities. A 2 inch to 3 inch layer of leaves in the garden is plenty.

- Because the rain garden is a depressed garden, it tends to collect leaves and debris and should be cleaned out in the fall and spring.
- The rain garden should not be used as a place to dump leaves.
- The overflow outlet pipe with the basket grate should be kept clear of leaves and other debris.
- Shredded leaves (created by running a lawn mower over 2 inch to 4 inch thick piles) will decompose faster and are better as mulch than whole leaves, but care must be taken to keep them from floating and entering the outlet pipe.

Annual Maintenance Schedule:

Tasks for early spring (before new growth is 3 inches high):

- Cut and remove dead stalks and seed heads remaining from previous season.
- Remove sticks and debris.
- Prune shrubs if necessary (see Shrub Pruning section).
- Divide and move perennials if they are too crowded (see Perennial Care section).
- Replenish mulch layer to maintain a 3 inch layer of shredded bark.

Tasks for late spring and summer:

- Remove weeds.
- Water as needed during periods of drought.

Tasks for fall:

- Remove weeds and diseased plants.
- Remove excess leaves.
- If fall is dry, continue to water trees and shrubs until the ground begins to freeze (late October). These woody plants need moisture entering winter to ensure survival.

Rain Garden Plant Selection and Care

Plant selection:

Plants, grasses, perennials, shrubs and trees, should be chosen by the amount of light they will receive (sun vs shade) and their ability to handle the periods of wet and dry they will experience throughout the year. Choose plants that have a nice natural form, have seasonal interest, are appropriate for the garden space that has to be filled, and are deep rooted to perform the uptake of water required in the rain garden. See the recommended list.



Grass, Perennial Care:

Dividing grasses and perennials: As your garden matures, the plants will grow, fill in, and may become crowded. To keep the plants healthy, you may need to remove some plants or divide them. It is best to divide them in the spring before they reach 4 inch height. Dig up the entire plant and use a knife, shovel or ax to break the clump into two or more pieces. Replant the pieces in the bed or elsewhere leaving enough space for them to grow.



Pinching and deadheading: Pinching and deadheading are not required for your rain garden, but they do benefit some species. Pinching means

to cut back or to pinch young stems a few inches above a leaf or bud. This practice makes the plant bushier, more compact or delays blooming. Deadheading means to cut off dead flower heads to increase the duration of bloom time. Cut off the spent flower at the base of the flower stalk, and the plant will put its energy into more flowers instead of seed production.

Removing dead stalks: After grasses and perennials die back, dead stalks should be cut and removed from the garden. This can be done in fall or spring. Fall removal is recommended if the plants were diseased or had insects. Spring removal is beneficial to allow the plants to provide winter interest of attractive seed heads and dried foliage, as well as for food and shelter for birds.



Perennials and Disease:

Most of the plants chosen for your rain garden are fairly disease resistant, but sometimes it is hard to distinguish between disease, nutrient deficiency, and insect damage. Prevention is an important strategy in handling disease.

Disease prevention tips:

1. Remove dead and diseased material from the garden promptly.
2. Keep weeds to a minimum.
3. Minimize plant stress by making sure plants have adequate nutrients and water.
4. Keep foliage dry by watering early in the day without wetting the leaves.

Shrub and Tree Selection:

Shrubs and trees should be selected for the size of the space to be filled. It is best to plant a variety that naturally fits the height and spread requirements of the space where it is planted rather than force the shape through repeated pruning.



Shrub and Tree Care:

Pruning: The shrubs and trees selected for your rain garden should have a nice natural form and should not require much pruning to maintain this form. You may however need to occasionally remove dead or diseased branches, crossing or rubbing branches, an odd branch, or just to rejuvenate the plant.

It is best to let them grow to their natural height and form, but in some cases pruning is helpful to the health of the plant. The best time to prune most shrubs and trees is early in the spring before the shrub begins actively growing. To maintain a natural shape, cut the oldest and largest stems back to the ground using pruning shears, clippers, or a saw. Broken, damaged or odd stems or branches should be pruned back to the next growing point (leaf or bud) or to the main stem. Do not shear across the top of the shrub to make it shorter. This practice could harm the health of the plant and cause the bottom to lose foliage.



Enhancing Your Rain Garden:

Adding plants: Plants can be added to your rain garden to fill in gaps or to replace some of the original plants in the event of damage or loss.

- Spring bulbs should be planted in the fall and can add a bright splash of color first thing in the growing season. Most bulbs need dry soil so they should be planted in the dry upper zone of the rain garden.
- Annuals, planted in late spring or early summer, can add continual summer color to your rain garden, especially during the first two years while the perennials and shrubs are filling out. Keep in mind that most annuals will need some type of fertilizer to thrive in the rain garden.
- Perennials can be added at any time to provide additional color and interest.
- Shrubs should be selected to fit the space. It is best to plant a variety of shrub that naturally fits the height and spread requirements of the space where it is planted rather than force the shape through repeated pruning. They should also be able to tolerate the amount of sun exposure and the changing conditions (wet to dry) of the rain garden.

Adding other features:

Decorative rock, statues or other landscape features can be added to the rain garden to enhance the appearance, but should be carefully placed to avoid interference with the function of the rain garden.

Rain Garden Plant Selection and Care

PLANT SECTION

Recommended Ornamental Native Plants for Rain Gardens

(100 sf device should have minimum 3 to 5 species, or more for larger devices)

Scientific Name	Common Name	Mature Height/ Tolerance
-----------------	-------------	--------------------------



Ribbon Grass



Perennial - Beebalm



Perennial - Black-eyed Susan



Small Shrub - New Jersey Tea



Large Shrub - Beautyberry



Small Tree - Serviceberry



Large Tree - Red Maple

Grasses

<i>Pennisetum alopecuroides</i> 'Hameln'	Dwarf Fountain Grass	2-4' ht., sun
<i>Phalaris arundinacea</i> 'Picta'	Ribbon Grass	1-2' ht., sun
<i>Schizachyrium scoparium</i>	Little Bluestem	2-4' ht., sun

Perennials (plant approx. 2' on center)

<i>Aster novae-angliae</i> 'Purple Dome'	Purple Dome Aster	2' ht., sun
<i>Echinacea purpurea</i>	Purple Coneflower	2-4' ht., sun
<i>Geranium maculatum</i>	Wood Geranium	1-2' ht., sun-shade
<i>Hemerocallis fulva</i>	Daylily	2-4' ht., sun
<i>Liriope muscari</i> 'Big Blue'	Big Blue Lilyturf	1' ht., sun-shade
<i>Lobelia cardinalis</i>	Red Cardinal Flower	2' ht., sun-shade
<i>Monarda fistulosa</i>	Bee-balm	2-5' ht., sun
<i>Rudbeckia hirta</i>	Black-eyed Susan	2-3' ht., sun-shade
<i>Salvia nemorosa</i> 'May Night'	Meadow Sage	1' ht., sun-shade

Small Shrubs (plant approx. 3' on center)

<i>Ceanothus americanus</i>	New Jersey Tea	1-3' ht., sun-shade
<i>Rhus aromatica</i> 'Gro-low'	Gro-low Fragrant Sumac	1-3' ht., sun

Large Shrubs (plant approx. 5' on center)

<i>Callicarpa bodinieri</i>	Beautyberry	6' ht., sun-shade
<i>Clethra alnifolia</i>	Summersweet	6' ht., sun-shade
<i>Cornus alba</i> 'Argenteo Marginata'	Silverblotch Dogwood	4-8' ht., sun-shade
<i>Cornus sericea</i>	Red Osier Dogwood	4-8' ht., sun-shade
<i>Ilex glabra</i>	Inkberry Holly	4'-8' ht., sun-shade
<i>Itea virginica</i>	Virginia Sweetspire	3-5' ht., sun-shade
<i>Myrica pennsylvanica</i>	Northern Bayberry	4-8' ht., sun-shade
<i>Salix cinerea</i> 'Variegata'	Tricolor Gray Willow	5-10' ht., sun
<i>Viburnum dentatum</i>	Arrow-wood Viburnum	3-15' ht., sun-shade
<i>Viburnum trilobum</i> 'Compactum'	Com. Am. Cranberrybush	5' ht., sun-shade

Small Trees (plant approx. 15'-20' on center)

<i>Acer ginnala</i>	Amur Maple	15-20'
<i>Amelanchier canadensis</i>	Shadblow serviceberry	20-25'
<i>Amelanchier laevis</i>	Alleghany Serviceberry	20-25'
<i>Crataegus viridis</i> 'Winter King'	Hawthorn	20'
<i>Magnolia virginiana</i>	Sweetbay Magnolia	15-20'
<i>Salix</i> 'Scarlet Curls'	Scarlet Curls Willow	30'

Large Trees (plant approx. 30' on center)

<i>Acer rubrum</i>	Red Maple	40-45'
<i>Betula nigra</i>	River Birch	40-50'
<i>Ostrya virginiana</i>	Hophornbeam	40'
<i>Platanus occidentalis</i>	American Sycamore	50'
<i>Quercus palustris</i>	Pin Oak	60-70'