



Trillium grandiflorum

Rain Gardens: Big or Small

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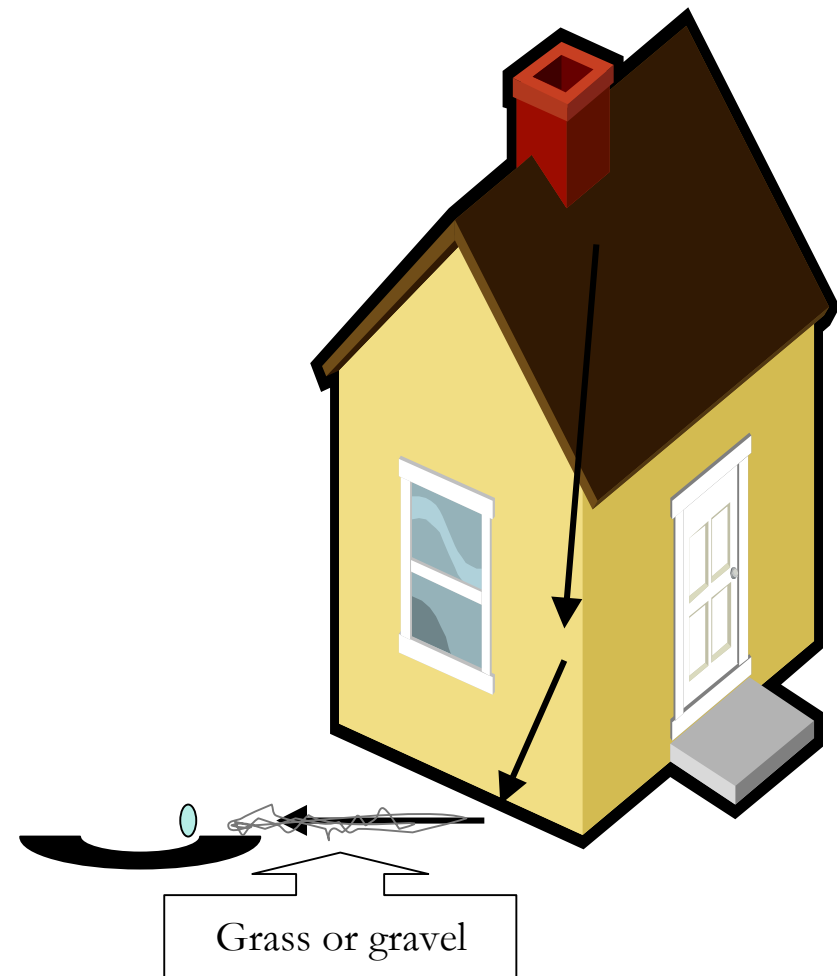
Residential Setting

- Create a rain garden in your yard
 - Basics
 - Location
 - Soils
 - Site prep
 - Plants
 - 1st year care



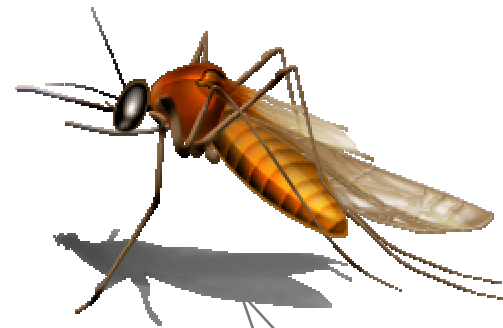
Basics

- Flat bottomed bowl
 - 2 feet deep
 - Interrupts flow from house to storm sewer
 - Where does overflow go?
- Your yard
 - Pick plants you like
- Start small and expand



Basics

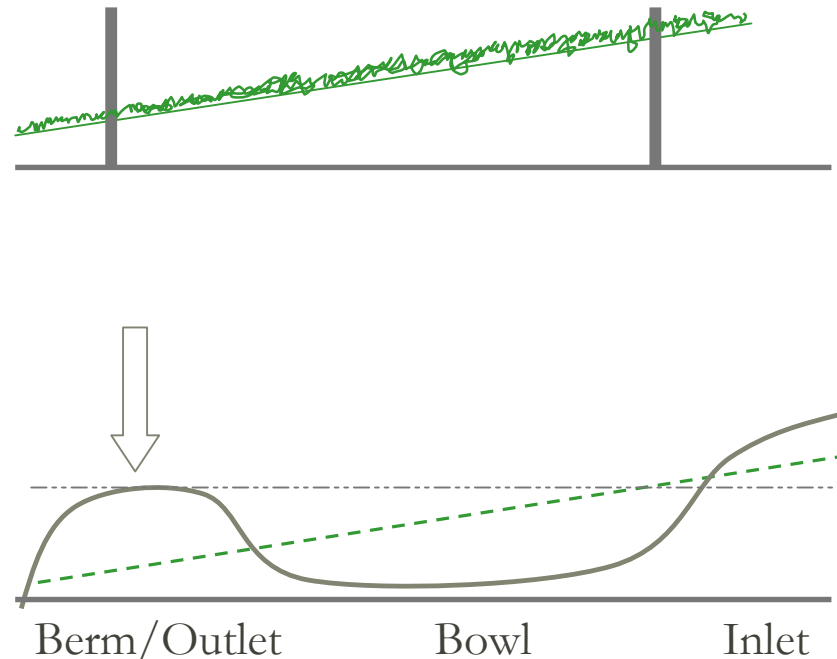
- **Not a pond**
- Drains in 24-48 hours
- Mosquitoes need standing water
 - 10-14 days for the whole shebang
 - Encephalitis
 - West Nile
 - Heartworm to cats and dogs



I don't like
rain gardens!

Location , Location, Location

- Locate near downspouts
- Min 10 feet from house
 - Can create problems!
- Watch yard during rain events
- Space to dig a depression
- Not under trees
 - Stress =
disease/infections
- Aesthetics



Soils

- Backbone of the garden
 - Amount of water absorbed
 - Size of garden
 - Plants
 - Work
 - Clay = double digging or lots of rototilling

- Sand (big)
- Silt (medium)
- Clay (small)



Soils (almost done)

Coffee can test

- Dig hole
- Wait
- Add some water
- Fill with water
- Measure drawdown

Where to find soil info:

- Local S&W
- OSU Extension – Soil testing
- Ohio Soil Survey
 - <http://websoilsurvey.nrcs.usda.gov/app/>

Soil Group	Soil Type	I = Rate (in/hour)
A	Sandy Loam	0.38
B	Loam	0.23
C	Silt	0.10
D	Clay	0.03

The Typical Rain Garden

- Usually 8-9 ft by 10 ft
- Usually 4-8 inches deep (up to 2 feet)
- Size to hold 1 inch of rain
- Coffee can test
 - 1 inch in 4 hours
 - 6 inches in 24 hours
 - 6 inches deep



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8 ft x 9 ft x 4 in =
How many gallons?

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200 gallons! May not seem like a lot, you will capture 90-95% of runoff.

The Exciting Part (site prep)

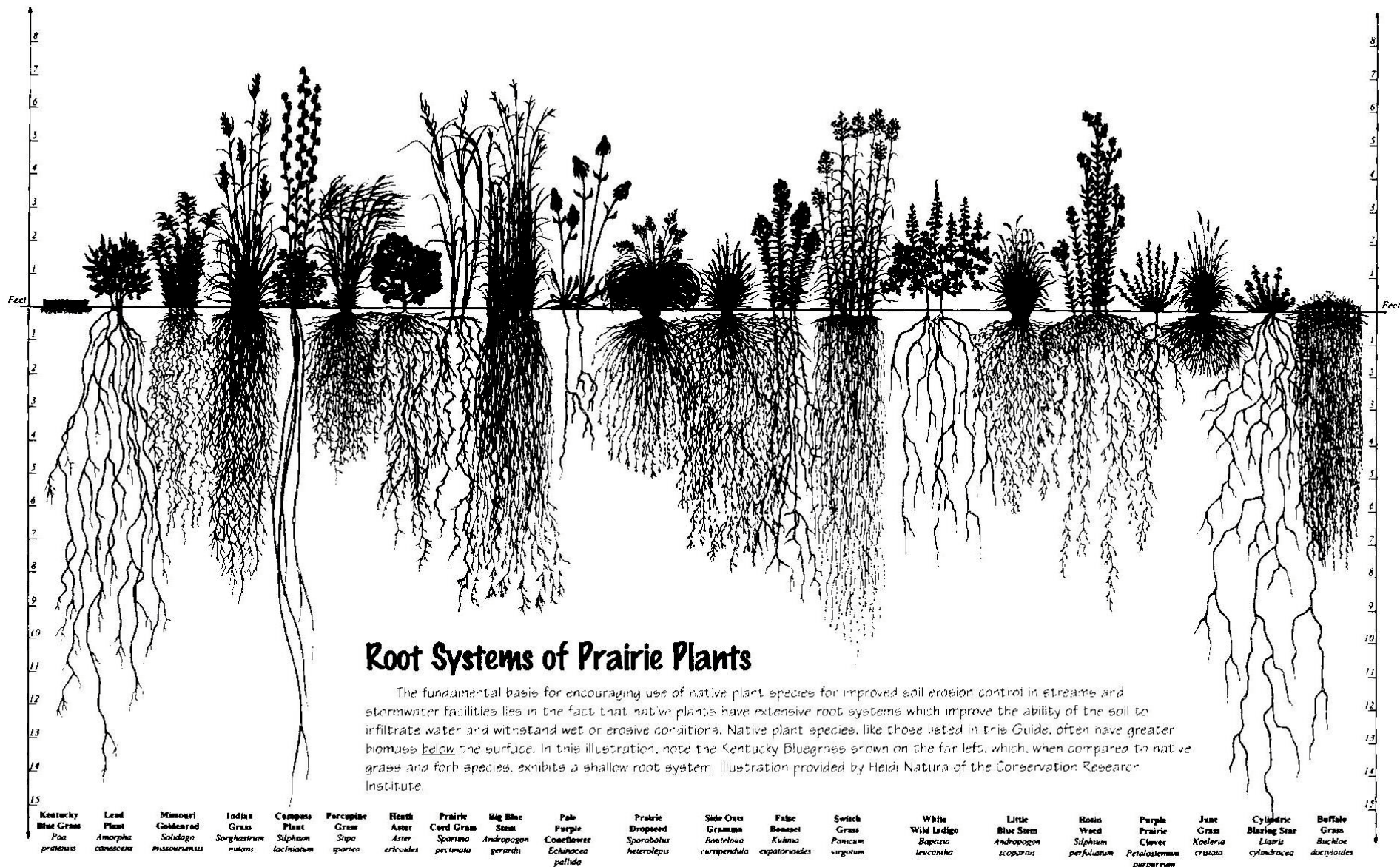
- Outline shape
 - Bean
- Remove sod
- Dig to depth
- Clay = rototill bottom
- RETEST infiltration
 - hose
- Plant plugs 12in on center



Plants

- Garden will be dry 95% of the time
- Natives
 - Dry to moist soil condition
 - Water and sun requirements
- Consider height and width
- Variety of species
 - Pick what you like
 - Build in success





Root Systems of Prairie Plants

The fundamental basis for encouraging use of native plant species for improved soil erosion control in streams and stormwater facilities lies in the fact that native plants have extensive root systems which improve the ability of the soil to infiltrate water and withstand wet or erosive conditions. Native plant species, like those listed in this Guide, often have greater biomass below the surface. In this illustration, note the Kentucky Bluegrass shown on the far left, which, when compared to native grasses and forb species, exhibits a shallow root system. Illustration provided by Heidi Natura of the Conservation Research Institute.

- | | | | | | | | | | | | | | | | | | | | | |
|--|---|--|--|--|--|---|--|---|--|--|--|--|--|---|--|--|--|---|--|--|
| Kentucky
Blue Grass
<i>Poa
pratensis</i> | Lead
Plant
<i>Amorpha
canescens</i> | Missouri
Goldenrod
<i>Solidago
missouriensis</i> | Indian
Grass
<i>Sorghastrum
nutans</i> | Compass
Plant
<i>Silphium
laciniatum</i> | Porcupine
Grass
<i>Sporo
sporeus</i> | Heath
Aster
<i>Aster
erectoides</i> | Prairie
Cord Grass
<i>Spartina
pectinata</i> | Big Blue
Stem
<i>Andropogon
gerardi</i> | Pale
Purple
Coneflower
<i>Echinacea
pallida</i> | Prairie
Dropseed
<i>Sporobolus
heterolepis</i> | Side Oats
Gramma
<i>Bouteloua
curtipendula</i> | False
Boneset
<i>Kuhnia
epatorioides</i> | Switch
Grass
<i>Panicum
virginum</i> | White
Wild Ladigo
<i>Baptisia
leucantha</i> | Little
Blue Stem
<i>Andropogon
scoparius</i> | Rosin
Weed
<i>Silphium
perfoliatum</i> | Purple
Prairie
Clover
<i>Petalostemum
purpureum</i> | June
Grass
<i>Koeleria
crustata</i> | Cylindric
Blazing Star
<i>Liatris
cylindrica</i> | Buffalo
Grass
<i>Buchloe
dactyloides</i> |
|--|---|--|--|--|--|---|--|---|--|--|--|--|--|---|--|--|--|---|--|--|

Plants

- Local Resources = Local Plants
- Native Plant Sales
 - Cuy S&W
 - <http://www.cuyahogawcd.org/RainGardenPlantKits.htm>
 - Holden Arboretum
 - Natural History Museum (members only/limited)
 - Cleveland Zoo
 - Nature Center at Shaker
 - May 13
- Ohio Prairie Nursery
 - Sun & Shade RG Kits

- *Asclepias incarnata* **Swamp Milkweed**
- *Carex lurida* **Lurid sedge**
- *Carex vulpinoidea* **Brown Fox Sedge**
- *Cassia hebecarpa* **Wild Senna**
- *Echinacea purpurea* **Purple Coneflower**
- *Eryngium yuccifolium* **Rattlesnake Master**
- *Iris versicolor* **Northern Blue Flag**
- *Liatris spicata* **Marsh Blazing Star**
- *Lobelia siphilitica* **Great Blue Lobelia**
- *Mimulus ringens* **Monkey Flower**
- *Silphium terebinthinaceum* **Prairie Dock**
- *Solidago ohioensis* **Ohio Goldenrod**
- *Solidago ridellii* **Riddell's Goldenrod**
- *Verbena hastata* **Blue Vervain**
- *Vernonia altissima* **Tall Ironweed**

- *Aquilegia canadensis* **Columbine**
- *Carex crinita* **Fringed Sedge**
- *Carex grayi* **Common Bur Sedge**
- *Carex lupulina* **Hop sedge**
- *Eupatorium maculatum* **Joe Pie Weed**
- *Eupatorium perfoliatum* **Boneset**
- *Iris virginica shrevei* **Southern Blue Flag**
- *Lobelia cardinalis* **Cardinal Flower**
- *Penstemon digitalis* **Foxglove Beardtongue**
- *Phlox glaberrima interior* **Marsh Phlox**
- *Phlox maculata* **Wild Sweet William**

• *Physostegia virginiana* **Obedient Plant**

- *Polemonium reptans* **Jacob's Ladder**
- *Senecio aureus* **Golden Ragwort**
- *Veronicastrum virginicum* **Culver's Root**

Finishing Tips and 1st Year

- Notch berm 1st year
 - Keep water level low
 - Established plants
- Double shredded hard wood mulch
 - Anything else will float
 - 2in deep
- Splash zone or turf zone
 - Slow water down
- Compaction
 - Keep equipment (and feet) off!

- Weed
- Water
- Prune
- Your rain garden will work better and better as its established.



Calculations

- Storage Volume

$$V = A \times I$$

- A = impervious area (size of roof)
- I = inches of runoff/12 (ft) (0.0833 ft)
- V = Storage Volume (cf)

Calculations

- Maximum Allowable Depth

$$D = I \times T$$

- I = Infiltration rate (feet/hour)
- T = Draw down time (hours)
- D = max depth (feet)

- OR GO WITH 2 FEET

Calculations

- Surface Area (how big does the garden need to be)

$$A = V/D$$

- V = Storage Volume
- D = Avg. Depth
- A = Surface area of garden in square feet (80-90 sq ft)
 - 8ft by 10 ft or 9ft by 10 ft garden)

Drip line

