one drop of sewage is too much

Step-by-Step Guide to Planning & Planting Rain Gardens in Detroit

WHAT IS A RAIN GARDEN?

A rain garden is a shallow depression in the ground planted with native plants that tolerate varying water levels and weather conditions. The garden is designed to hold rainwater on site temporarily so that it infiltrates the soil rather than running off into storm drains. Rain gardens help reduce pollution in lakes and streams by reducing rain water flowing into combined sewer systems, which overflow to the river when they reach capacity.

DO YOU KNOW...

- Pollution in our local rivers is carried there by rainwater?
- The pollutants are caused by the daily activities of humans?
- Rainwater cannot soak into the ground because too much of the land is covered by homes, buildings, parking lots and roads?
- When it rains, sewer pipes fill up and wastewater overflows into the Rouge and Detroit Rivers, polluting Lake Erie?
- Excessive rain causes flooding, erosion, and poor habitat for fish in our rivers?
- You can help prevent rainwater pollution?

Raw and partially treated sewage pollutes the Rouge and Detroit Rivers.

EACH OF US CAN HELP PREVENT WATER POLLUTION

By decreasing the amount of rainwater that flows off your property and into the sewers, you can help prevent water pollution. Each of us can do this by disconnecting the downspouts on our home from the sewer system and directing the water into a beautiful rain garden.

THE PROBLEM WITH RAINWATER

Houses, roads, buildings and parking lots cover much of the land in Detroit. When it rains, water has no place to go. To keep our homes and streets from flooding, rainwater is directed to storm sewers on city streets and parking lots.

When Detroit neighborhoods were built, they used one sewer system to carry wastewater from homes and rainwater from streets to the wastewater treatment plant. As the population grew, sewer lines filled to capacity. When the pipes are full, they overflow into the Rouge and Detroit Rivers to prevent sewage from backing up in residential basements. This overflow contains chemicals, raw sewage, and harmful bacteria that pollute waterways and threaten public health. Unfortunately, not only do the overflows pollute the Rouge and Detroit Rivers, they also pollute Lake Erie.

Photo Credit: Michigan Sea Grant

THE SOLUTION INVOLVES YOU!!!

You can help reduce rainwater from flowing into the sewer by landscaping with a rain garden and disconnecting your downspouts from sewers on your homes. Downspouts should flow into rain gardens or other vegetated areas, not directly into the sewer system.

FOLLOW THESE STEPS TO CREATE YOUR RAIN GARDEN

1) Select a location
2) Determine the garden size
3) Choose native plants suited for the site
4) Prepare the garden area
5) Plant the garden
6) Cover with an organic mulch
7) Disconnect downspouts & direct rainwater to the garden
8) Maintain your garden over time

1 SELECT A LOCATION

The site must be more than 10 feet away from the foundation of a home (or other structures) and 3 feet from sidewalks and driveways. The garden should not be placed too far from the downspout or the primary source of water you are trying to capture.

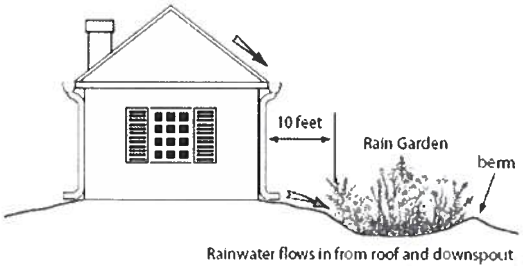


Photo Credit: Rain Gardens for the Rouge River: A Citizen's Guide to Planning, Design, & Maintenance for Small Site Rain Gardens (SOCWA)

2 DETERMINE THE GARDEN SIZE

There are a few things you need to know in order to determine the size of the garden needed to handle the amount of water that will flow into it. These are the infiltration rate and the area that will drain into the garden.

INFILTRATION RATE:

Calculate how fast the water soaks into the ground at the site. This sounds difficult but it is easy.

- Dig a hole 6 to 8 inches deep and about 4 inches wide
- Fill the hole with water
- Wait an hour or two, refill the hole with water and measure the water level.
- After an hour measure how much the water level dropped. The difference is the infiltration rate.
  Let's say the water level dropped by 1/2 inch. The infiltration rate is 1/2 inch per hour.
- Multiply the rate by 24 (1/2 inch x 24 = 12) to get the total inches per day. This number is the infiltration rate per day and is used to calculate the depth of the garden.

DRAINAGE AREA:

Estimate the square footage of the area that will drain into your garden. This can be from your roof, driveway, sidewalks and lawn areas. Multiply the length times the width of the drainage area. If collecting water from more than one area, add the square footage of the areas together to get the total area drained.

2 CONT.

GARDEN SIZE:

Once the drainage area and infiltration rate are known, you can determine the size of the rain garden. Calculate the size of your garden using the formula below. Divide your drainage area by the infiltration rate to learn how large the garden must be to receive the water that will drain into it.

$$\frac{\text{Drainage area (sq. ft.)}}{\text{Infiltration rate per day}} = \text{Size of the Garden (sq. ft.)}$$

EXAMPLE: You are building a rain garden that will receive water from the front half of a house. The area of roof that will drain into the 2 downspouts in the front of the house is 24 feet wide by 22 feet long. Multiply 24 x 22 to get 528. The drainage area is 528 sq. ft. Your infiltration rate was 1/2 inch per hour or 12 inches per day. Using the formula, you calculate the size of the garden to be a minimum of 44 sq. ft.

$$\frac{\text{Drainage area (sq. ft.)}}{\text{Infiltration rate per day}} = \text{Size of the Garden (sq. ft.)} \qquad \frac{528 \text{ sq. ft.}}{12 \text{ inches}} = 44 \text{ sq. ft.}$$

Now that you have this formula, you can change the garden depth to a more desired depth. Continuing with our example, say you don't want the depth to be 12 inches, you'd rather have the depth no more than 6 inches, change the garden depth to 6 and divide 528 by 6 to get a larger garden size of 88 sq ft to ensure you have room for the amount of water that may drain into it and still dry up within 24 hours.

GARDEN SHAPE:

Create any shape you like as long as it is roughly the size you calculated. Common garden shapes are kidney, oval, or round. More formal garden shapes are square or rectangular.

3 CHOOSE NATIVE PLANTS SUITED FOR THE SITE

It is important to select native plants that are suited to the conditions of the site. Note how much sunlight the garden will get throughout the day and choose plants accordingly. Select plants that like wet conditions for the low areas and dryer conditions for the slope of the garden. Native plants are recommended because they are adapted to the wet springs and dry summers of southeast Michigan. A list of native plant nurseries can be found online at www.mnppa.org.

Asclepias Incarnata

Aster Novae-Angliae

Coreopsis Tripteris

Geranium Maculatum

Helenium Autumnale

Iris Virginica

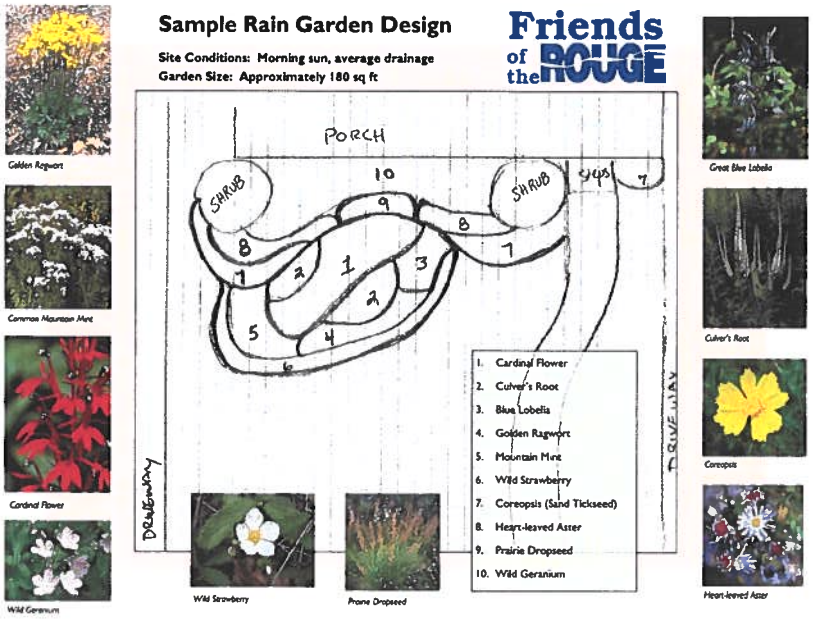
Lobelia Siphilitica

Verbena Hastata

Photo Credit: Suzan Campbell

3 CONT.

Look for this sticker that identifies native plants sold at Eastern Market.



4 PREPARE THE GARDEN AREA

- Call MISS DIG (811) to flag the location of utility lines before beginning a rain garden project. Avoid placing your garden over utility lines.
- If you have clay soil, dig out 1 to 3 feet of soil and replace it with a mixture of 70% compost and 30% sharp sand. Sharp sand has a gritty texture and helps loosen clay soil. ******Care should be taken to avoid breathing the dust from the existing soil due to the potential for lead particles from old paint and leaded gasoline if near a busy road. Highest concentrations of lead from paint chips in the soil are within a few feet from structures.******
- Use the removed soil to create a small berm around the garden. A larger berm can be created at one end of the garden to use up the soil and create interest.
- Shape the garden bed so the center of the garden is the desired depth with a gentle slope near the edges.

5 PLANT THE GARDEN

- Spring or fall is the best time to plant the garden. Planting in summer is okay but the young plants must be watered regularly.
- It is best to plant in large groups of the same species. This type of planting is more appealing to the human eye and makes it easier to identify weeds in the years to come. Space the plants 1 to 1.5 ft. apart.
- Native plants have deeper root systems and typically come in a deep cell. It Is important to plant each one level with the surrounding soil. If the plant is higher than the surrounding soil, it will dry out and may die. If planted too deep, the plant will rot and die.
- Label the plants so you know where they are in the future.

EQUIPMENT & SUPPLY NEEDS FOR A 100 SQUARE FOOT GARDEN:

- **Compost and sharp sand: Compost is an essential part of the rain garden. It is the sponge that soaks up rainwater. Roughly 26 cubic feet of compost and 14 cubic feet of sharp sand is needed for 100 sq. ft. of garden at 12 inches deep.**
- **Native plants: Approximately 80 native plant plugs will be needed for the garden.**
- **Organic mulch: You will need 14 cubic feet of mulch to cover a 100 sq. ft. planted garden at 2-3 inches deep.**

6 COVER WITH AN ORGANIC MULCH

Once planted, spread a 3-inch layer of organic mulch throughout the garden to hold moisture and prevent weeds. Take care not to smother the young plants with mulch. It is best to keep the mulch from touching the stalks of the plants.

7 DISCONNECT DOWNSPOUTS & DIRECT RAINWATER TO THE GARDEN

- Cut the downspout 9 inches above the sewer pipe with a hacksaw or tin snips.
- Plug or cap the sewer line with a plug with a wing nut that fits in the pipe or a cap with a hose clamp over the pipe.
- Attach an elbow over the downspout. If necessary, use crimpers or needle-nose pliers to crimp the end of the cut downspout so it slides inside the elbow.
- Extend the downspout to the garden. Measure and cut the downspout to the length needed for the water to drain into the rain garden. Attach the extension to the elbow by slipping the extension over the end of the elbow.
- Secure the joints where the downspout, elbow and extensions connect with sheet metal screws.
- Place a large rock or several smaller rocks at the end of the extension to reduce erosion in the garden.

All downspouts should be disconnected to reduce the amount of rainwater flowing into the sewer. Repeat the process above, extending the downspout 6 feet from homes with basements or 2 feet from homes with slabs or crawl spaces.

8 MAINTAIN YOUR GARDEN OVER TIME

- Regular maintenance is necessary to keep the garden looking good and prevent the loss of the native plants.
- Edging the garden keeps the lawn from creeping in to the garden.
- ***Weeding is one of the most important tasks!*** Regular weeding will stop weeds from spreading throughout the garden. Mulching the garden with woodchips will help to prevent weeds and make pulling weeds you do get much easier.
- Watering is necessary for the first two years of the garden to allow the plants to become full and healthy. Once established they should not need to be watered. If there is an extended dry period, you may water to keep plants looking good.
- Other maintenance tasks include thinning plants if they get too large and cutting back the dead stalks in late fall or early spring.

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