

# Rain Gardens

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COOPERATIVE EXTENSION



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# What is a Rain Garden?

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



# Why?

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- 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

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- 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.

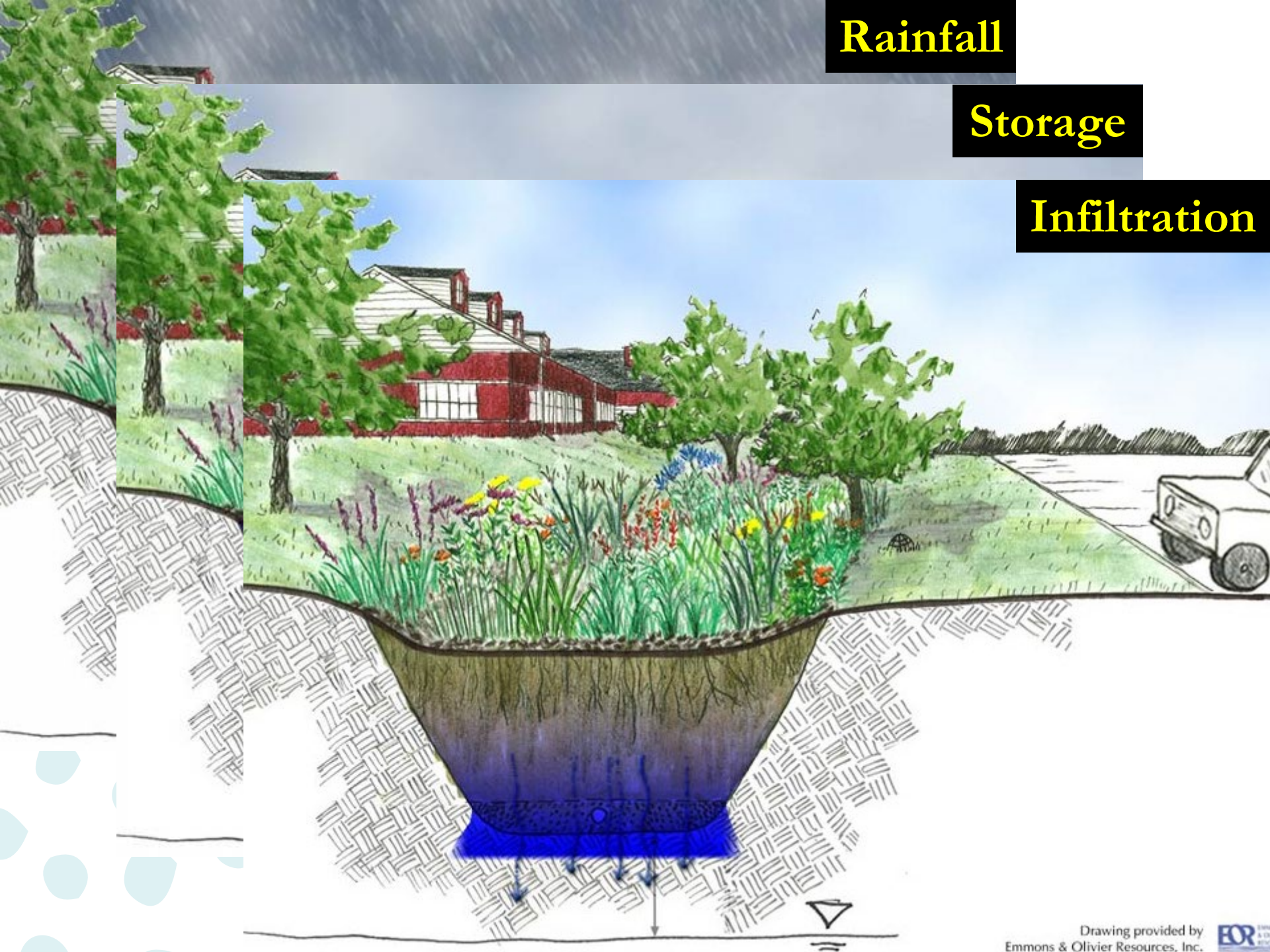




**Rainfall**

**Storage**

**Infiltration**





# Site Selection





# Where Do You Put a Rain Garden?

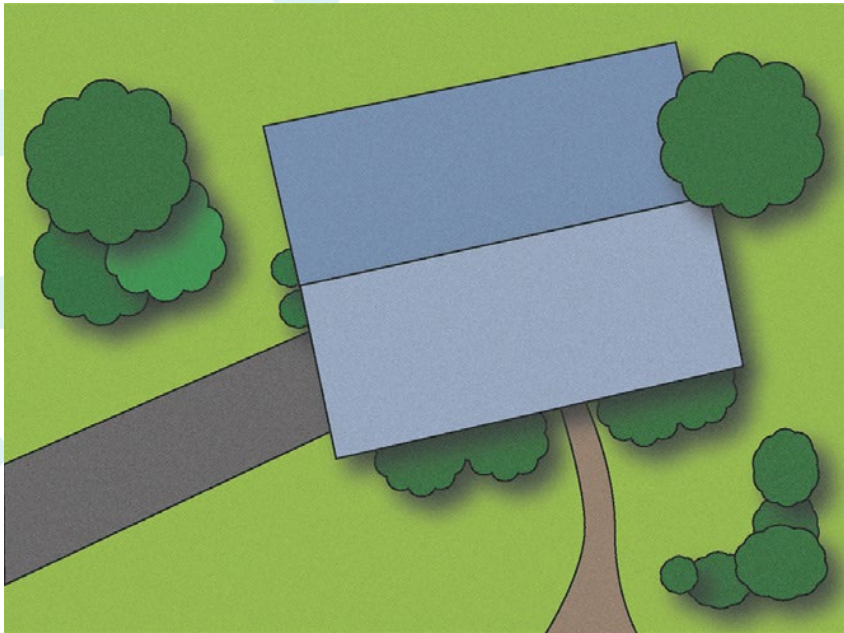
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- Full sun/ part shade
- Just above where water gathers
- At least 10 feet from house or other building
- Away from septic, wells, trees, and utilities
- Avoid areas that are already constantly wet
  - Should drain within 24 to 48 hours

# Site Selection

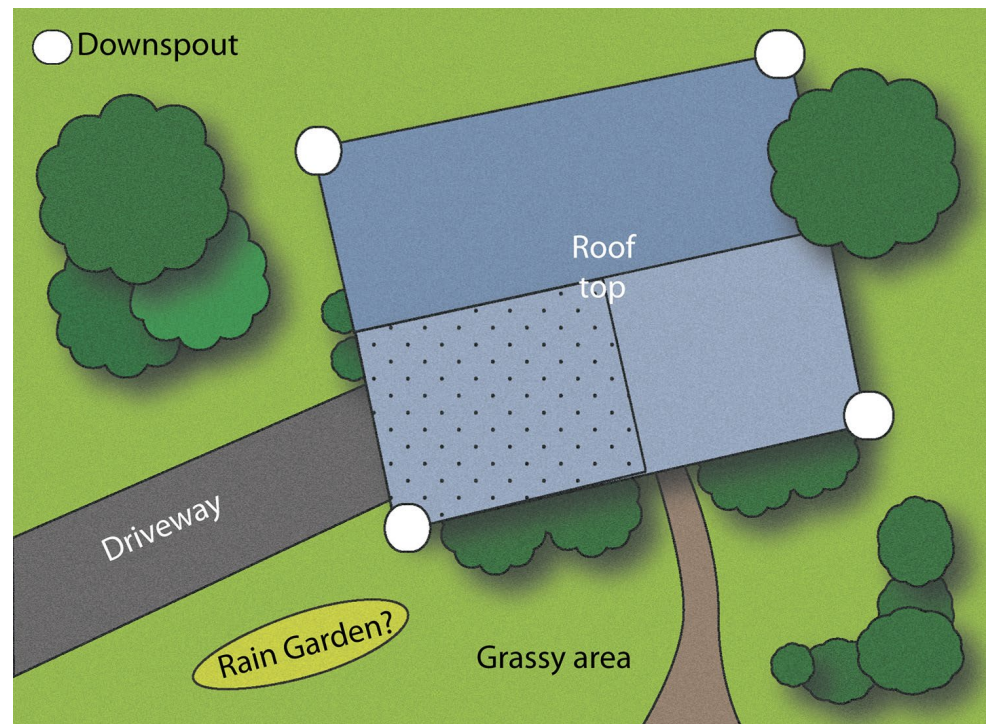
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- Survey and sketch property
  - Note buildings, pavement, trees, and downspout locations
- Observe how the water flows when it rains
  - Where does it soak in
  - Where does it collect
  - Where does it leave the property

# 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?

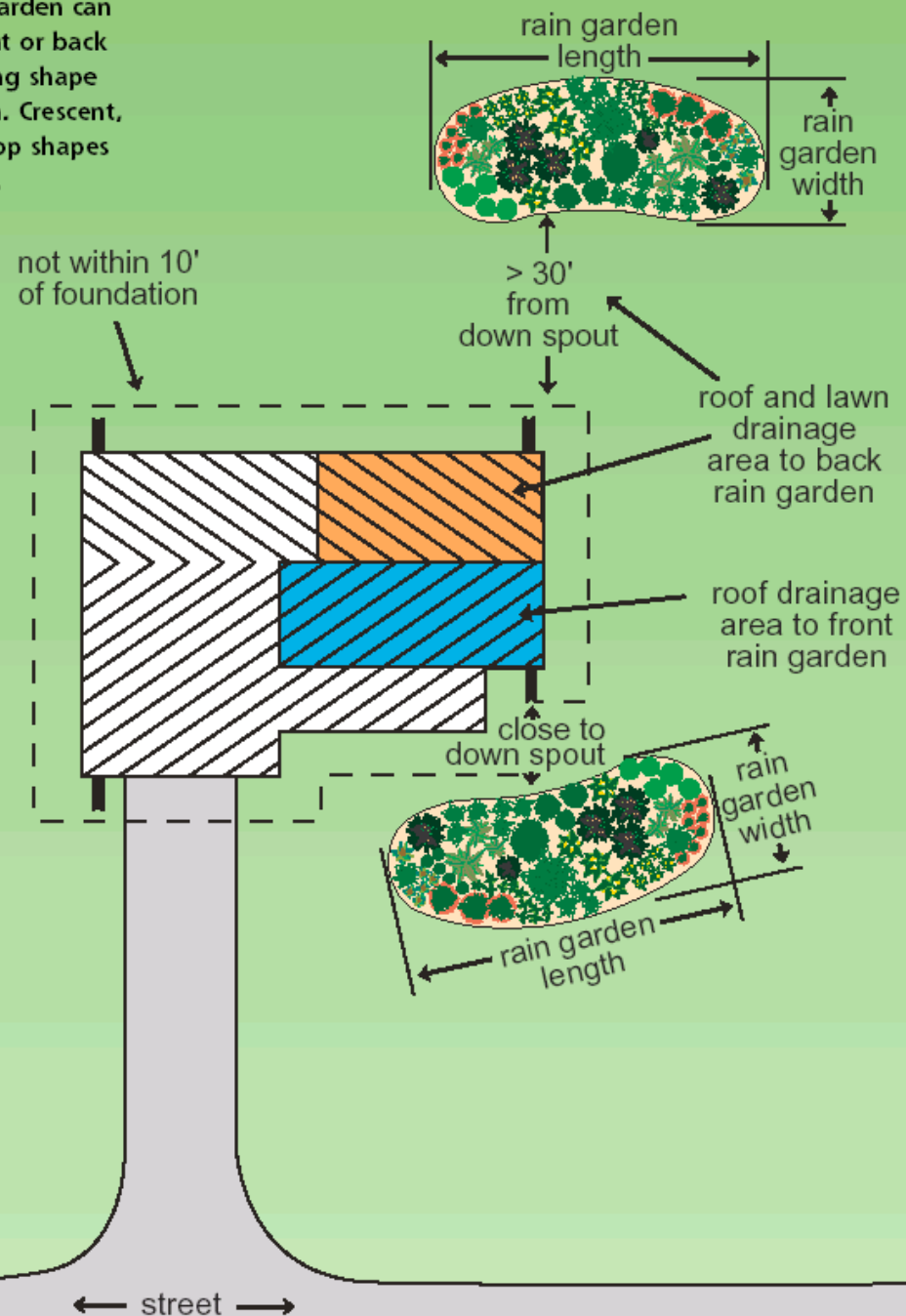


# Designing a Garden

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- 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 slop 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)
<b>3" ponding depth</b>		
600 ft <sup>2</sup>	60 ft <sup>2</sup>	5X12, 6X10, 8X8
800 ft <sup>2</sup>	80 ft <sup>2</sup>	7X12, 8X10, 9X9
1000 ft <sup>2</sup>	100 ft <sup>2</sup>	7X15, 10X10
1200 ft <sup>2</sup>	120 ft <sup>2</sup>	6X20, 8X15, 10X12
1400 ft <sup>2</sup>	140 ft <sup>2</sup>	10X14, 12X12
1600 ft <sup>2</sup>	160 ft <sup>2</sup>	10X16, 12X13, 13X13
1800 ft <sup>2</sup>	180 ft <sup>2</sup>	10X18, 13X14
2000 ft <sup>2</sup>	200 ft <sup>2</sup>	10X20, 14x15
2500 ft <sup>2</sup>	250 ft <sup>2</sup>	10X25, 13X20, 16X16
3000 ft <sup>2</sup>	300 ft <sup>2</sup>	10X30, 17X18



# Natural Design







## Formal Designs

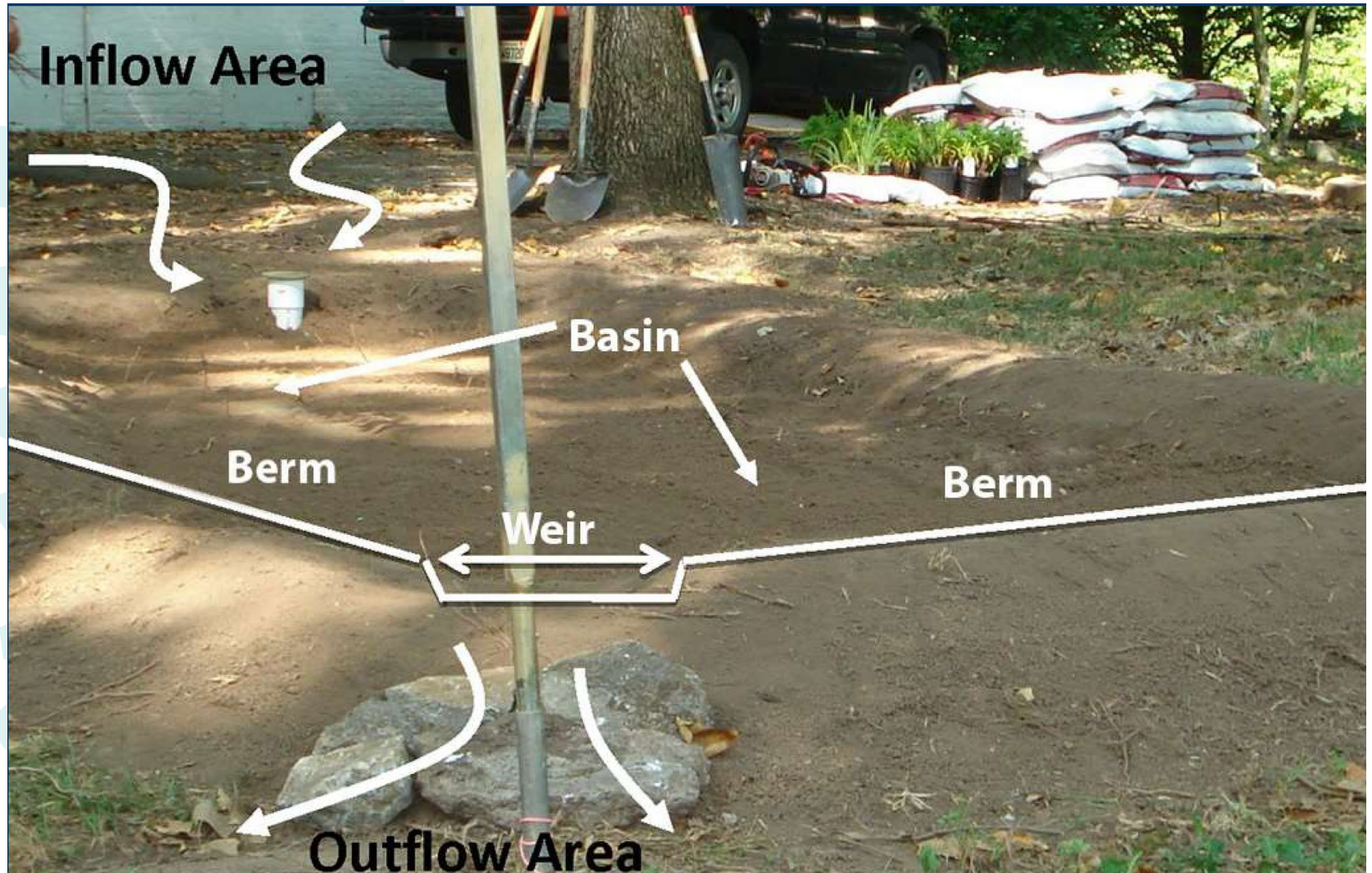


# Installation

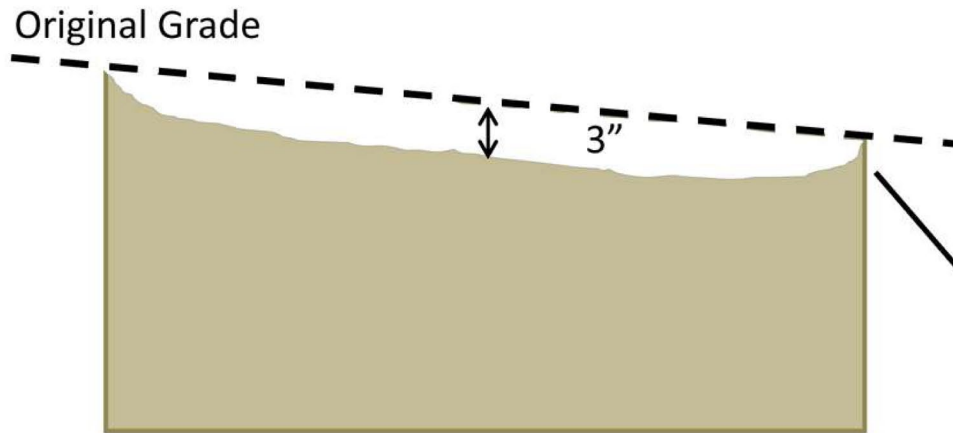




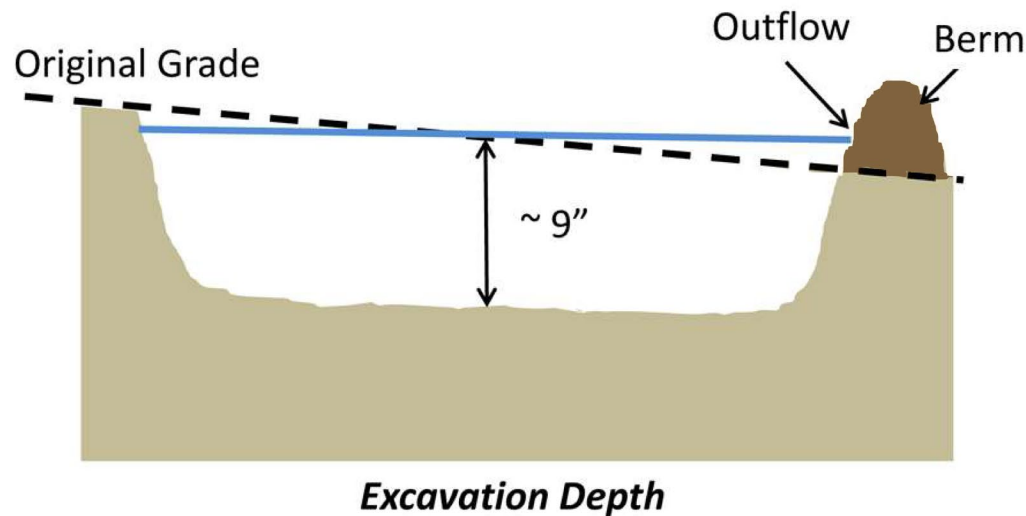
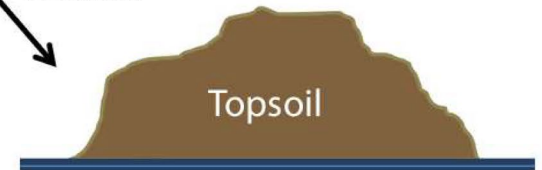
# Installation



# Digging the Rain Garden



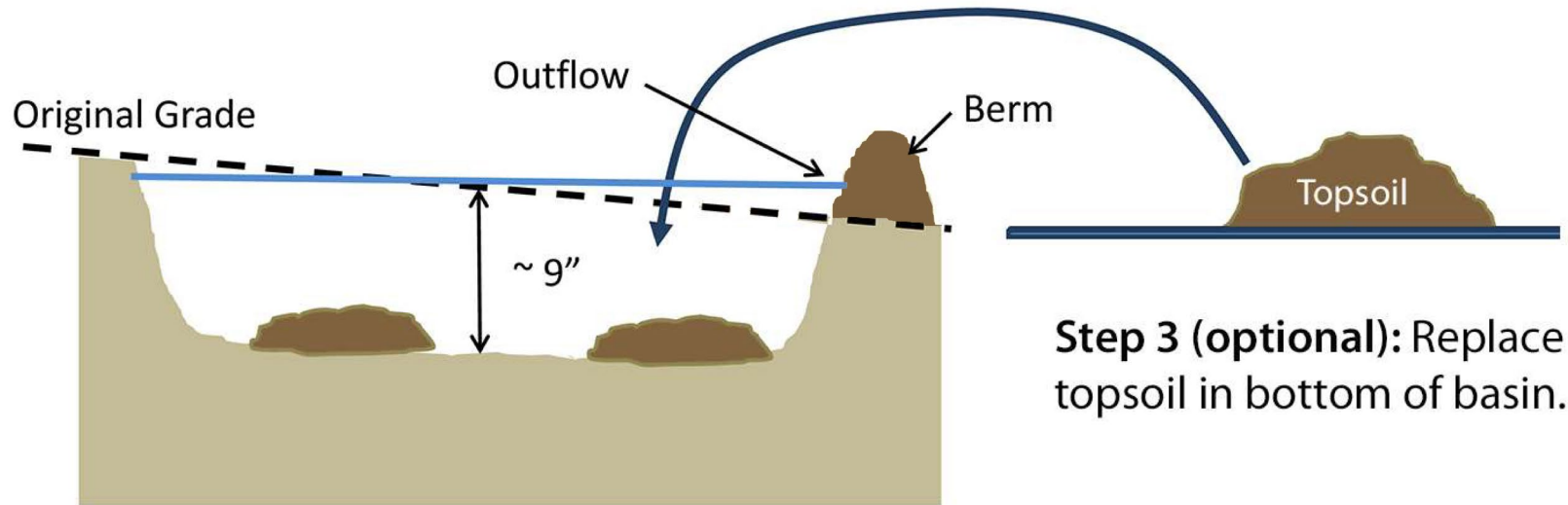
**Step 1:** Remove turf and topsoil. Stockpile topsoil on a tarp for later use. Turf can be used to reinforce the berm.



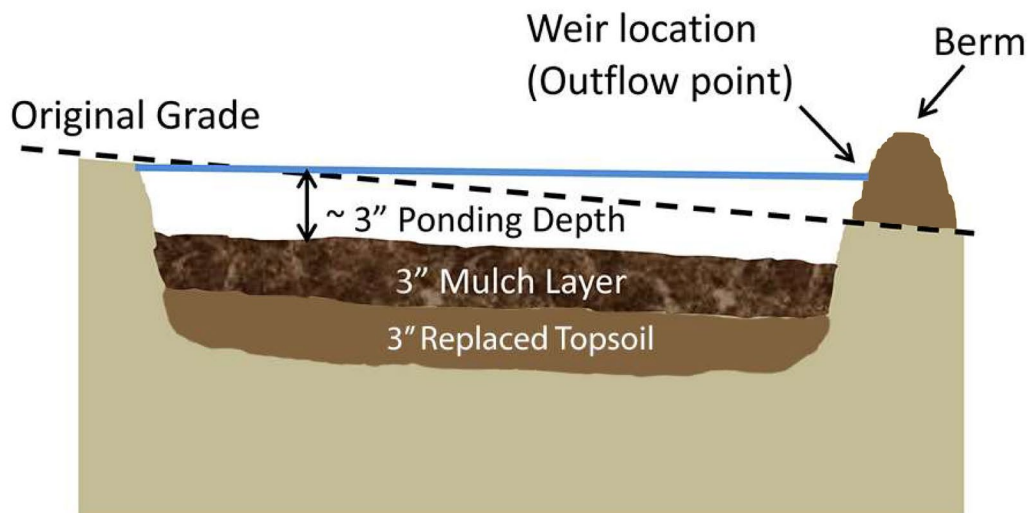
**Step 2:** Remove 6 inches of subsoil (note that a total of 9" of soil will be removed, 3" of topsoil and 6" of subsoil). Use subsoil to build berm. If possible rototill or turn basin bottom to loosen compacted soil.



# 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

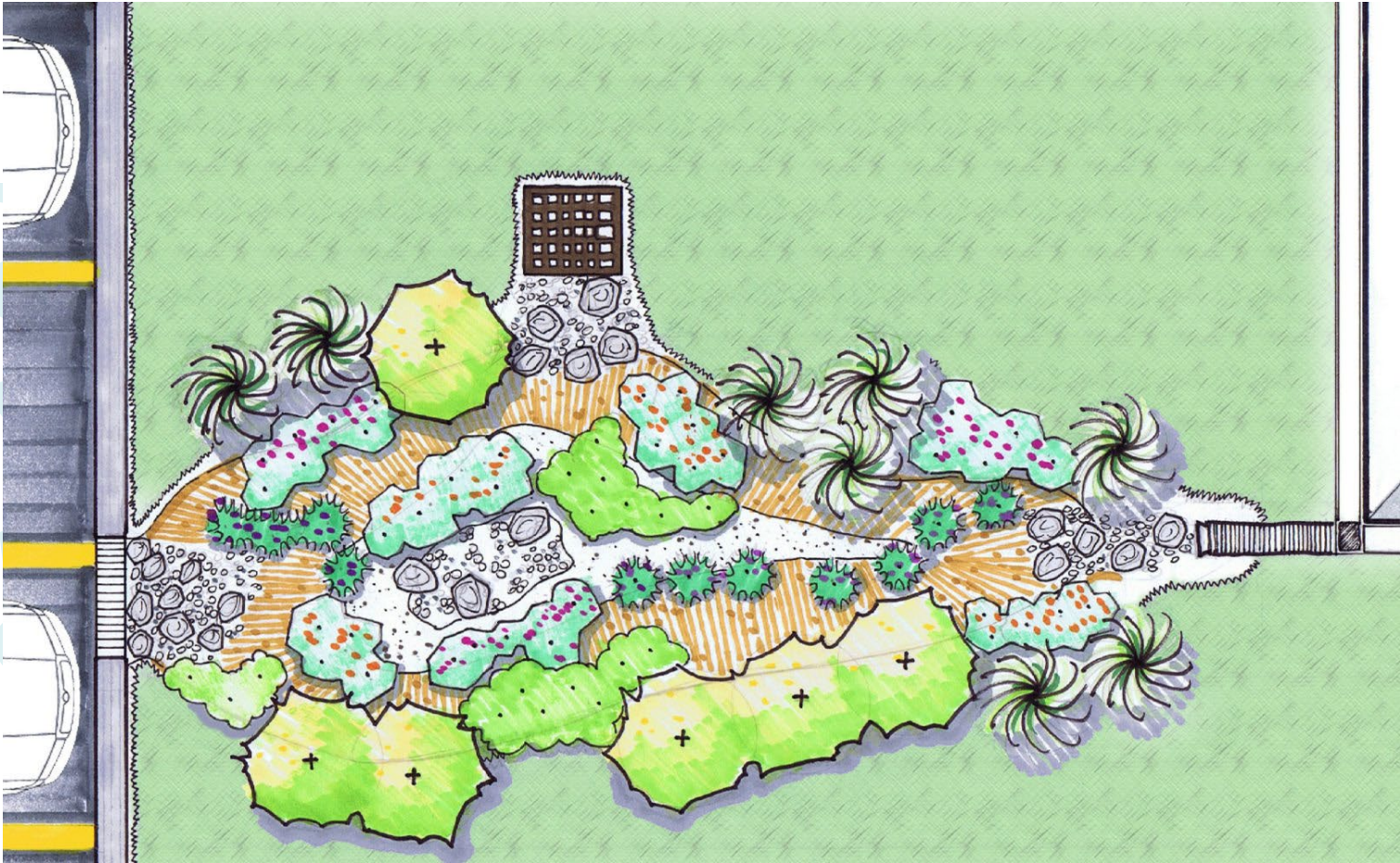


- Zones
  - Upper, Middle, Lower
- Group in odd numbers
- Label plants
- Mulch



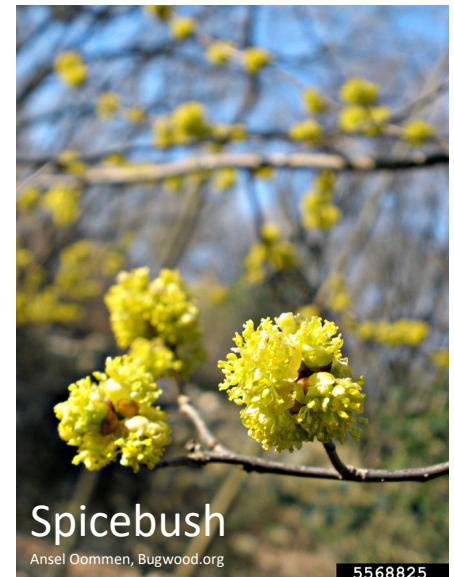
# Planting Zones

- 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



UGA2514005

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

Goldenrod

Steven Katovich, Bugwood.org



5569129

Blue flag iris

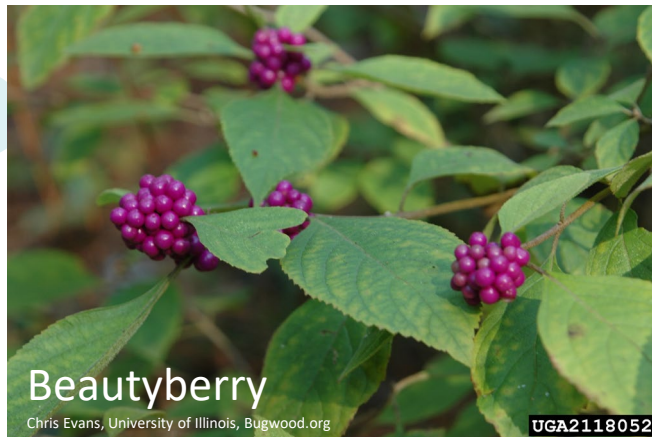
Rob Routledge, Sault College, Bugwood.org



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# Middle Zone - Shrubs



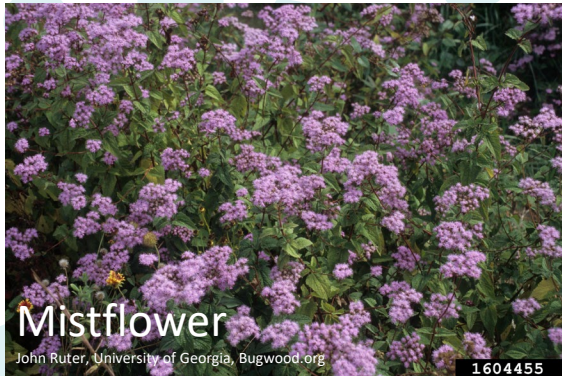
- American beautyberry (*Callicarpa americana*)
- SummerSweet (*Clethra alnifolia*)
- Sweetspire (*Itea virginica*)
- Chokeberry (*Aronia arbutifolia*, *A. melanocarpa*)
- Inkberry (*Ilex glabra*)
- Native Vibrunum (*Vibrunum dntatum*, *V. nudum*)



# Middle Zone – Herbaceous



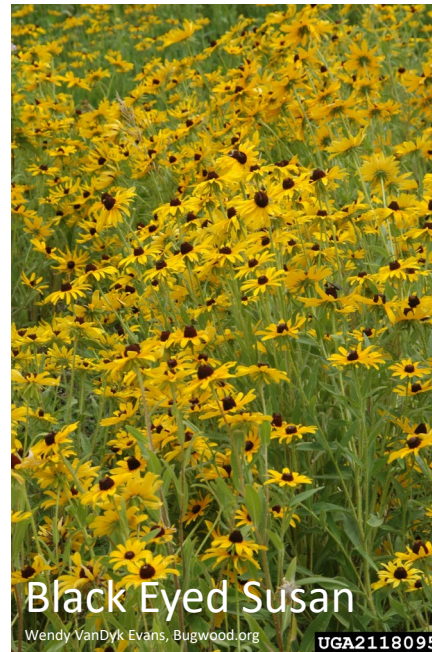
- Blue false indigo (*Baptisia australis*)
- Broomsedge (*Andropogon virginicus*)
- Switchgrass (*Panicum virgatum*)
- Mistflower (*Eupatorium coelestinum*)
- White turtlehead (*Chelone glabra*)
- St. John's Wort (*Hypericum prolificum*)





# 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



- 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

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- 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

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- 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 2<sup>nd</sup> too
- Do not fertilize
- Limit soil/debris
  - Leaves will try to accumulate
- Limit compaction
  - Paths







# Daylily Garden

Source: City of Maplewood, MN





Michael Ln  
2530 E

Shrub Garden

Source: City of Maplewood, MN





Prairie Garden

Source: City of Maplewood, MN





# Butterfly Garden

Source: City of Maplewood, MN

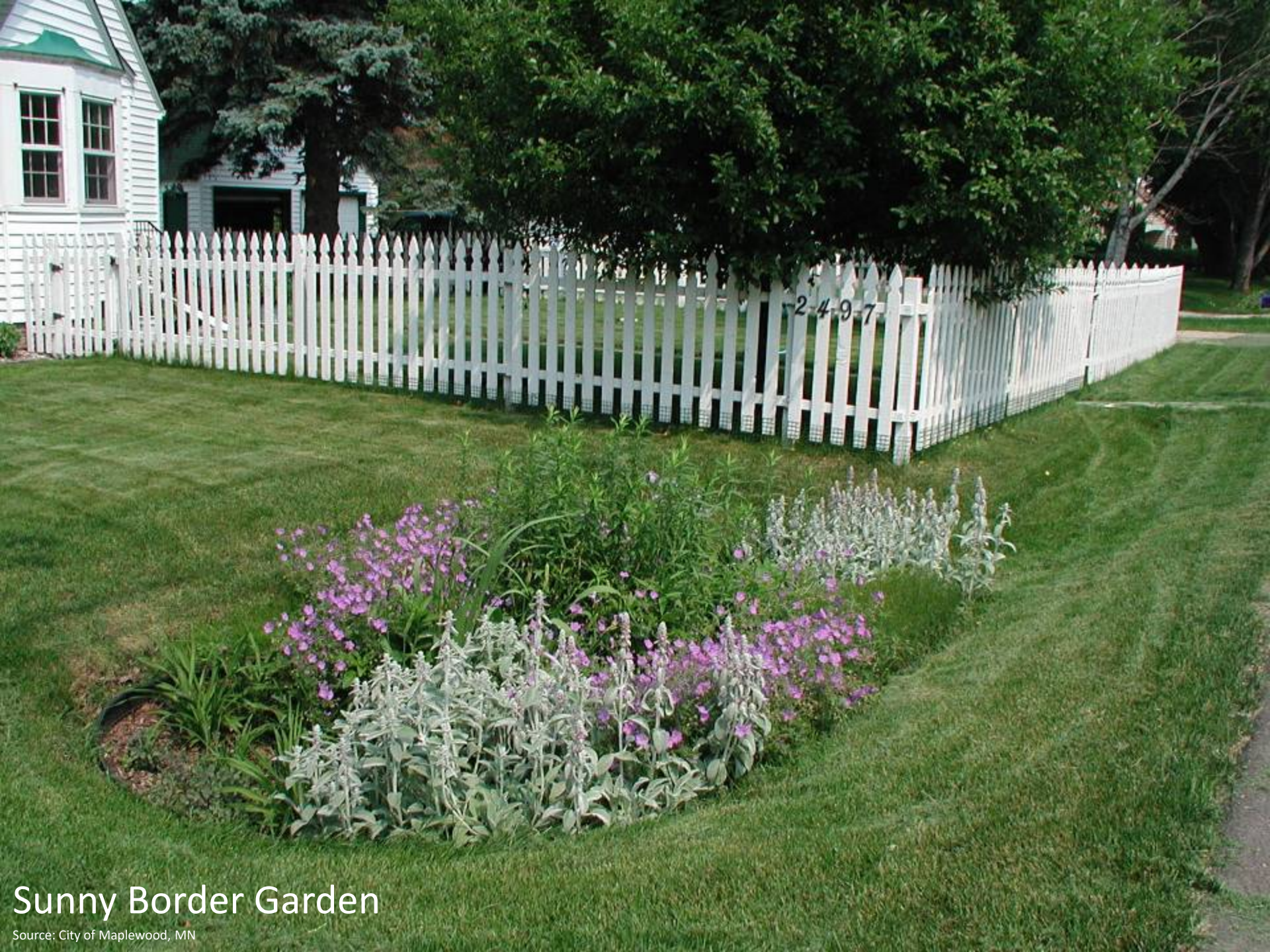




# Shade Garden

Source: City of Maplewood, MN





# Sunny Border Garden

Source: City of Maplewood, MN



# Questions?

## How does a rain garden work?

