RAIN GARDENS

for Homeowners

Soak up the rain and bring conservation to your yard

WHAT IS A RAIN GARDEN?

Rain gardens are shallow, bowl-shaped landscaping features planted with native species that capture and treat stormwater runoff from rain events. Rain gardens are utilized on residential and small commercial properties to mimic the natural hydrological cycle whereby rainfall soaks into the ground rather than running off the landscape and polluting local creeks, streams, and rivers. This infiltration helps to mitigate flooding in localized areas such as neighborhoods, streets and streams. Rain gardens also provide important habitat to support beneficial insects and pollinators that can help improve local water quality.

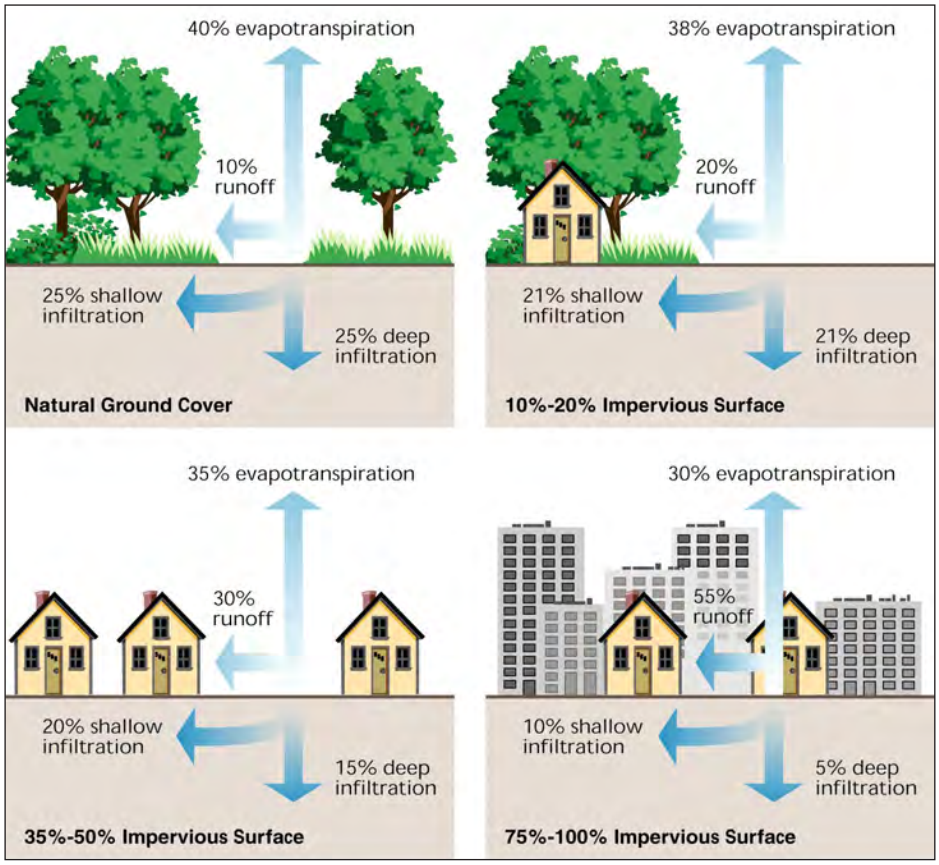
WHAT IS STORMWATER RUNOFF?

Stormwater runoff is a nonpoint source of water pollution that also contributes to erosion, flooding and increased surface water temperatures detrimental to aquatic life. Rain gardens are strategically located to accept stormwater runoff from impervious surfaces such as roofs, driveways, walkways and patios. Rainfall becomes stormwater runoff when it hits impervious surfaces and picks up various pollutants including oil, gas, heavy metals, pet waste, fertilizers and sediment. Due to soil compaction from development, residential lawns can also act as impervious surfaces that create runoff. The graphic illustrates the role of impervious surfaces in reducing infiltration, or the process by which water on the ground surface soaks into the soil and recharges local groundwater resources. Just one acre of impervious surface in our local climate can generate up to 1 million gallons of stormwater runoff annually! But where does all that runoff go? Several of our communities operate a municipal separated storm sewer system (MS4) that conveys stormwater to local waterways. In older areas of our cities served by a combined sewer (sanitary and stormwater in the same pipe), combined sewer flow is conveyed to local treatment plants and can overflow into local waterways once conveyance or treatment capacity is exceeded. Stormwater runoff is a key culprit in combined sewer overflows and flashy instream conditions, leading to erosion and sedimentation of our waterways.

Prior to development, much of the rainfall would slowly soak into the ground and recharge groundwater resources that fed our local streams, lakes and wetlands. Rain gardens attempt to restore this pre-developed landscape condition by managing stormwater sustainably following the adage "slow it down, soak it in." They are an effective form of green infrastructure that can reduce total suspended solids and bacteria by 90% and nitrogen and phosphorus in runoff by 60% according to the *Indiana Stormwater Quality Manual*. In addition to water quality and quantity benefits, they also provide important pollinator habitat. A network of rain gardens across the county will collectively will help significantly improve our local waterways.

RAIN GARDEN SITE REQUIREMENTS

The first step to choosing a location for your rain garden is observing your property during and after a storm. It is important to choose a well-drained area for your rain



Stream Restoration, Principles, Processes and Practices (FISRW 1998)

Relationship between impervious cover and surface runoff. Impervious cover in a watershed results in increased surface runoff. As little as 10 percent impervious cover in a watershed can result in stream degradation.

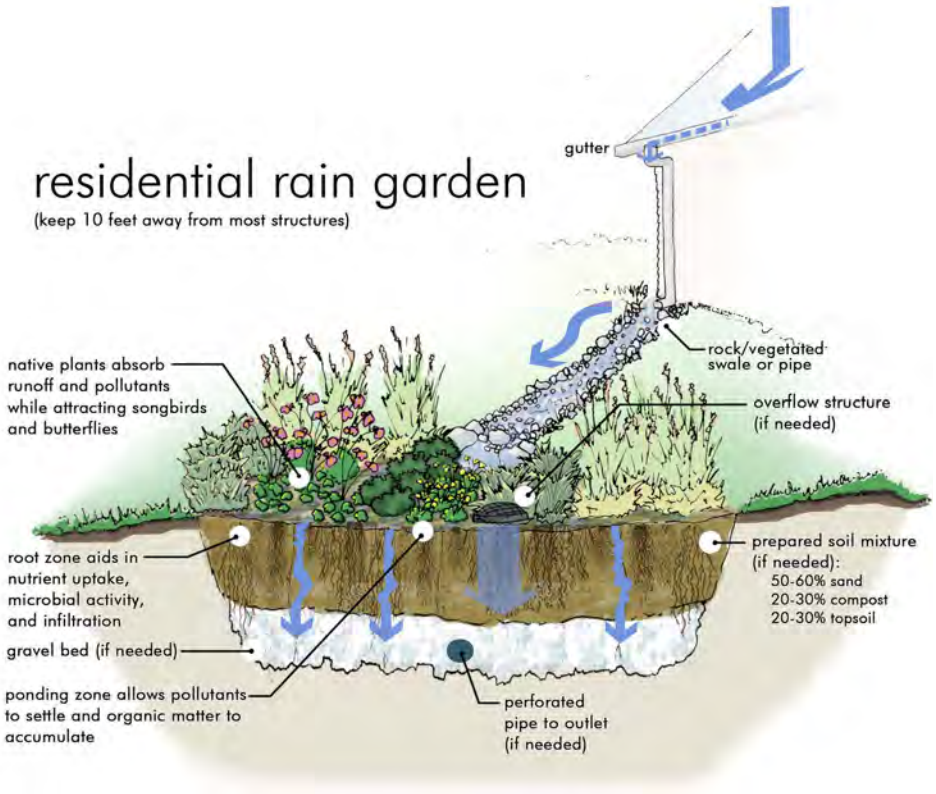
garden. **Low areas, where water typically ponds for more than 24 hours, are not an ideal location for your rain garden.** Standing water creates breeding habitat for mosquitoes who need 7–12 days to breed, so make sure the low areas you select infiltrate water in 24 hours or less. Place rain gardens upstream of areas where water stands for more than 24 hours to capture water before it gets to these problem drainage areas.

You'll want your rain garden to be located near the source of runoff, typically gutter downspouts, driveways and walkways. If you are utilizing a rain barrel, make sure to direct the overflow to your rain garden location to create a treatment chain. You can find an aerial of your property showing impervious surfaces by entering your address at https://gis1.hamiltoncounty.in.gov/GeneralViewer/ and switching to the aerial basemap (orange dot with white squares). Look for areas where water naturally flows from these impervious areas onto your landscape.

Franklin County Ohio SWCD

Note the following when choosing a location for your rain garden:

- Locate at least 10' from structures/foundations (20' away if space allows). Make sure your selected location is downstream of your structure. If you have a wet basement, make sure to resolve this issue first by consulting our brochure *Building with the Land*.
- Avoid steep slopes steeper than 10%. (See the *Cuyahoga Rain Garden* resource for how to measure slope.) A 3:1 side slope or less is recommended. Look for flat areas as steeper slopes require deeper rain gardens and will require more digging.
- Avoid utilities, septic fields and water supply wells. Call 1-800-532-5544 to have your underground utilities marked.
- Avoid placing rain gardens near trees and tree roots.
- Don't block existing drainageways (swales/ditches) needed to maintain proper drainage on your property. Make sure the rain garden overflow has an adequate outlet.
- Avoid areas with high groundwater table or shallow bedrock (see soil types info.)

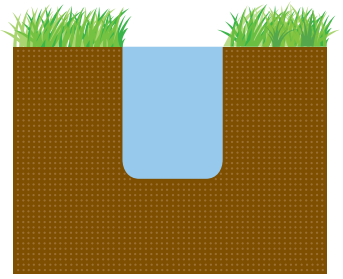


Empower Results/White River Alliance

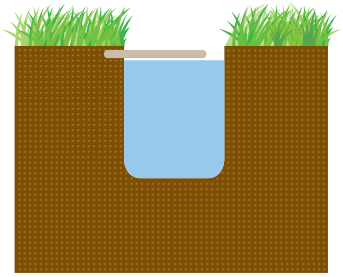
Rain Garden Soil Types and Infiltration Testing

The depth of your rain garden will be determined by the amount of water that can infiltrate in 24 hours. This is determined by your soil type. The majority of Hamilton County soils have a high clay content that may limit the soil's ability to infiltrate water, along with a seasonally high groundwater table that can be within a foot of the

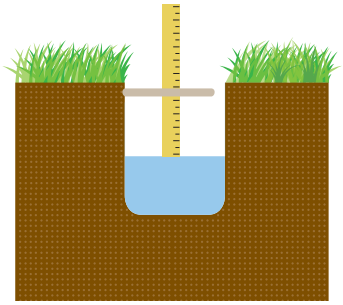
SOIL INFILTRATION TEST



1. Dig a coffee can-sized hole in the planned rain garden site and fill it with water several times during the day to saturate the surrounding soil.



2. The next day fill the hole nearly to the top and mark the water level with a stick in the side of the hole.



3. After 6 hours, measure the drop of the water by measuring the distance between the stick and the top of the water. Take this measurement in inches and multiply by 4 to get your infiltration rate for 24 hours. This will be the depth of your rain garden. The ideal depth for a rain garden is 6 inches.

ground surface from November–April. A soil survey can be conducted by downloading and utilizing the SoilWeb app on your phone (see additional resources). The app was developed by a California university in collaboration with the USDA-NRCS and gives the user immediate information on their soil type. Typical soil types in Hamilton County are listed in the table on this page along with their drainage characteristics.

Rain gardens should be planted in soils with at least a 1" per hour infiltration rate. While it is always preferable to utilize native soils, soils that don't meet this requirement can be amended with compost and washed/graded sand. Sandy soils can have infiltration rates exceeding 8" per hour and, for comparison, clay soil can be as low as .02" per hour. Subsurface drainage tile can also be utilized to prevent standing water when clay soils lie beneath the rain garden, but the drain should slope away from the garden and be buried at least 2' deep. More information about subsurface drainage tile can be found in *Building with the Land*.

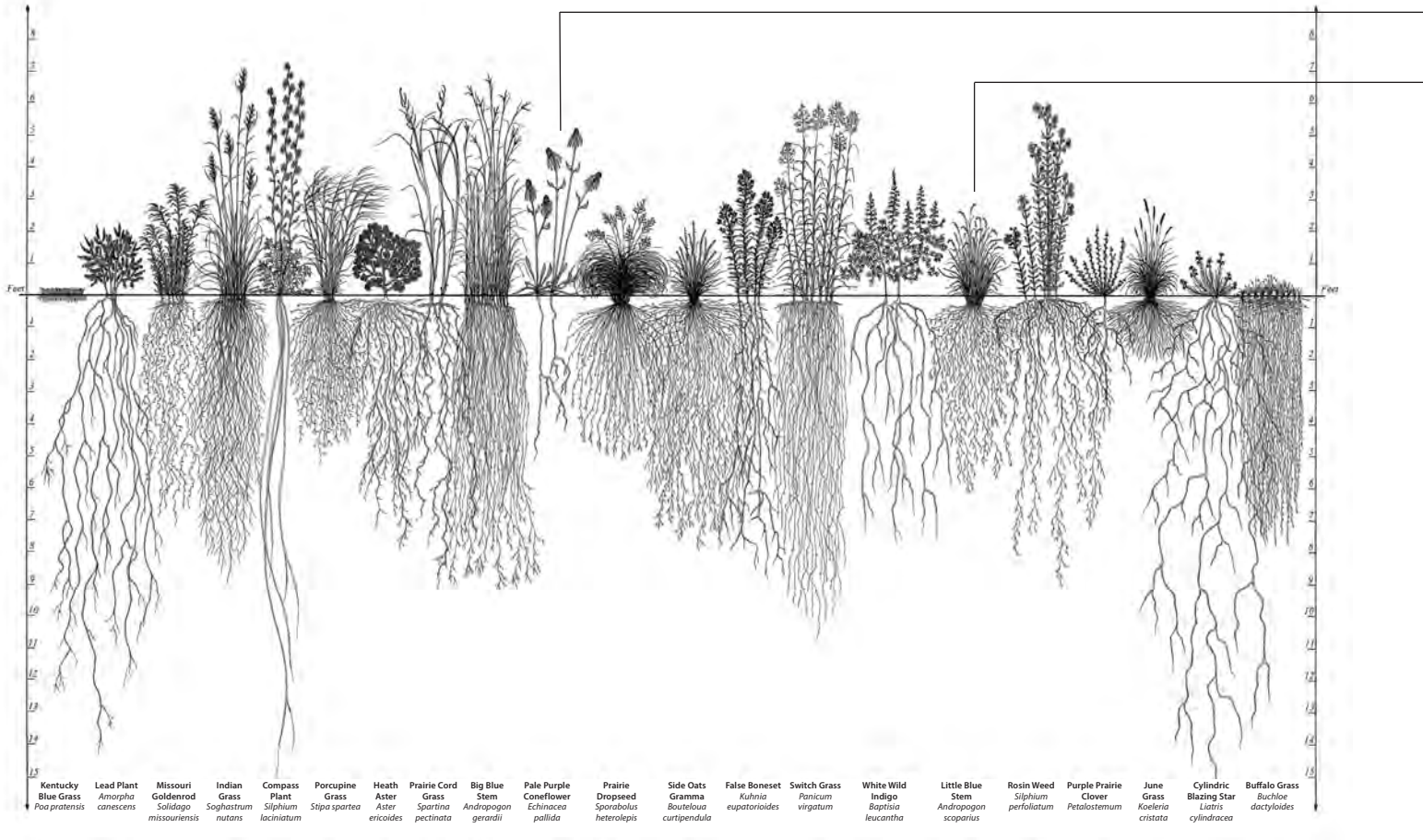
Regardless of your soil type, you must conduct an infiltration test to determine your infiltration rate. This test is best completed during the spring. Dig a hole that is 8" wide and 8" deep using a post hole digger and saturate the soil by running a garden hose several times during the day to fill the hole and saturate the surrounding soil. The next day fill the hole nearly to the top, and mark the top of the water level with a stick in the side of the hole. After 6 hours, measure the drop of the water by measuring the distance between the stick and top of the water. Take this measurement in inches and multiply by 4 to get your infiltration rate for 24 hours.

TYPICAL HAMILTON COUNTY SOIL TYPES	
Brookston silty clay loam (Br)	very poorly drained
Crosby silt loam (CrA)	somewhat poorly drained
Miami silt loam (Mm)	well drained

Rain Garden Sizing

Depending on the property, the contributing drainage area of a rain garden is usually 5–10 times the size of rain garden. A 100–200 square foot rain garden is an ideal size for most residential properties. Most rain gardens are 4–8" deep. Remember the depth of the rain garden is the infiltration rate over 24 hours as determined by an infiltration test. Rain gardens will need to be larger and shallower if the 1" per hour infiltration rate isn't possible with your na-

ROOT SYSTEM OF PRAIRIE PLANTS



© Heidi Natura and Living Habitats, Root Systems of Prairie Plants, 1995

tive soils. Rain gardens are typically twice as long as they are wide to allow runoff to spread out across the garden surface.

Always determine where your rain garden will overflow. This is a balancing act as constructing a berm at the downstream end of the garden will allow the water to infiltrate ("slow it down"), but heavy rainfall will require cutting a notch at the top of the berm to allow an overflow point. Placing small diameter river rock at the inlet and outlet of the garden will slow the water down, stabilize soil and allow sediment to drop out and not clog the garden's infiltrative capacity.

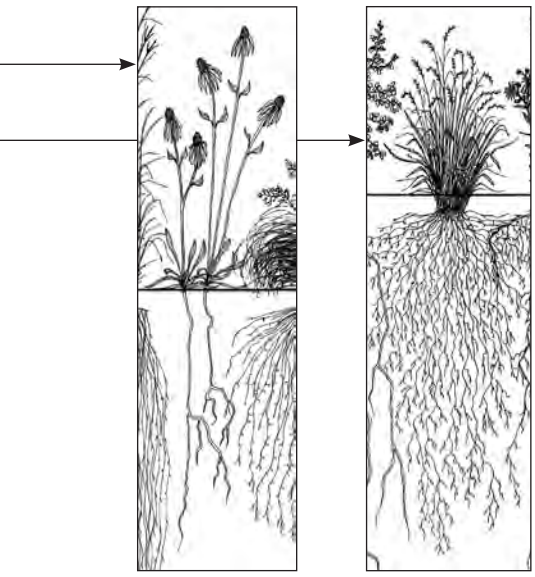
Plant Selection

Deep rooted perennial native plants are not only beautiful but provide a variety of ecosystem functions in rain gardens. They clean runoff, provide food for insects and birds, and improve soil health. As shown in the illustration, native plant roots expand deep into the soil and are often deeper than the plant is tall! Most people just think of wildflowers (forbs) when picturing native plants, but grasses and sedges (collectively known as graminoids) are also important for rain garden function. At least 1/3 of the plantings in rain gardens should consist of graminoids, which have a more expansive root system that add organic matter to the soil as they die. Graminoids are also important for weed prevention. Native plants take 2–3 years to establish, but are drought resistant once established and will no longer require supplemental watering. Most of the energy in the first few years is spent developing strong root systems, thus the saying "the first year they sleep, the second year they creep, the third year they leap." Be patient with your native plantings which have evolved to adapt to local climate conditions.

Choose native plants based on light and moisture preferences as well as growing habit (i.e. aggressive, short lived, etc.). This guide recommends starting with 3–4 species in your rain garden for ease of maintenance and selecting tidy, tough low species that are tolerant of a variety of moisture conditions and salt. Utilize plant plugs (not seed) sourced from the native plant sources listed in the resource section on page 6. For a well-organized appearance, it's recommended to establish a border of short statured native grasses or sedges around the edges of your rain garden—Prairie Dropseed is in an excellence choice for sunny areas. Larger rain gardens can incorporate small statured trees and shrubs but care should be taken if subsurface drainage tile is installed.

Installation

Once you have determined the location and size of your rain garden following the guidelines above, it's time to dig your garden, amend your soils if needed and



FORB
Pale Purple Coneflower

GRAMINOID
Little Bluestem

plant your native plugs. Soil amendments may be needed to increase infiltration rates or attain the ideal pH of 6.5–7.5. An engineered soil mix includes 30% sand, 30% compost and 40% topsoil (low clay content). It is also recommended to utilize double shredded hardwood (not cedar or pine bark) at a depth of no more than 3" following initial plant installation.

We recommend following the installation instructions detailed in the *Iowa Rain Garden Design & Installation Manual* for detailed steps on proper rain garden construction. We also maintain a list of recommended contractors on our website —see resources section.

Maintenance Considerations

Like anything in the home landscape, rain gardens do require periodic maintenance to maintain function and appearance. Maintenance is most intensive during the first few years of establishment but reduces as the garden matures. The following are key maintenance points to observe:

- Water as needed during establishment period. Native plugs require an inch of water a week for the first 6 weeks, with supplemental water as needed.
- Maintain mulch at a depth of 1–2."
- Weed to keep the garden clear of typical invasives which can outcompete native plants and prevent infiltration. See invasive plant resources list in additional resources.
- Cut plants back in the Spring and compost dead plant material (do not compost weeds).
- Inspect for sediment and blockage of outlets due to sediment/debris/vegetation. Inspect after 1" rainfall to make sure the garden drains down after 24 hours.
- Replace plants in barren areas; conduct soil testing if barren areas take up more than ½ of the garden area.

How much do Rain Gardens Cost?

Rain gardens are an affordable, attractive addition to the home landscape and can cost anywhere between $3 to $20 per square foot depending on various factors. Key cost factors include the need for soil amendments, subsurface drainage tile, overflow structures and whether gardens are professionally designed or installed. Some communities offer stormwater utility credits for rain gardens and/or a registration process to avoid high weeds and grass violations. Contact your municipality for more information.

Help promote backyard conservation by introducing rain gardens onto your property and share your projects with your neighbors!

photos above: Franklin County Ohio SWCD

Contact our office for additional assistance:
Hamilton County SWCD
Phone 317-773-2181
www.hamiltonswcd.org

List of Additional Resources

- Marion County SWCD
  Building with the Land:
  https://marionswcd.org/drainage/
- MWRD *Green Neighbor Guide:*
  https://mwrd.org/sites/default/files/documents/Green_Guide_191220.pdf
- Hamilton SWCD Rain Garden Page
  https://www.hamiltonswcd.org/raingardens.html
- Hamilton SWCD Creating & Maintaining a Prairie Booklet
  https://www.hamiltonswcd.org/prairie.html
- Recommended Contractors:
  https://marionswcd.org/contractors-service-providers/

- *Iowa Rain Garden Design & Installation Manual:*
  https://iowastormwater.org/rainscaping/rain-gardens/
- *Cuyahoga County Rain Garden Manual:*
  https://cuyahogaswcd.org/files/resources/raingardenmanual-oldversion-forwebsite.pdf
- SoilWeb App:
  https://casoilresource.lawr.ucdavis.edu/gmap/

Local Native Plant Sources

- Indiana Native Plant Society
  https://indiananativeplants.org/landscaping/where-to-buy/
- Hamilton County Invasives Partnership
  https://hcinvasives.org/

The plants in the table listed at right are proven native plant species for rain gardens.

Moisture preference and placement in rain garden:

Wet	Bottom of rain garden
Mesic	Moist area on sides/slopes of rain garden
Dry	Edges at top of rain garden

Stature:	Short: ‹24" Medium 24-48" Large ›48"

HIP
Hamilton Co. Invasives Partnership

NATIVE PLANT SPECIES FOR RAIN GARDENS

LATIN NAME	COMMON NAME	STATURE	EXPOSURE	BLOOM SEASON/COLOR						MOISTURE PREFERENCE
				May	June	July	Aug	Sept	Oct	
Aster ericoides	Heath Aster	Short	Sun-Part Shade							Dry
Iris virginica	Blue Flag Iris	Medium	Sun-Part Shade							Wet
Penstemon calycosus	Smooth Beardtongue	Short	Sun to Shade							Mesic and Dry
Penstemon digitalis	Foxglove Beardtongue	Short	Sun-Part Shade							Mesic and Dry
Phystostegia virginiana	Obedient Plant	Medium	Sun-Part Shade							All
Pycnanthemum virginianum	Mountain Mint	Medium	Sun-Part Shade							Mesic and Dry
Baptisia australis	Blue False Indigo	Large	Sun-Part Shade							Wet and Mesic
Zizia aurea	Golden Alexanders	Short	Sun to Shade							Wet and Mesic
Carx vulpinoidea	Fox Sedge	Short	Sun							Wet and Mesic
Carex muskingumensis	Palm Sedge	Short	Part Shade-Shade							Wet and Mesic
Carex grayii	Burr Sedge	Short	Part Shade-Shade							Wet and Mesic
Sporobolus heterolepis	Prairie Dropseed	Short	Sun							Dry
Ascelipias incarnata	Marsh Milkweed	Medium	Sun							Wet and Mesic
Ascleipias tuberosa	Butterfly Milkweed	Short	Sun-Part Shade							Dry
Liatris spicata	Dense Blazing Star	Medium	Sun							Wet and Mesic
Echinacea purpurea	Purple Coneflower	Medium	Sun-Part Shade							Dry
Chelone obliqua	Pink Turtlehead	Medium	Part Shade							Wet and Mesic
Eupatorium maculatum	Spotted Joe-Pye Weed	Large	Sun-Part Shade							Wet
Vernonia fasiculata	Ironweed	Large	Sun-Part Shade							Wet
Veronicastrum virginicum	Culver's Root	Large	Sun							Wet
Monarda bradburiana	Bee Balm	Medium	Sun							Wet and Mesic
Rudbeckia subtomentosa	Sweet Black-Eyed Susan	Large	Sun-Part Shade							Wet
Rudbeckia fulgida var speciosa	Showy Black-Eyed Susan	Short	Sun							Wet and mesic

RAIN GARDEN & POLLINATOR HABITAT

Orchard Park Presbyterian Church

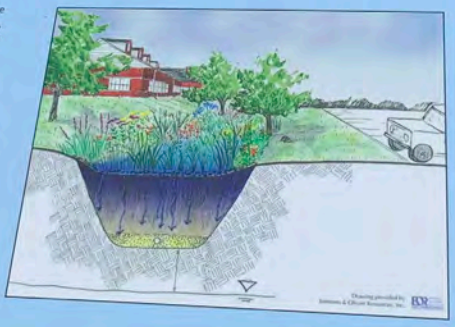
This rain garden collects stormwater from the roof and parking lot of the church as well as adjacent roads. The water infiltrates into the ground instead of entering stormwater pipes. Unused grass areas were also converted to a meadow of native plants. The native plants in the rain garden and meadow are adapted to local conditions and don't require chemical fertilizers or supplemental watering. Native plants provide great food, shelter, an nesting areas for pollinators.

What is a rain garden? *A rain garden is a bowl-like landscape bed planted with native vegetation. Rain gardens capture storm water runoff from impervious surfaces like parking lots, roofs, and driveways and hold the water so it can be absorbed into the ground and cleansed of pollution. This helps with water quality and prevents flooding.*

What is runoff? *Runoff is water that flows across land & hard surfaces into stormwater pipes and eventually to our lakes, rivers, streams, and oceans. Whether flowing across an agricultural field, a parking lot, or a roof or lawn, this water picks up pollutants like fertilizer, particles from pet waste, gas and oil leaked from cars, trash, and soil particles. These pollutants end up in our waterways affecting water quality, wildlife, and our drinking water.*

What can you do? *Create a rain garden at your home or business. Add native plants to your landscaping or replace grass areas with natives. Keep storm drains clear and avoid adding excess fertilizers to your yard. We can all make a difference for clean water and wildlife!*

Learn more and get help at www.hamiltonswcd.org.



Rain gardens have many benefits: they improve water quality, reduce runoff and prevent flooding, replenish groundwater supplies, provide wildlife and pollinator habitat, and enhance the beauty of our landscape.

Orchard Park Presbyterian Church

Hamilton County Soil & Water Conservation District

Williams Creek Management

Clean Water Indiana

DNR Indiana Department of Natural Resources

Hamilton County Soil & Water Conservation District

Clean Water Indiana

Marion County Soil and Water Conservation District

Heartland Backyard Conservation Program

This booklet was originally developed by the Marion County SWCD with funding provided by the Clean Water Indiana Grant Program.

Use the QR code to access a digital copy of this booklet