

Rain Gardens

Adam Leonberger

Franklin County Extension Agent for Horticulture

COOPERATIVE EXTENSION



What is a Rain Garden?

- A rain garden is a planted depression that captures and reduce stormwater runoff from impervious surfaces



Why?

- Increase the amount of water that filters into the ground
- Provide protection from flooding and addresses drainage problems
- Filter run off pollution to improve water quality
- Habitat for wildlife
- Decreases soil erosion



Stormwater Runoff

Pollutants In Our Stormwater



Pet Waste



Sediment

Fertilizers and Lawn Chemicals



Detergents and Paint



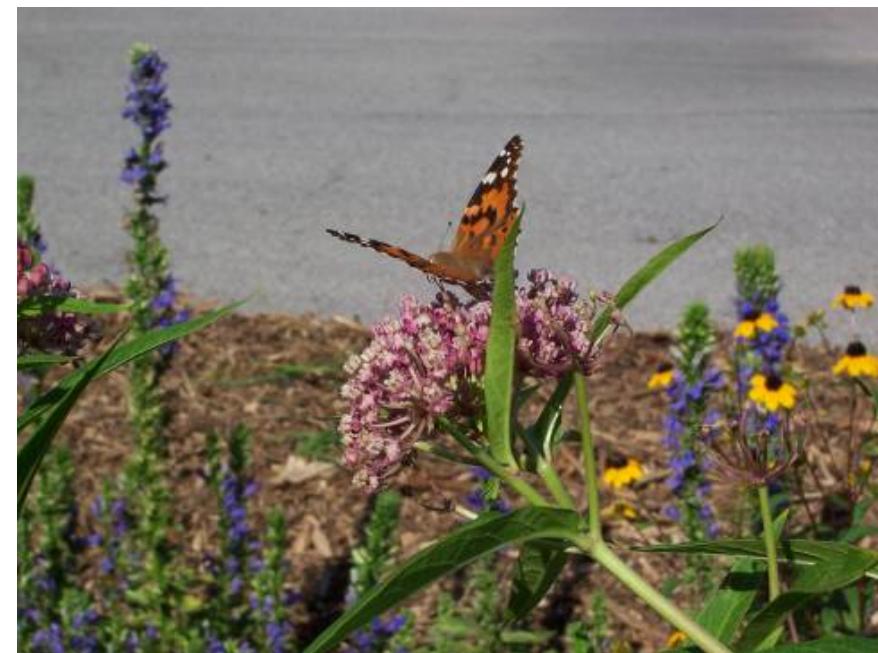
Yard Waste

Motor Oil and Antifreeze



Rain Gardens

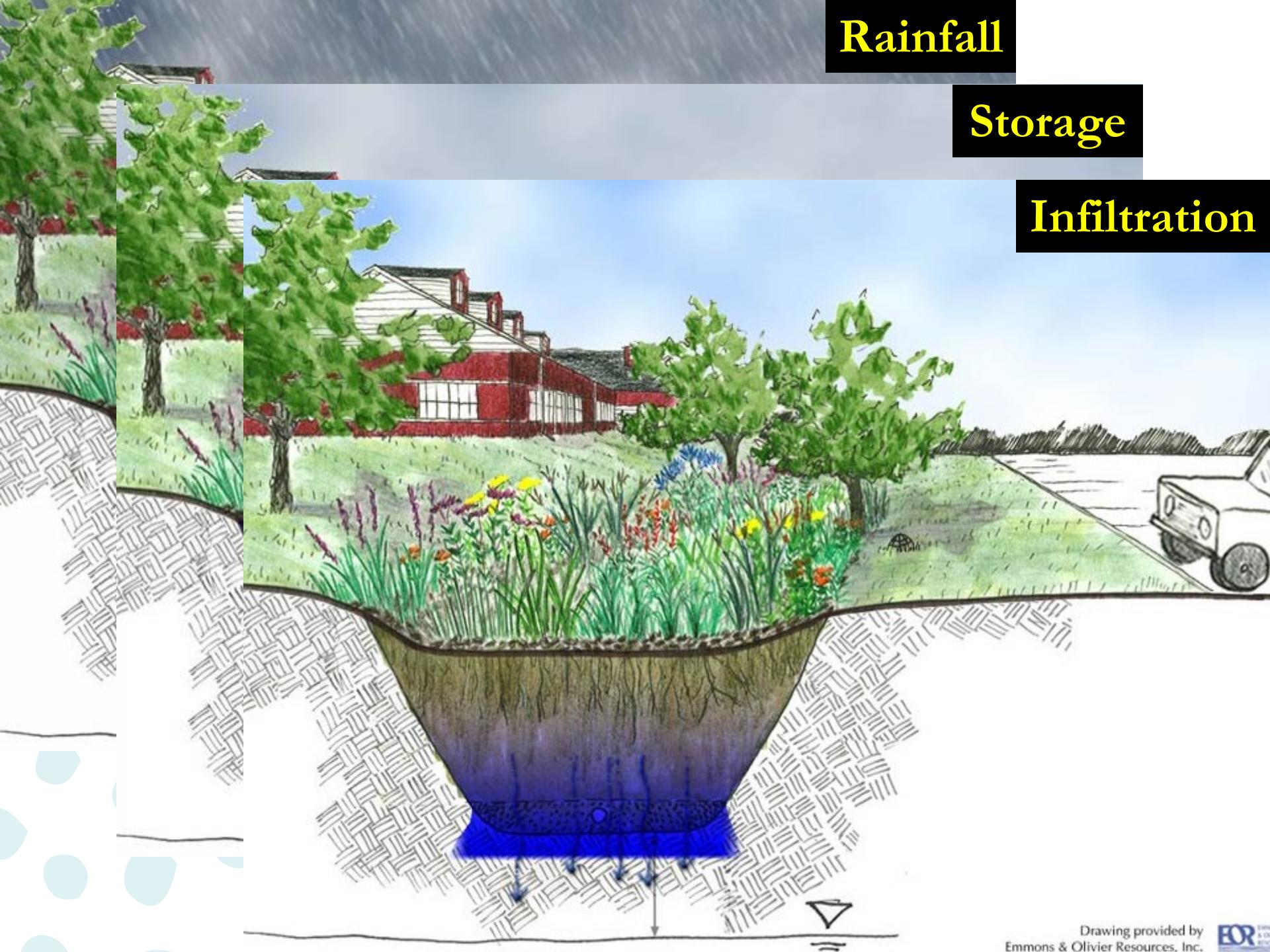
- Unlike bog or wetland gardens, Rain Gardens hold water for only 1 to 2 days.
- Compared to a conventional lawn, a Rain Garden can allow 30% more water to soak into the ground.
- Rain Gardens are also wonderful habitat for wildlife and can be an attractive asset to any property.



Rainfall

Storage

Infiltration



Site Selection

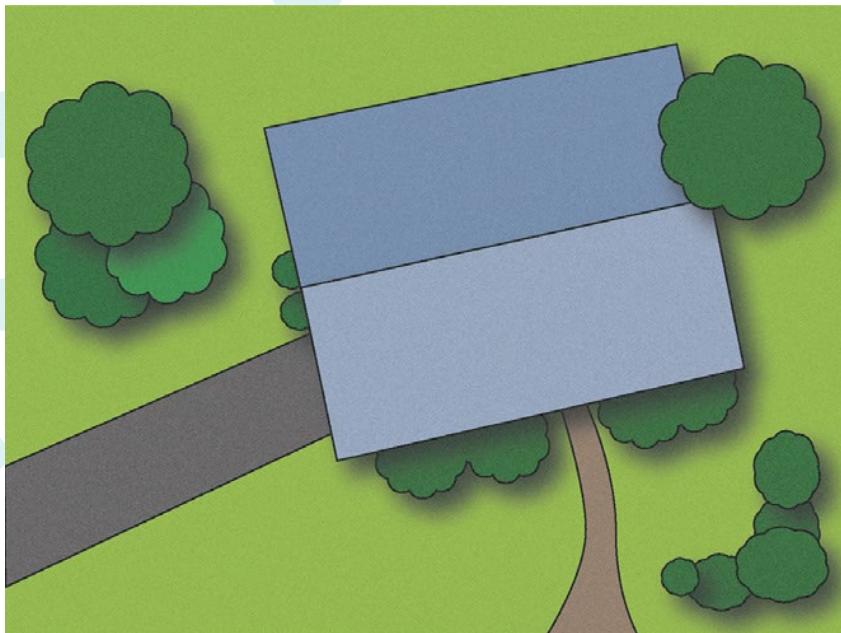


Where Do You Put a Rain Garden?



- Full sun/ part shade
- Just above where water gathers
- At least 10 feet from house or other building
- Away from septic, wells, trees, and utilities
- Avoid areas that are already constantly wet
- Should drain within 24 to 48 hours

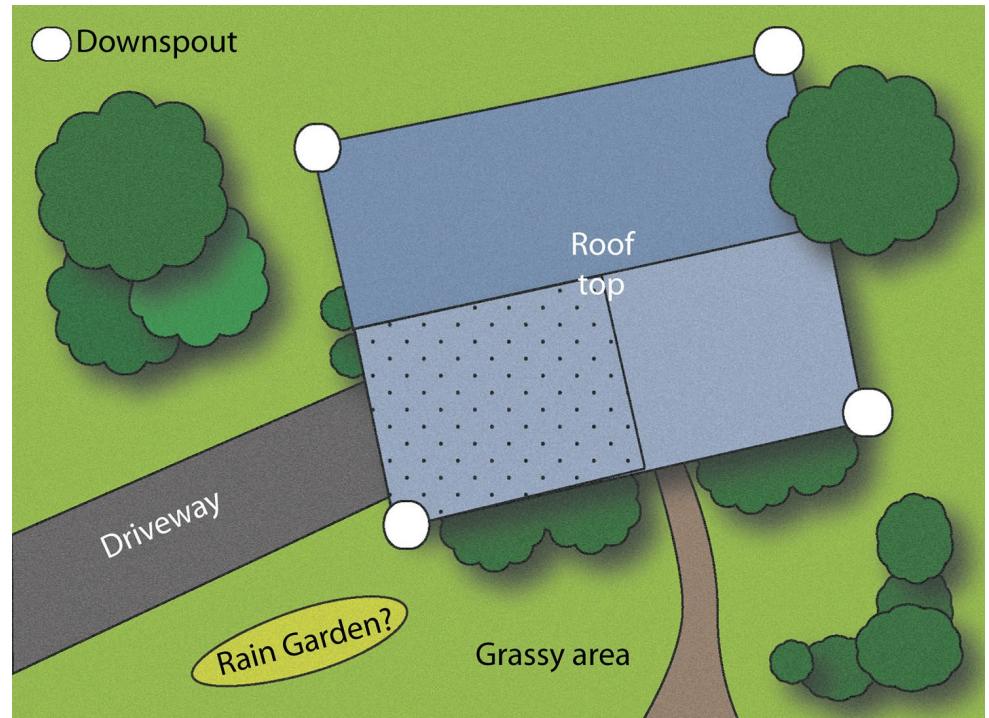
Site Selection



- Survey and sketch property
 - Note buildings, pavement, trees, and downspout locations
- Observe how the water flows when it rains
 - Where does it soak in
 - Where does it collect
 - Where does it leave the property

Site Selection

- Look for relatively flat sites
 - less than 12% grade
 - Ground should drop less than $1\frac{1}{2}$ inches per foot





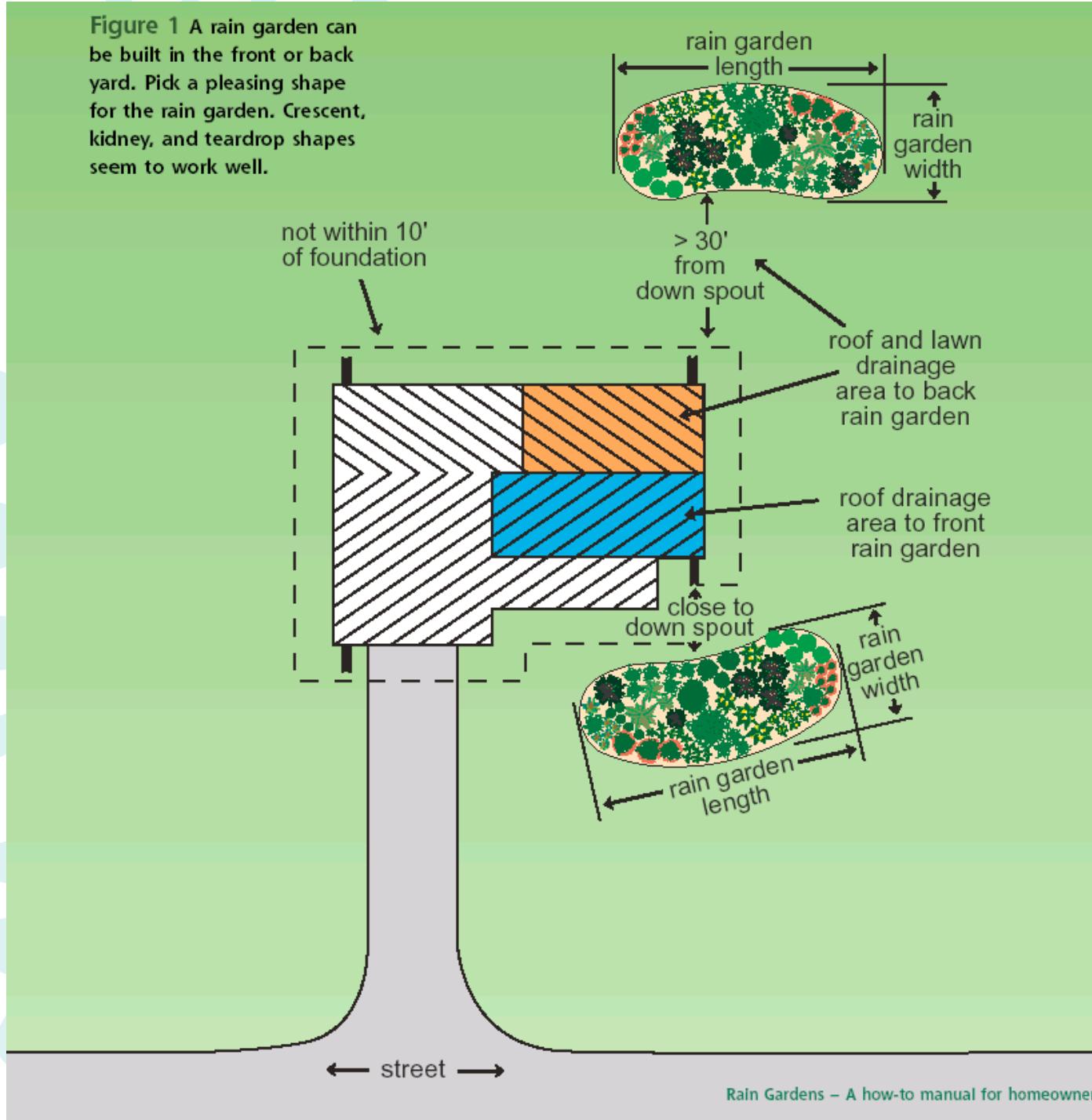
If drains in less than 1 hour = too fast and plants won't establish

If drains in more than 48-72 hours = too wet! Backyard wetland?

Designing a Garden

- Size of the garden depends on amount of impervious surfaces
 - Measure footprint of roof that drains to a downspout, driveways, and walkways.
- Select the ponding depth
 - For most residential gardens, use 3-inch depth
 - Can be deeper where space is limited, or slope allows

Figure 1 A rain garden can be built in the front or back yard. Pick a pleasing shape for the rain garden. Crescent, kidney, and teardrop shapes seem to work well.



Impermeable Surface Area	Required Size of Rain Garden	Potential Rain Garden Dimensions (ftxft)
3" ponding depth		
600 ft ²	60 ft ²	5X12, 6X10, 8X8
800 ft ²	80 ft ²	7X12, 8X10, 9X9
1000 ft ²	100 ft ²	7X15, 10X10
1200 ft ²	120 ft ²	6X20, 8X15, 10X12
1400 ft ²	140 ft ²	10X14, 12X12
1600 ft ²	160 ft ²	10X16, 12X13, 13X13
1800 ft ²	180 ft ²	10X18, 13X14
2000 ft ²	200 ft ²	10X20, 14x15
2500 ft ²	250 ft ²	10X25, 13X20, 16X16
3000 ft ²	300 ft ²	10X30, 17X18



Natural
Design





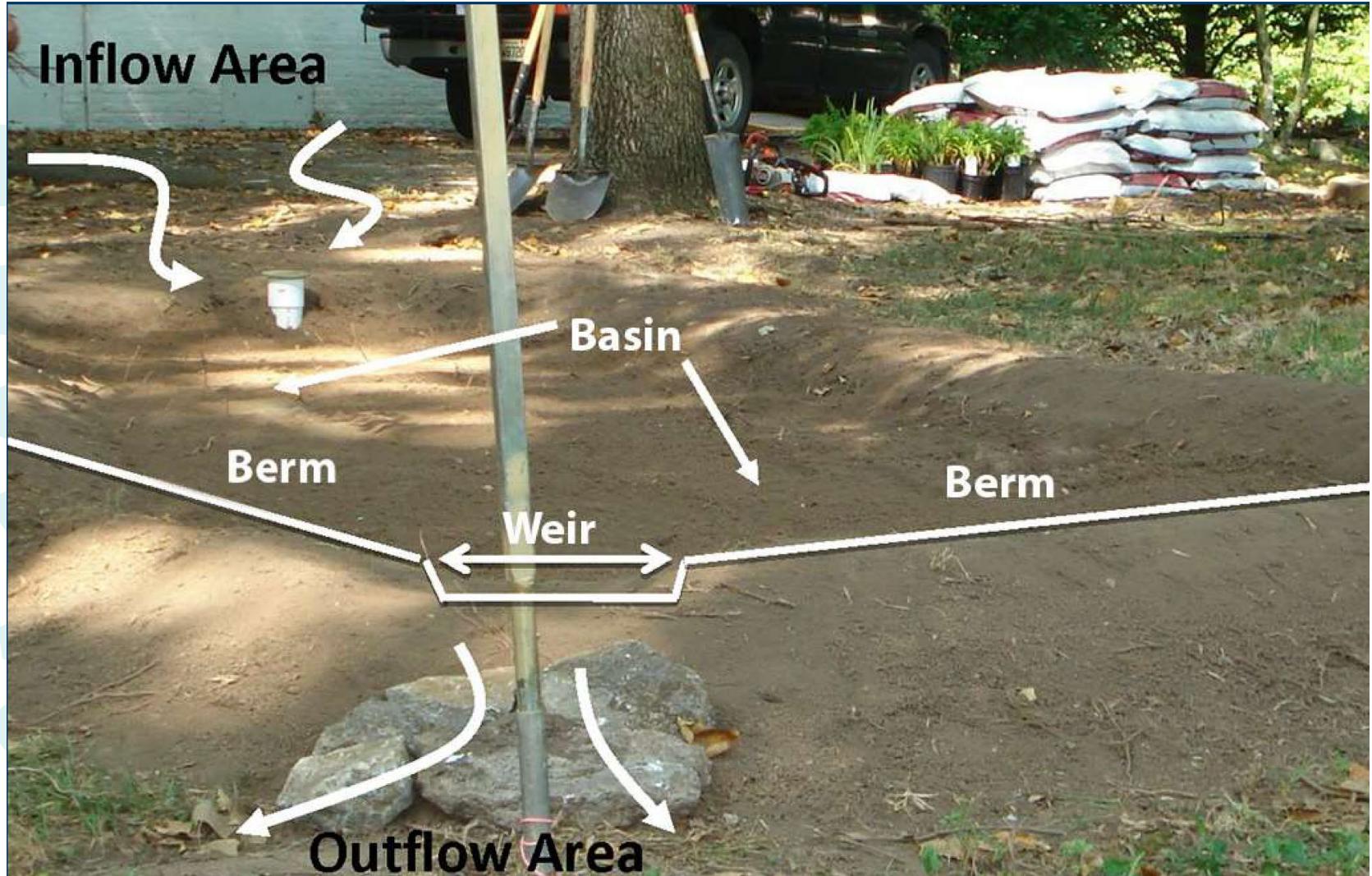
Formal Designs



Installation

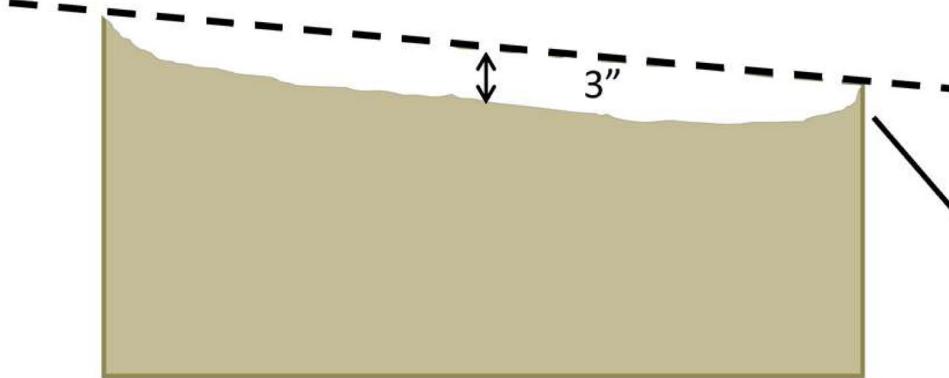


Installation



Digging the Rain Garden

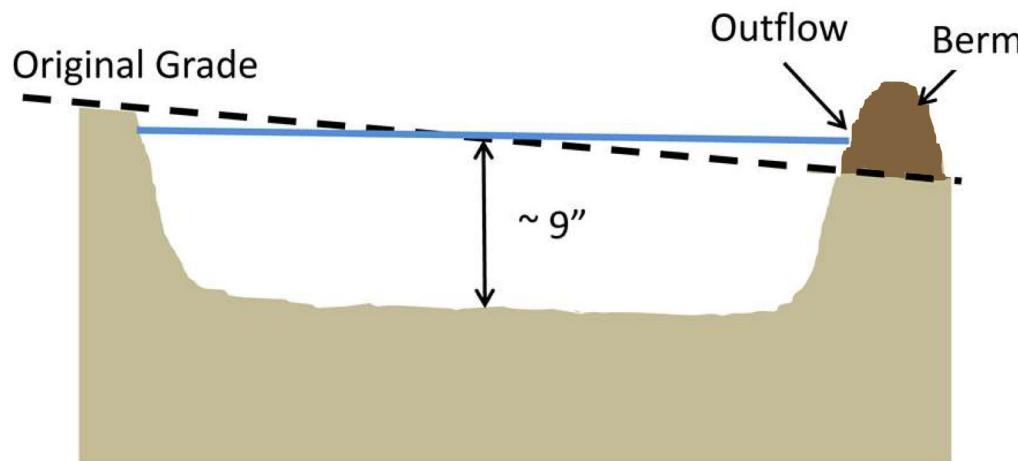
Original Grade



Step 1: Remove turf and topsoil. Stockpile topsoil on a tarp for later use. Turf can be used to reinforce the berm.

Topsoil

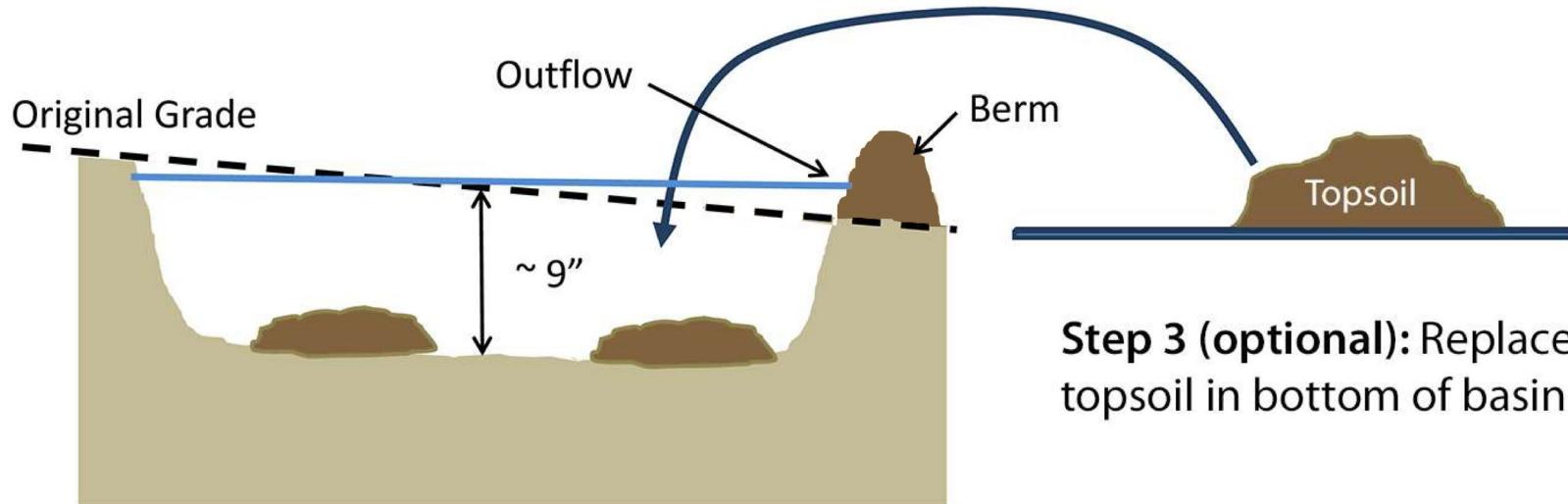
Original Grade



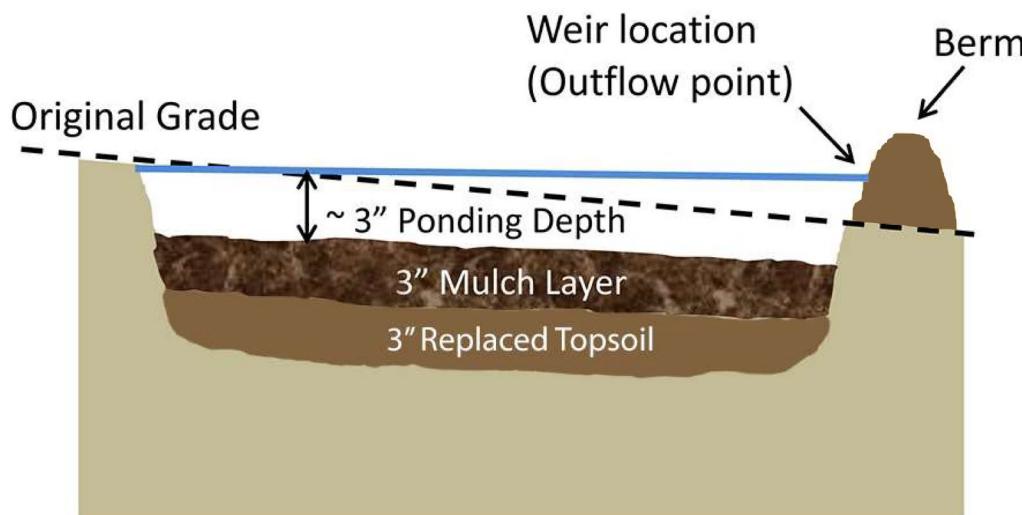
Excavation Depth

Step 2: Remove 6 inches of subsoil (note that a total of 9" of soil will be removed, 3" of topsoil and 6" of subsoil). Use subsoil to build berm. If possible rototill or turn basin bottom to loosen compacted soil.

Digging the Rain Garden



Step 3 (optional): Replace topsoil in bottom of basin.



Step 4: Cut the weir in the berm. The weir elevation should be lower than the berm.

Step 5: Cover soil with 3 inches of mulch.

Installation

- The berm should be as high as or slightly higher than the uphill edge
- Compact the soil in the berm by tamping hard
- Plant grasses or use rock to protect the berm from erosion



Installation

- Critical: The weir must be just below the inflow
- Sets the depth of ponding
- Protects the berm from eroding
- Use rocks to create a spill way





If downspout flows directly into garden, protect inflow from scouring and erosion.



Planting



- Zones
 - Upper, Middle, Lower
- Group in odd numbers
- Label plants
- Mulch

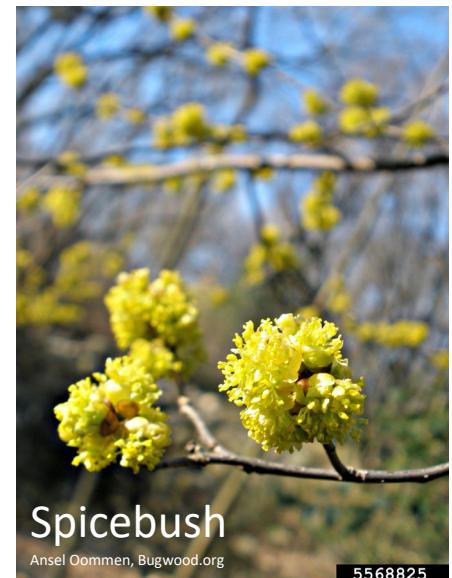
Planting Zones

- Plants that can tolerate the most water in the center
- Marginally tolerant plants along edge



Lower Zone - Shrubs

- Buttonbush (*Cephalanthus occidentalis*)
- Ninebark (*Physocarpus opulifolius*)
- Spicebush (*Lindera benzoin*)
- SummerSweet (*Clethra alnifolia*)
- Sweetspire (*Itea virginica*)



Lower Zone - Herbaceous

Bee Balm

Jerry A. Payne, USDA Agricultural Research Service, Bugwood.org



Goldenrod

Steven Katovich, Bugwood.org

5569129



Blue flag iris

Rob Routledge, Sault College, Bugwood.org

- Blue flag iris (*Iris versicolor*)
- Goldenrod (*Solidago patula, S. rugosa*)
- Bee Balm (*Monarda didyma*)
- Swamp milkweed (*Asclepias incarnata*)
- Swamp rose mallow (*Hibiscus moscheutos*)
- Cardinal Flower (*Lobelia cardinalis*)
- Fox Sedge (*Carex vulpinoidea*)

Middle Zone - Shrubs



- American beautyberry (*Callicarpa americana*)
- SummerSweet (*Clethra alnifolia*)
- Sweetspire (*Itea virginica*)
- Chokeberry (*Aronia arbutifolia*, *A. melanocarpa*)
- Inkberry (*Ilex glabra*)
- Native Viburnum (*Viburnum dentatum*, *V. nudum*)



Middle Zone – Herbaceous



- Blue false indigo (*Baptisia australis*)
- Broomsedge (*Andropogon virginicus*)
- Switchgrass (*Panicum virgatum*)
- Mistflower (*Eupatorium coelestinum*)
- White turtlehead (*Chelone glabra*)
- St. John's Wort (*Hypericum prolificum*)



Upper Zone

- American cranberry bush (*Viburnum trilobum*)
- Witch hazel (*Hammamelis virginiana*)
- Blue star (*Amsonia tabernaemontana*)
- Buckeye (*Aesculus pavia* and *A. parviflora*)
- Black Eyed Susan (*Rudbeckia hirta*)



Full Shade



Bottlebrush Buckeye



Cinnamon Fern

Rob Routledge, Sault College, Bugwood.org 5496891



Virginia Bluebells

David Cappaert, Bugwood.org

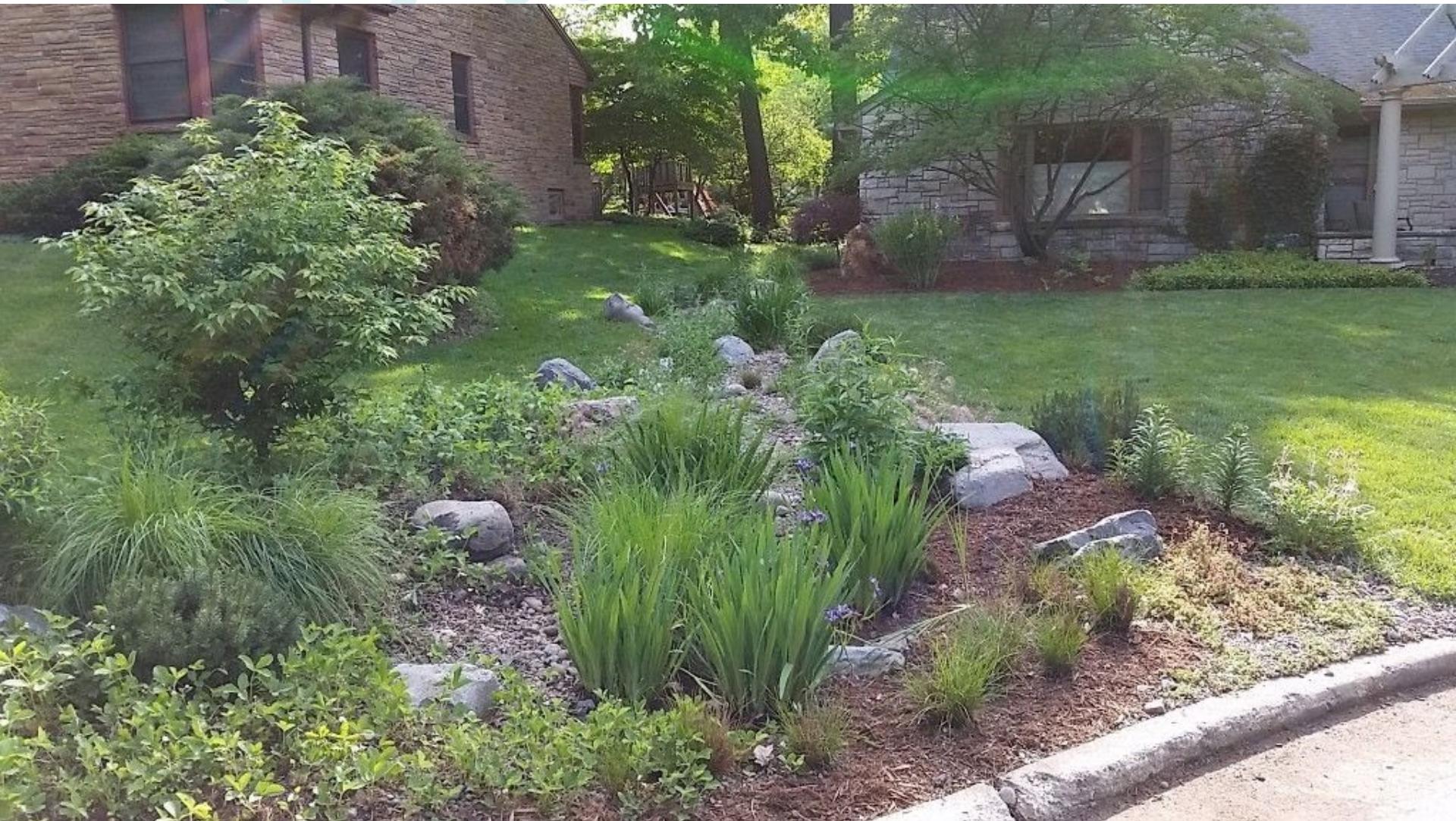
- Sensitive Fern (*Onoclea sensibilis*) – L
- Cinnamon Fern (*Osmunda cinnamomea*) – M,L
- Sweetflag (*Acorus gramineus*)
– U,M,L
- Virginia Bluebells (*Mertensia virginica*) – M
- Bottlebrush Buckeye
(*Aesculus parviflora*) - M

Tips for planting

- Incorporate sedges, rushes, and grasses
 - Help stabilize soil
 - Provide proper root competition to slow all growth down
 - Acts as a backdrop for the flower plants
- Utilize local stone, ornamental fences, paths, and additional native plantings to give a cohesive look to garden
- Apply 2-inch layer of mulch around plants



Grasses and sedges help give a fuller appearance and provide backdrop for flowers



Large accent stones placed to provide appearance of a stream

Maintenance

- Weeding is crucial the first few years
- Do not use herbicides
- Try to dig out roots
- Don't pull unless you know it's a weed
 - Keep a list of what is planted
- By year 3 or 4, desirable plants will fill in and weeding will be much less





Maintenance



- At the end of the season, leave stems and seedheads
 - Provides shelter for beneficial insects
 - Food for songbirds
- In early spring cut back to 8-10 in
 - Provide nesting sites for native bees



Maintenance

- Water 1st year
- Maybe 2nd too
- Do not fertilize
- Limit soil/debris
 - Leaves will try to accumulate
- Limit compaction
- Paths





Daylily Garden

Source: City of Maplewood, MN



Shrub Garden

Source: City of Maplewood, MN



Prairie Garden

Source: City of Maplewood, MN



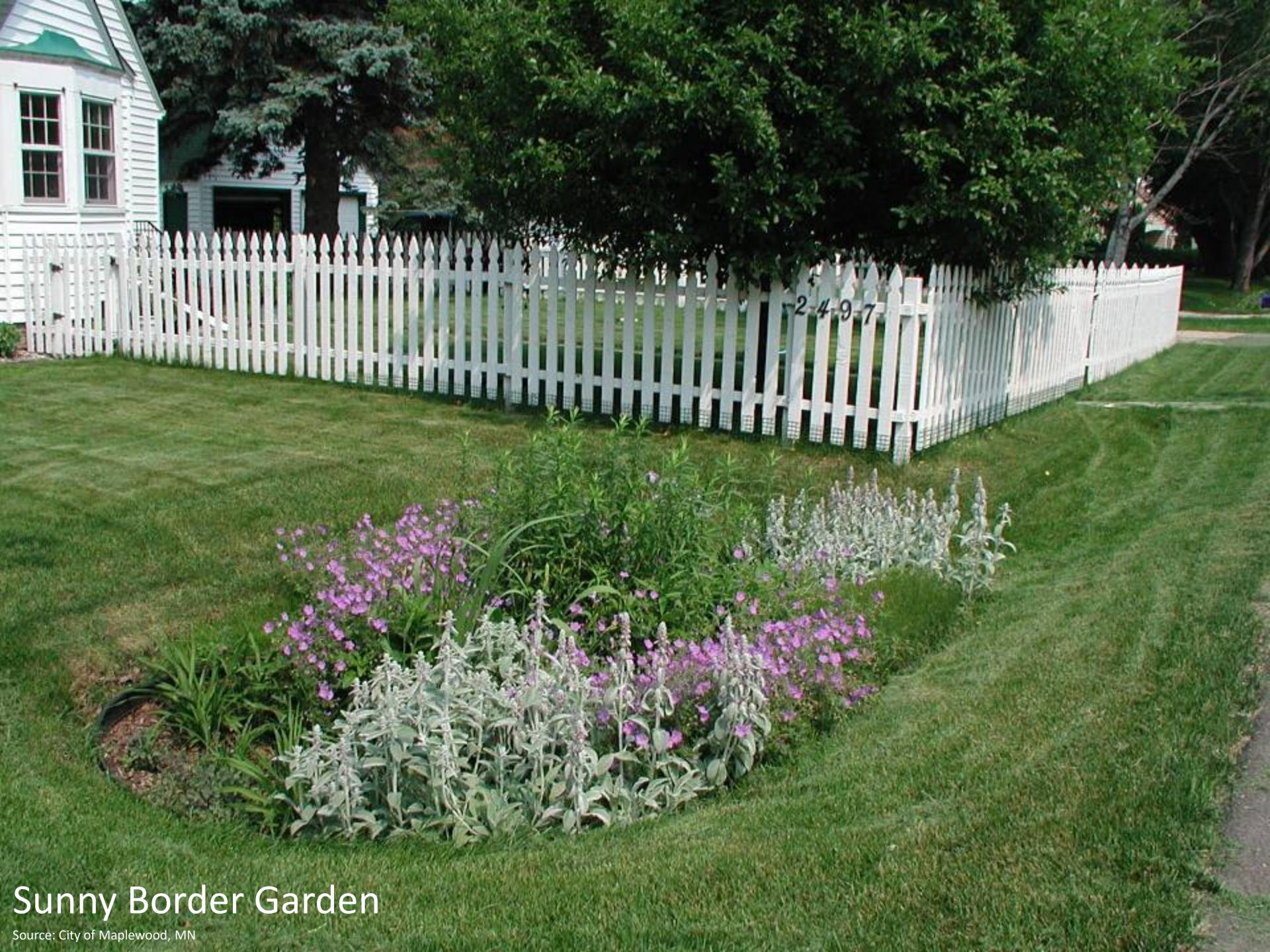
Butterfly Garden

Source: City of Maplewood, MN



Shade Garden

Source: City of Maplewood, MN



Sunny Border Garden

Source: City of Maplewood, MN

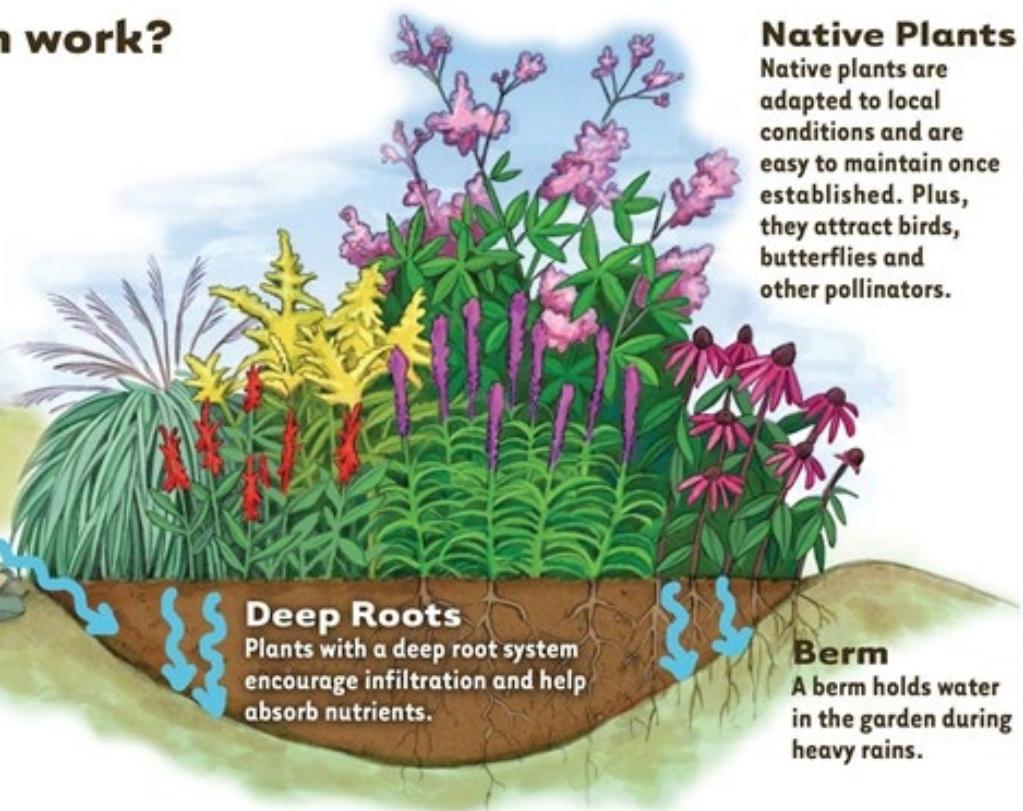
Questions?

How does a rain garden work?



Gutters & Down Spouts

Assist with directing rain water from your roof to your rain garden.



Native Plants

Native plants are adapted to local conditions and are easy to maintain once established. Plus, they attract birds, butterflies and other pollinators.