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WATER PROBLEMS?
WATER SOLUTIONS!
WHERE THE RAIN DROPS GO!

Learning Objectives

- Identifying the proper location for water solutions
- Understanding the basics
- Designing for form, function, and beauty
- Installation
- Management and Care

Problems….

- What constitutes a problem?
  - How wet?
  - How long?
  - Soil consistency
  - Temporary/Long Term
    - Grading
    - Irrigation
    - Grey or Green
  - Use

Soil Testing

Soil

-Soil infiltration Test

-Dig a hole and watch how fast the water stays, flows, or goes!

-18” deep hole

-Fill with water- let it drain completely over 6-18/24 hours

(amend soils)less than 6- typically functional

more than 18/24-try again!)

-Refill and record:

Infiltration rate= the rate fall of the water in the hole/time= inches/hour

-Use a ruler and measure the rate at which the water drains- divide by the amount of time

-Standards:

I >or equal to 0.5 inches/hour- site will support

I< or + 0.5 inches/hour then under drain, or soil amendment are needed or a different location

-Clay can drain!

-Compensate

-Go big or go home

-Rough it up (new construction)

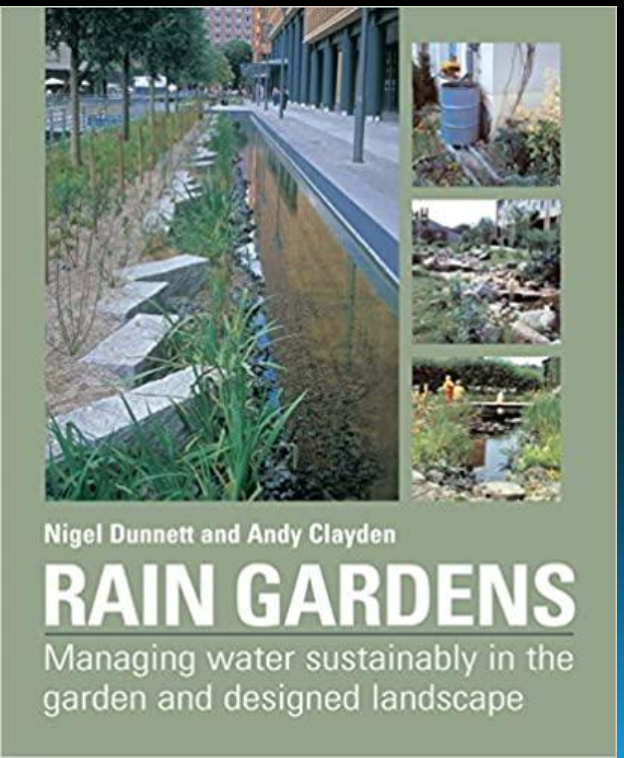
- Compaction

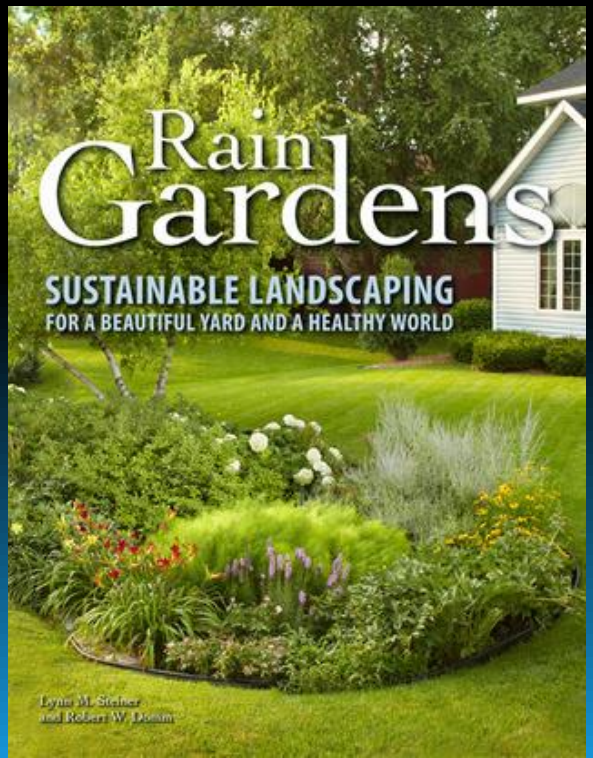
Identifying and Utilizing

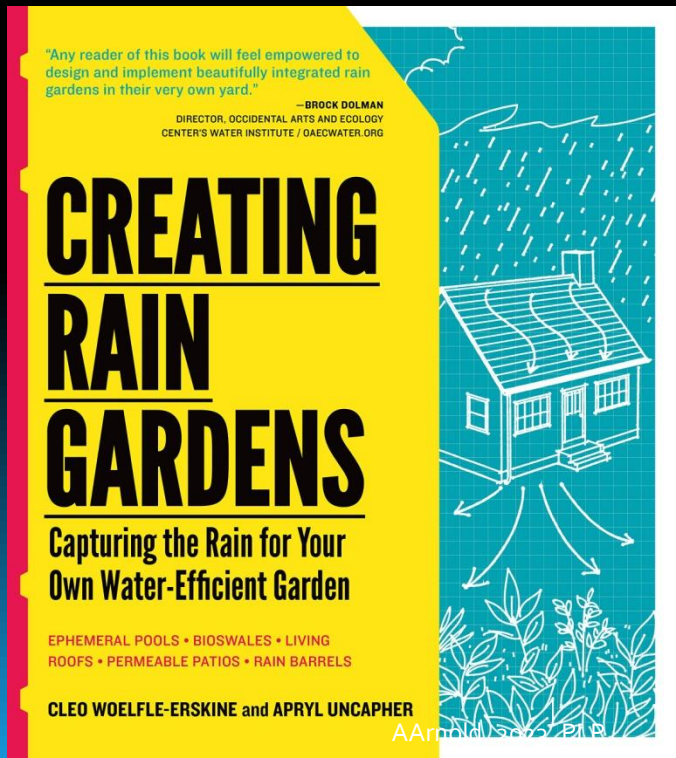
- Water, Soil, Time
  - Don’t put a band aid on it!
  - Grow water loving plants
  - Add compost
  - Green Infrastructure or Grey!
    - Rain Garden Construction
    - French Drain or Dry Well or Drain Tile
    - Give in and create a bog or pond!

Smarter Not Harder….

-Use your resources… (Dunnett/Clayden-Woelfle-Erskine/Uncapher-Steiner/Domm)
-Look at examples/case studies
-Utilize others with skill (may include your kids!)
-Make it fun and solve a problem!

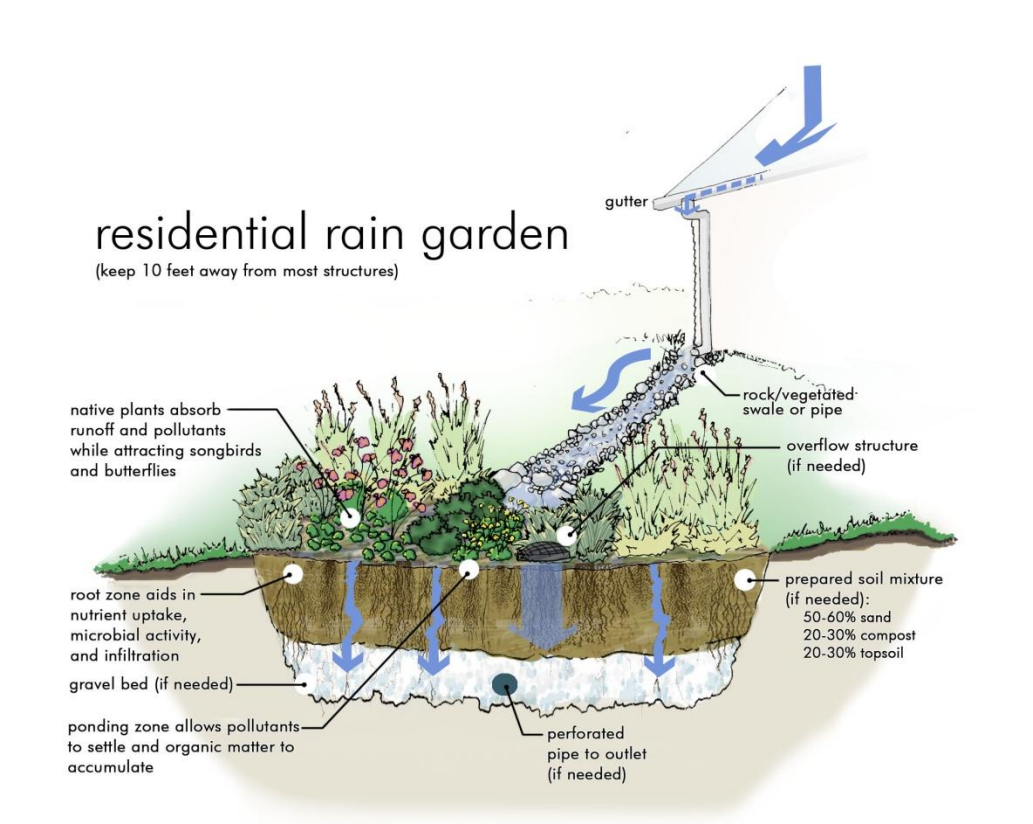






Identifying the Proper Location

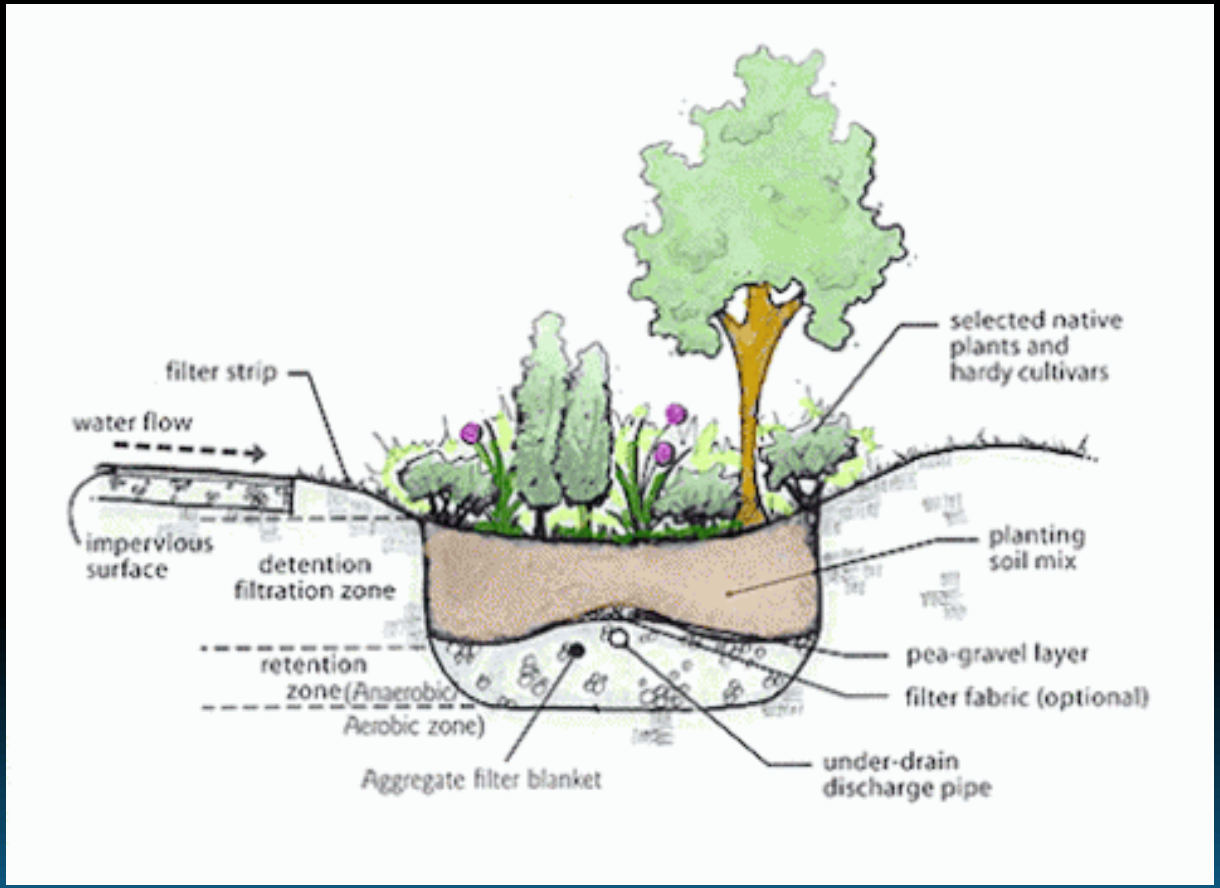
-Collect as much impervious surface water as possible
-Best areas are where water drains but doesn't hold
-Minimum 10-15' away from your home
-Consider location of trees, utilities, easements, setbacks, understanding soil and the groundwater table
- Consider the world around you- you are not an island!



Understanding the Basics

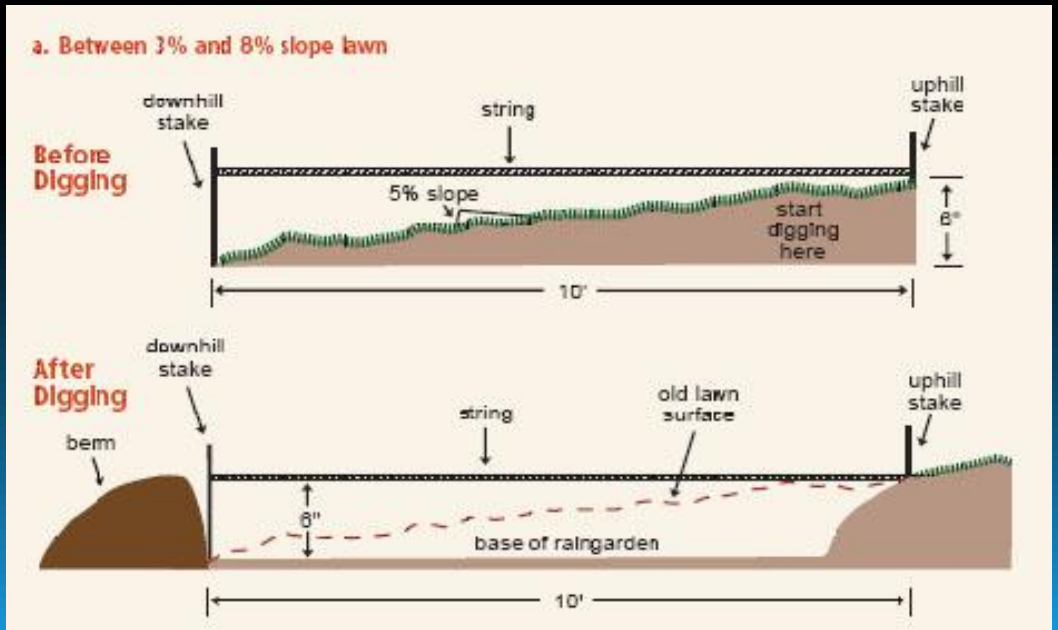
Goals
- -Water
- -Flower
- -Use
- -Function

Water
- - Groundwater Table
- - Surface Runoff
- - Surface Cover



Understanding the Basics

Location
- -Trees
- -Proximity
- -Utilities
- -Slope- (string and stake method)
  - -4% or less – 4” rain garden
  - -5-7% - 6” garden
  - -8-12%- 8” garden
  - -Greater than 12%- find a different location



Sizing your Rain Garden

Goals, Water, Location, Soil…. Now what!!!

Size your garden:

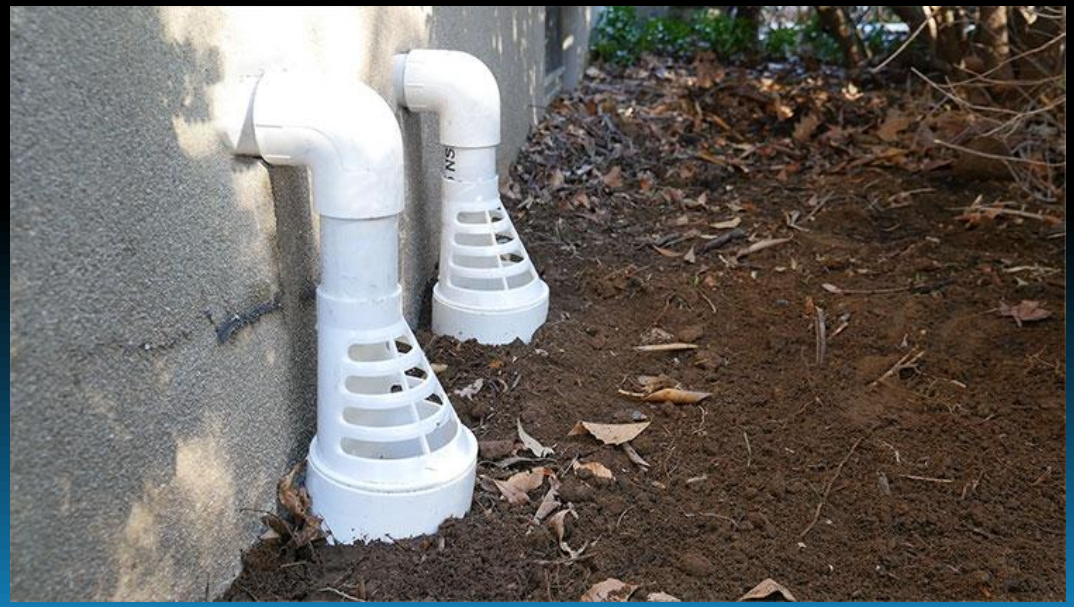
- Are any downspouts being considered? Does this include the sump pump? What grey infrastructure do you need? Want?
- Surface- how much is being drained to this space
-Surface- what do you need/want to direct to this space

Various methods:

- Complex and detailed
-Simple Calculations
-Cheats and Tricks!

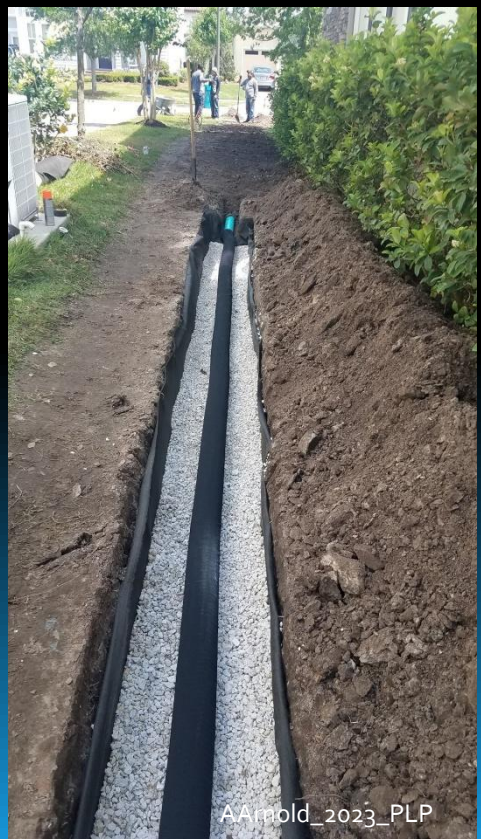
Sizing your Rain Garden: Sump Pumps

- Where do the sump pumps go?
  - Freezing
  - Overflow
  - Understanding flows



Sizing your Rain Garden: Grey

- If you need the big tools- grey infrastructure is a must!
- 90% of the time we incorporate both methods



Sizing your Rain Garden

-Measure the footprint of your house. This is the area taken up by your house if looking down from above. Multiply the length by the width of the house, the answer will be square feet.

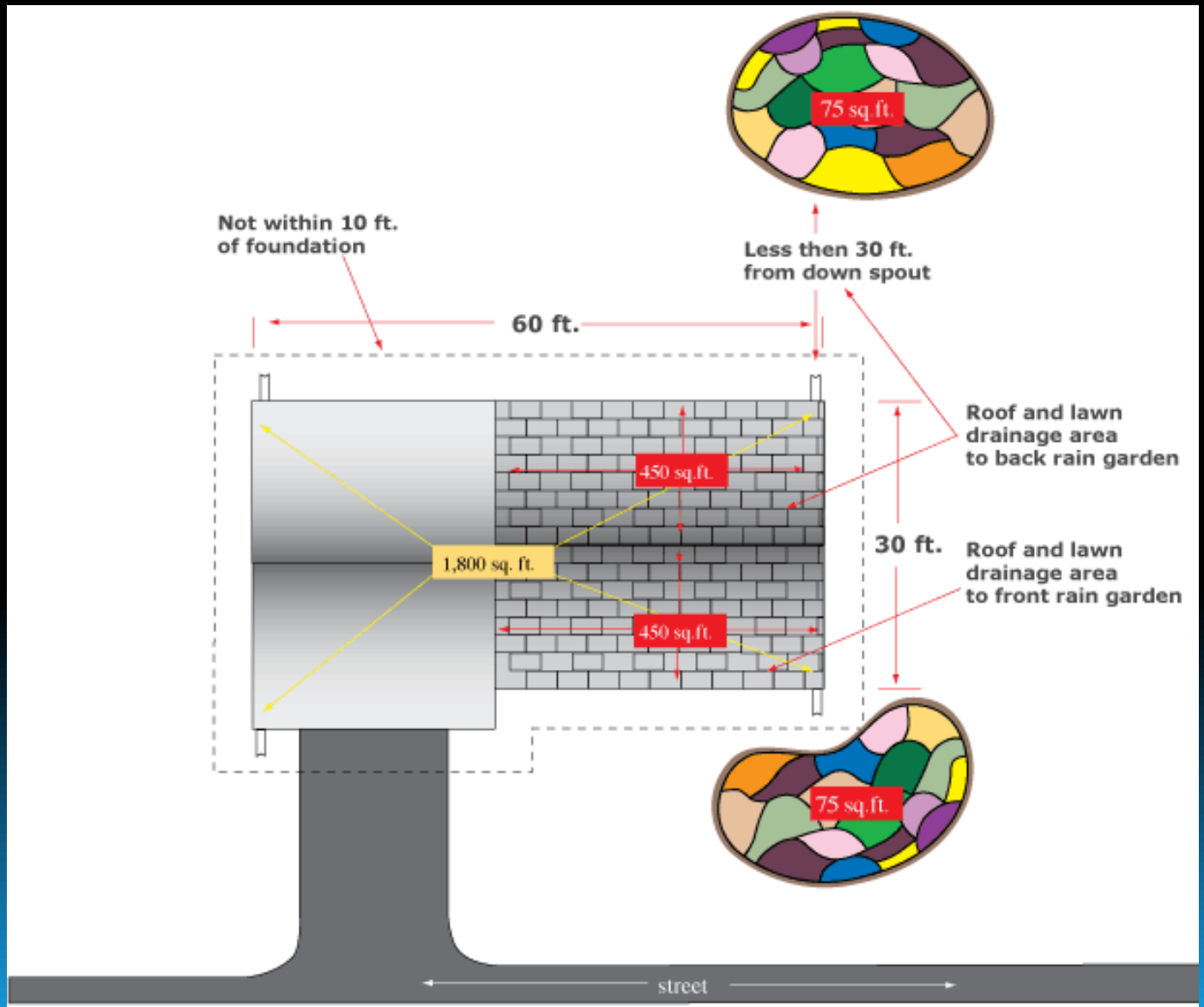
-Estimate how much of the area actually drains to the area where you want to install the garden. Typically, gutters drain to both ends of a house, so the length can be cut in half, but this is not always the case.

-If you are collecting runoff from your driveway or a section of road, just estimate the size of the impervious surface draining to the spot where you want to put the garden, and continue to step 4.

-Divide this area by 6. This calculation sizes the garden to hold one inch of runoff from the drainage area, in a garden 6 inches deep. The result is the area in square feet (or square meters) that you need for your rain garden. See the example below.

-You can make the garden and shape you like, as long as it is roughly the size that you calculated above. Ovals or kidney-shaped gardens tend to look nicer than square or rectangular gardens, but it's up to you.

Sizing your Rain Garden



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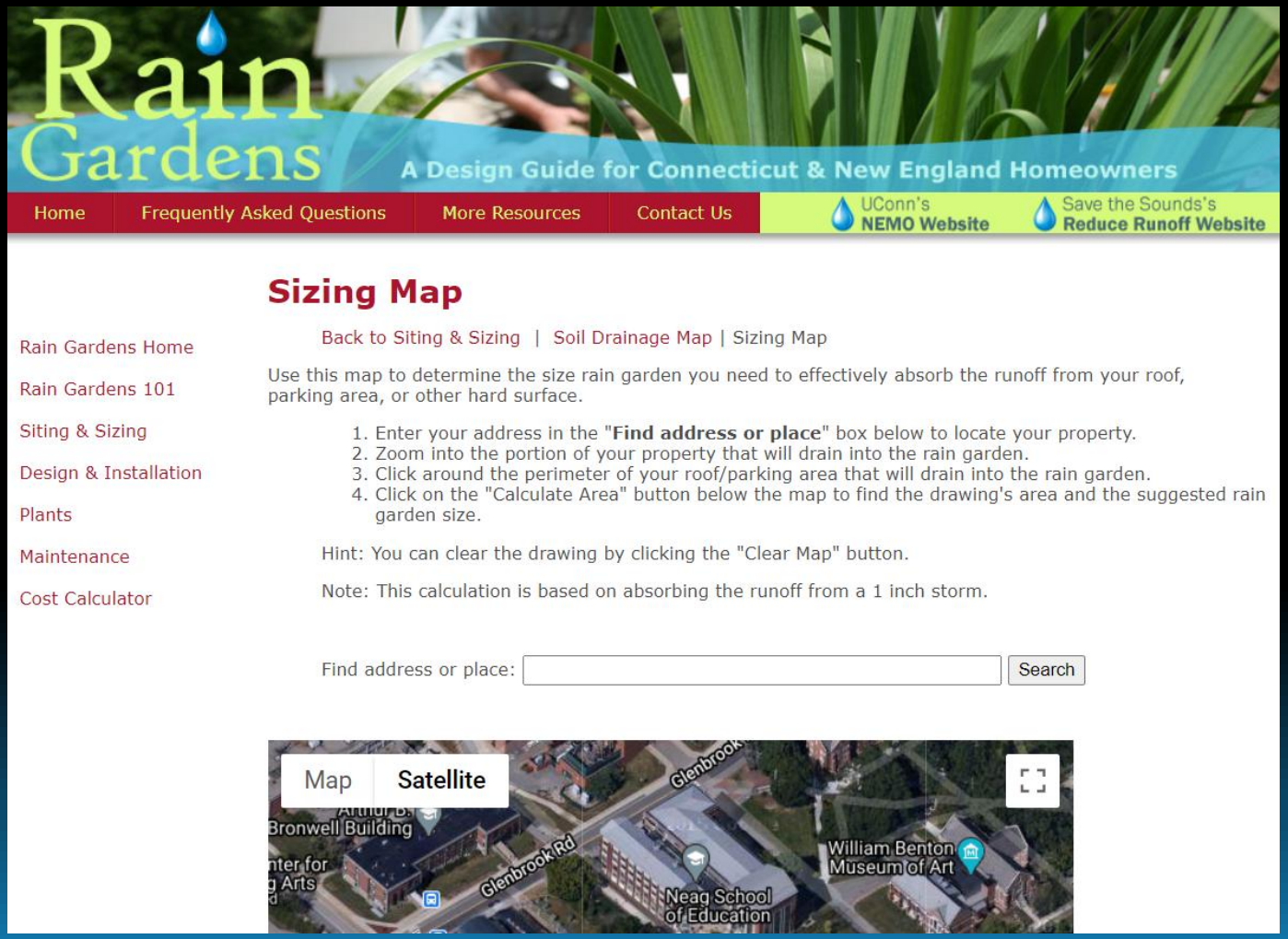
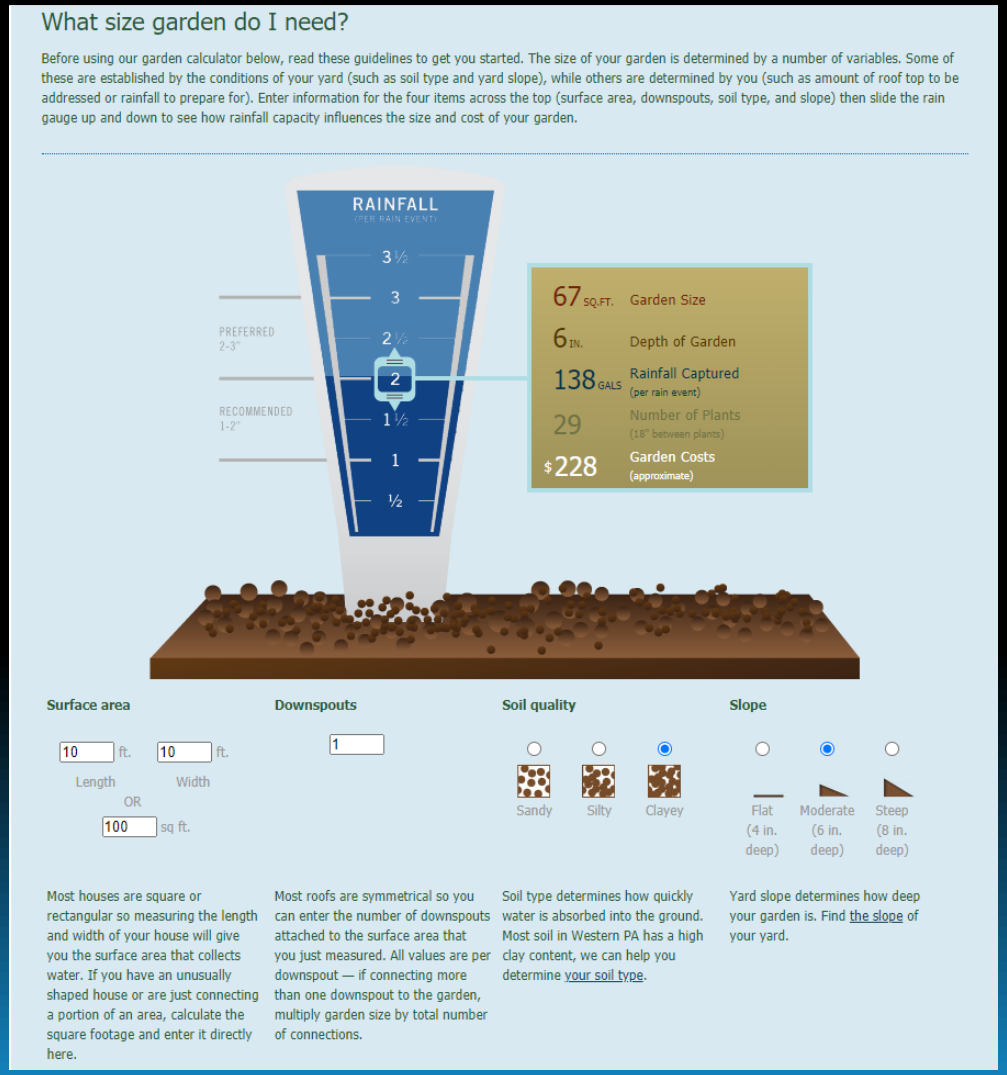


https://nemo.uconn.edu/raingardens/sizemap.htm

Sizing your Rain Garden



http://raingardenalliance.org/right/calculator

Designing for **Form**, Function, and Beauty

-Shape

-Utilize the lay of the land
-Any free form shape- can be a swale!
-Protect trees
-Better to size larger than smaller
- Fit will existing landscape (what is your landscape style?)
-How will it be viewed (one sided, multiple sides?)
-Remember where you want your water to flow

Designing for Form, **Function**, and Beauty

-Excavate soil- Loose soils that offer filtration

-Typical mix- 50-60% Sand/20-30% Topsoil- low clay/ 20-30Compost or 30/30/30!

-Utilize excavated soil to 'regrade' area to assist in rain garden form

-Cover- gravel or mulch:

-Erosion Control

-Traps and holds moisture

-May need reinforcements (select stones- especially at downspouts or slopes)

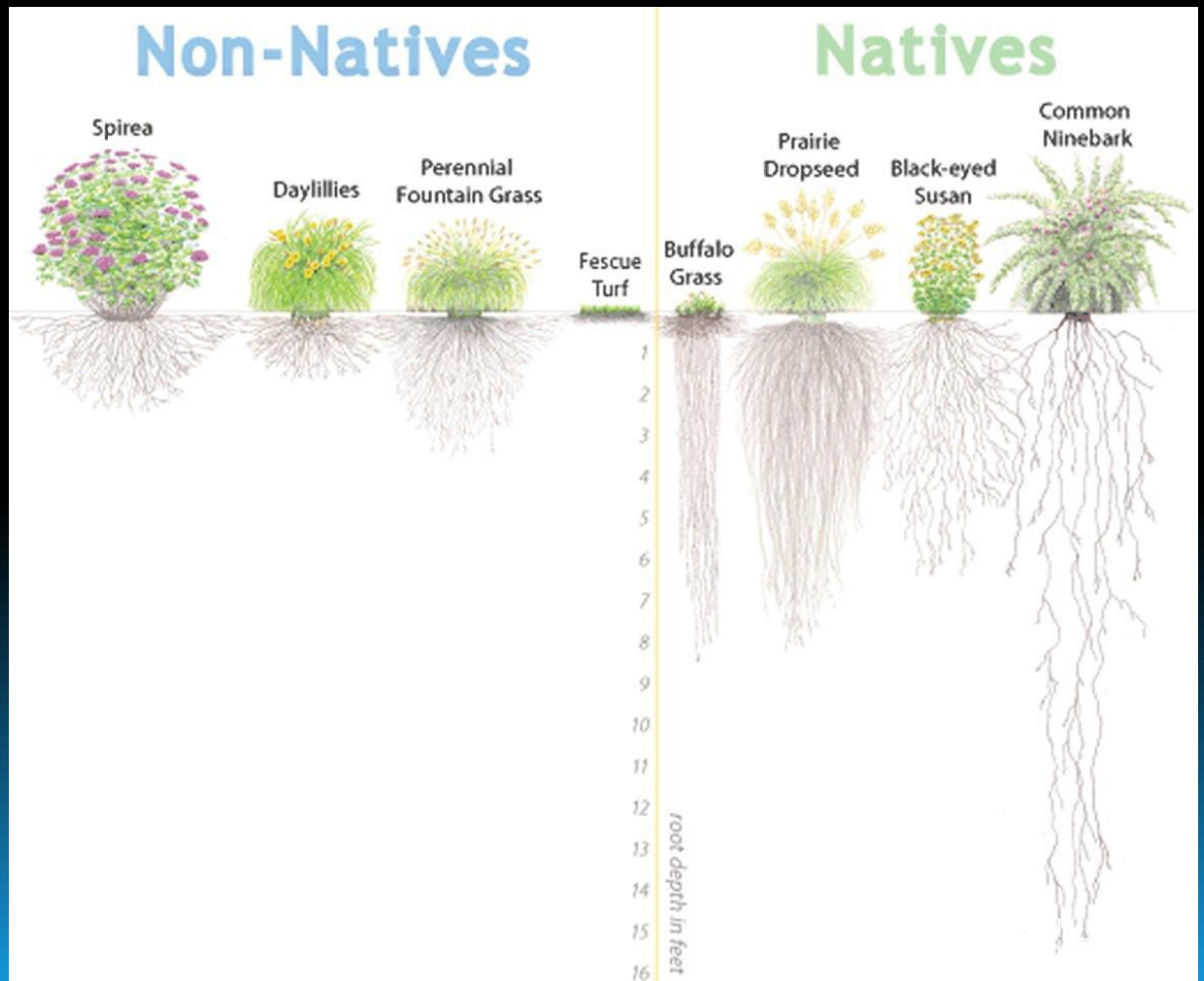
Designing for Form, Function, and **Beauty**

Wetland Indicator Status Codes

DRY	Almost never occurs in a wetland
MODERATE	Occurs in wetlands and non-wetlands
WET	Always occurs in a wetland

Designing for Form, Function, and **Beauty**

-Plants- the fun part!:
- -Wetland Edge plants
- -Sun/Partial/Shade
- -Aesthetics
- -Goals



Designing for Form, Function, and **Beauty**

Designing for Form, Function, and **Beauty**

Rain Garden Design

What is a rain garden?

A rain garden is simply a shallow depression in your yard that's planted with native wildflowers and grasses that are able to thrive in changing soil moisture. Its purpose is to gather, filter and infiltrate rainwater into the ground (restoring the aquifer), provide habitat for wildlife, and deliver enjoyment to its owner (that's you!)

Rain gardens are gaining popularity for 3 reasons:

1 Rain gardens make good use of the rainwater; the native plants filter and clean water as it soaks into the ground. By keeping runoff out of storm drains, rain gardens also help protect water quality in local lakes and streams and restore the aquifer, our underground water supply.

2 Rain gardens are planted with beautiful, hardy, low-maintenance native perennial plants and native shrubs.

3 Rain gardens provide food and shelter for birds, butterflies and beneficial insects, such as mosquito-devouring dragonflies!

Simple Construction

It's easy! Just follow these easy steps:

1 Dig a shallow depression with a level bottom. The size depends on your drainage needs. A good guesstimate is 20% of the square feet of your drain area for sandy soil, 30% for loam, and 40-50% for clay.

Pick a naturally low spot in your yard at least 10ft from your house. Full sun is best. Try to choose a spot with at least half-day sunlight. Do not put the rain garden in the area of a septic field.

A depression of about 2-6 inches is fine. Slope the sides gradually from the edge to the level bottom. For heavy clay soils, dig the rain garden deeper or mix topsoil with compost to improve drainage.

2 Direct your downspout or sump pump outlet to your rain garden, either by digging a shallow swale—a linear depression designed to channel water—or by routing it through a buried 4" pipe. Always plan that the overflow location is lower than where the water enters.

3 Plant your rain garden with native plants appropriate for your soil type and sun/shade conditions.

4 If it doesn't rain, keep the soil moist but not wet for the first growing season until plants are well-established.

Once your native rain garden plants are established, standard garden maintenance is all that is required.

Too much of a good thing

During heavy rains, your garden may overflow. Make sure this overflow follows the drainage pattern originally designed for your lot. Test this by filling your depression with a garden house and watching the overflow. If needed, dig a shallow swale to direct overflow toward the street or other downhill areas away from buildings. It should not drain to your neighbors property.

True Natives vs. Cultivars

We recommend using true natives which are adapted to survive under our local conditions (rainfall, drought, and temperature fluctuations) and support wildlife who are dependent on plants for their food and development. Cultivars have been artificially cloned or bred for specific characteristics such as flower color and may not function as well as the true native. The name of the plant gives a clue if it's a pure native; if the botanical name is followed by a common name in single quotation marks then it is a cultivar (e.g. Echinacea purpurea 'White Swan'). Purchasing from well-respected growers/nurseries is a dependable strategy for getting the right plants.

More Tips

- Weed biweekly until native plants are established.
- Avoid using lawn fertilizers near the rain garden. They stimulate weeds without benefitting plants.
- Don't worry about mosquitoes. A properly constructed rain garden will not hold water long enough for mosquitoes to reproduce and it attracts dragonflies, swallows, and other controls to keep them in check.
- Place natural rocks, bird houses, a bench or garden ornaments in and around your rain garden. Have fun with this!
- Include native sedges and grasses to help physically support taller species.

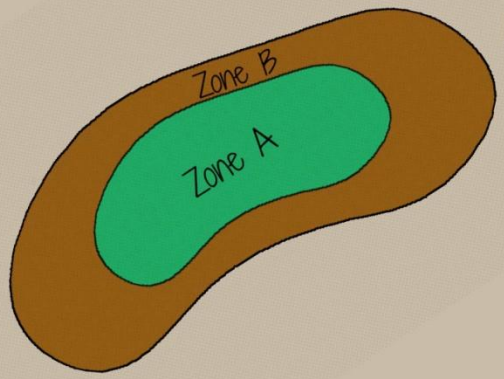
The Conservation Foundation...

...is a nonprofit organization dedicated to preserving open space and natural lands, protecting rivers and watersheds, and promoting stewardship of the environment in Northeast Illinois.

Established in 1972, we work closely with citizens, elected officials, developers, land-use planners, park districts, and forest preserves. We have helped protect more than 30,000 acres of open space.

The Conservation Foundation has more than 5,000 donors and members, and 500 volunteers.

Our main office is at the McDonald Farm in Naperville, IL, with another at Dickson-Munst Farm in Montgomery, IL. For more information, visit **www.theconservationfoundation.org**.



Zone B Plants (drier)

Whorled Milkweed	Asclepias verticillata
Foxglove Beardtongue	Penstemon digitalis
Zigzag Goldenrod	Solidago Flexicaulis
Bee Balm	Monarda fistulosa
Showy Black-Eyed Susan	Rudbeckia fulgida var. speciosa
Purple Coneflower	Echinacea purpurea
Prairie Blazing Star	Liatris pycnostachya

Sedges (Zone B)

Bicknell's Sedge	Carex bicknellii
Eastern Star Sedge	Carex radiata
Prairie Dropseed	Sporobolus heterolepis

Zone A Plants (wet/moist)

Swamp Milkweed	Asclepias incarnata
Great Blue Lobelia	Lobelia siphilitica
Marsh Blazing Star	Liatris spicata
White Turtlehead	Chelone glabra
Blue Flag Iris	Iris virginica shrevei
Golden Alexanders	Zizea aurea

Sedges (Zone A)

Brown Fox Sedge	Carex vulpinoidea
Palm Sedge	Carex muskingumensis

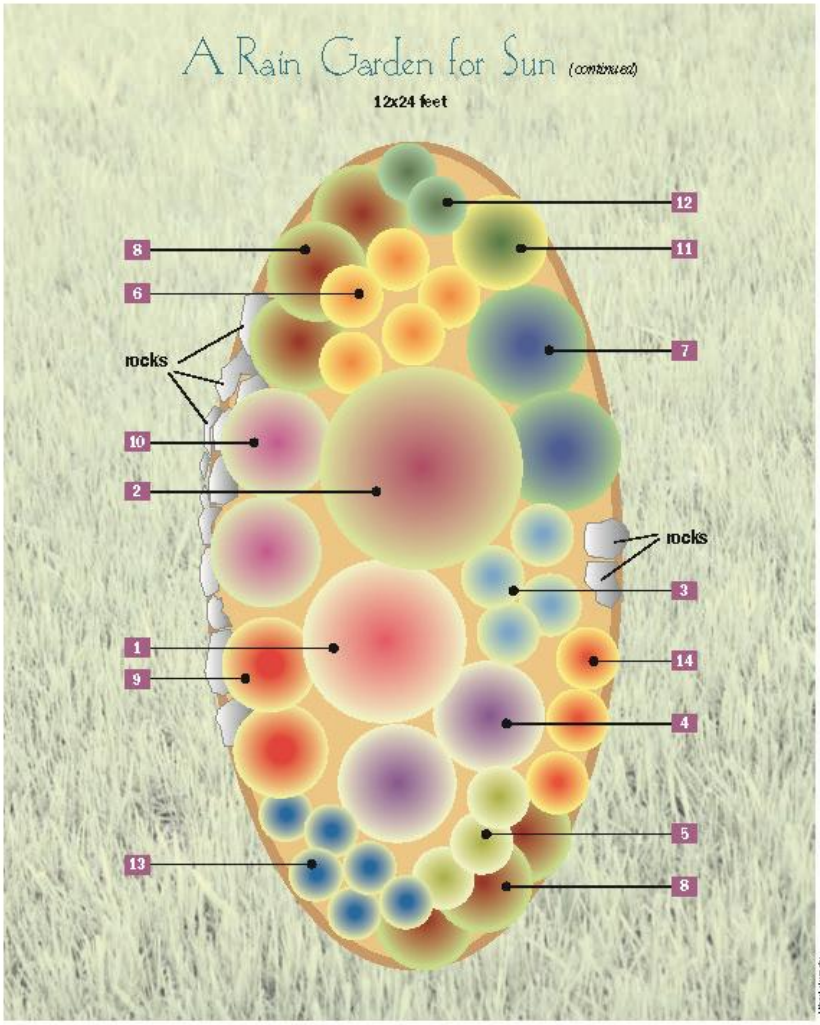
Moist Shaded Areas

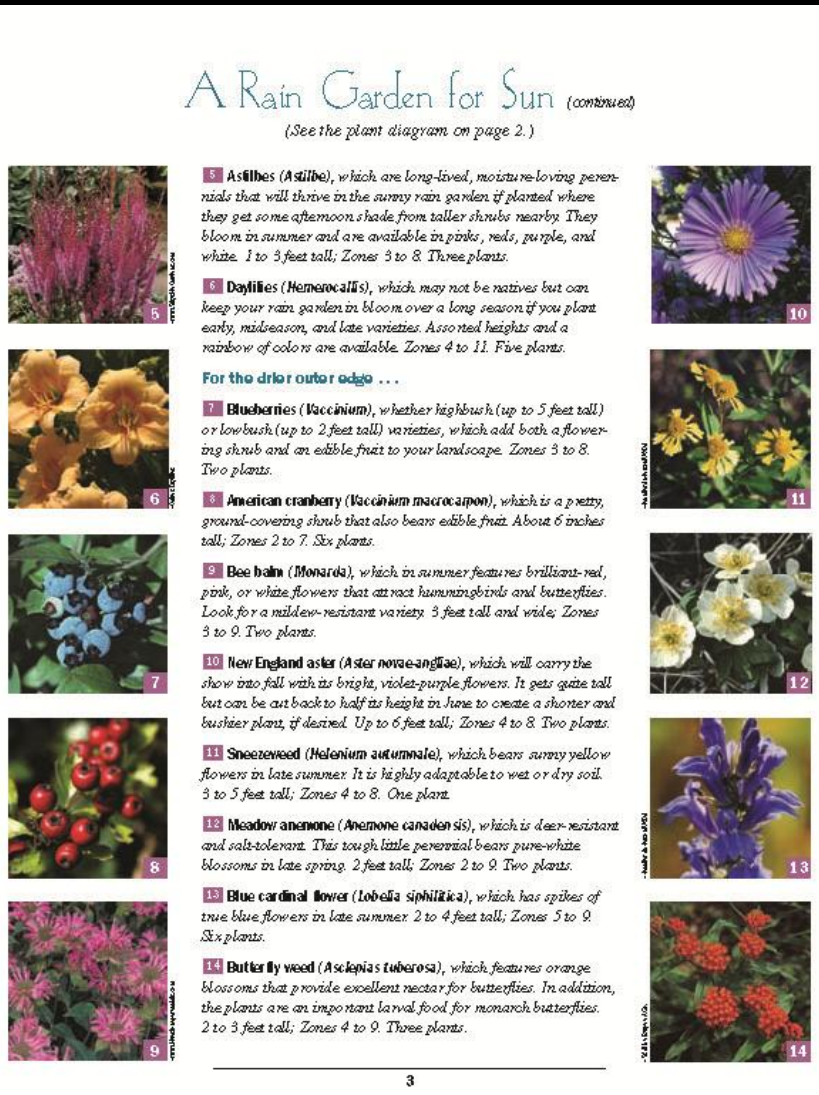
Great Blue Lobelia	Lobelia siphilitica
Wild Columbine	Aquilegia canadensis
Woodland Phlox	Phlox divaricata
Wild Ginger	Asarum canadense
Shooting Star	Dodecatheon Meadia
Jack-in-the-Pulpit	Arisaema triphyllum
Wild Geranium	Geranium maculatum

Sedges

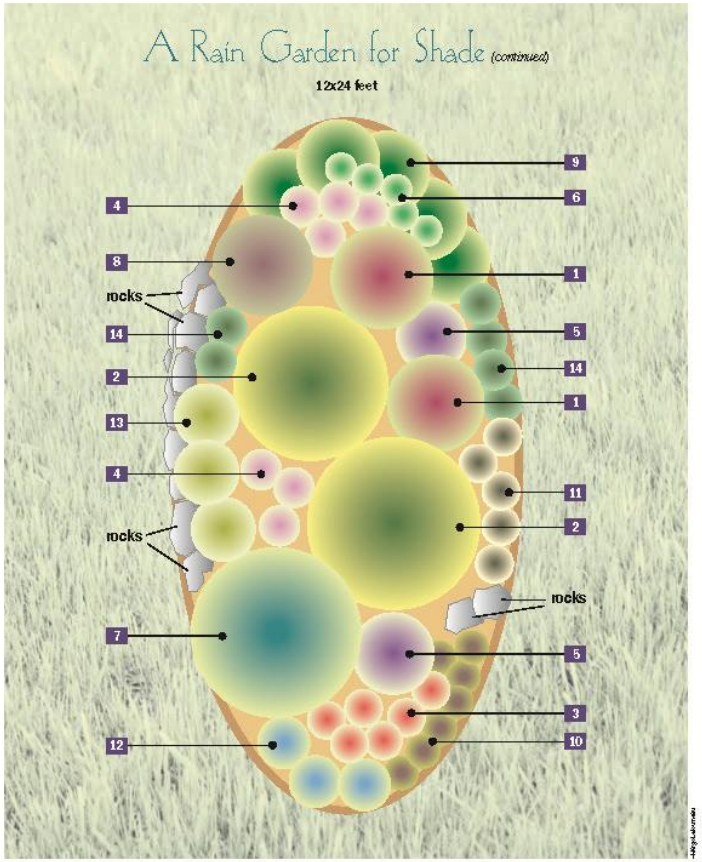
Penn Sedge	Carex pensylvanica
Palm Sedge	Carex muskingumensis
Plantain-Leaved Sedge	Carex plantaginea

Designing for Form, Function, and **Beauty**





Designing for Form, Function, and **Beauty**



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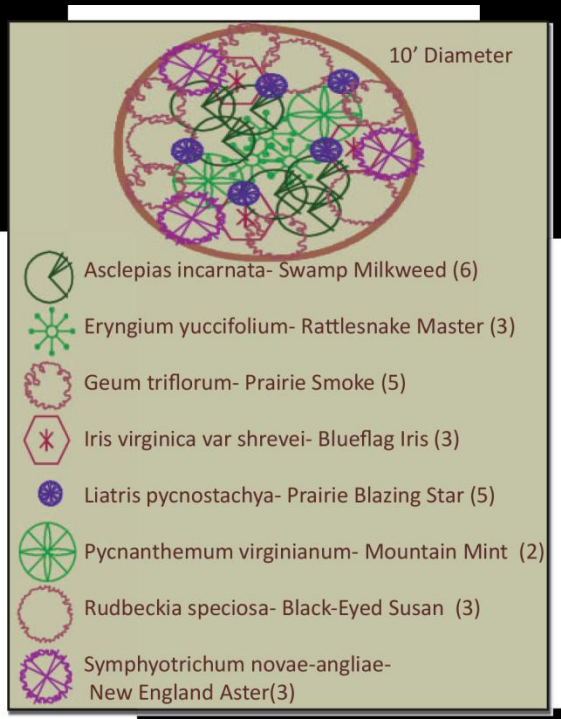
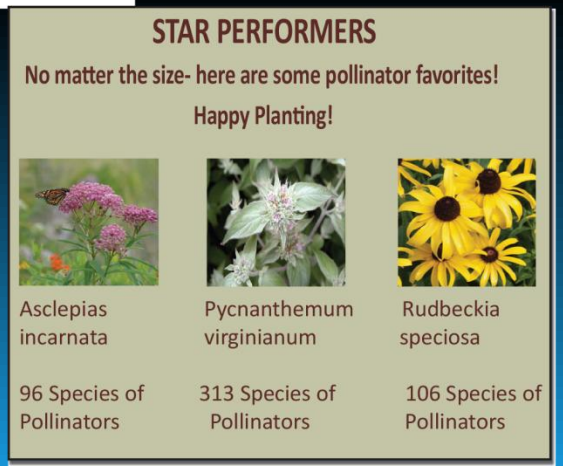




Designing for Form, Function, and **Beauty**

Scientific Name	Common Name	Pollinators	Height	Bloom Time	Bloom Color	Sun	Soil
1. Juncus effusus	Common Rush	6 Species	2'	June-Aug	n/a	☼	Moderate-Wet
2. Eutrochium maculatum	Spotted Joe Pye Weed	65 Species	5'	June-Sept	Pink	◑	Wet
3. Chelone glabra	Turtlehead	8 Species	5'	July-Sept	White	☼	Wet
4. Rudbeckia fulgida	Orange Coneflower	106 Species	3'	July-Sept	Yellow	☼	Moderate
5. Veronicastrum virginicum	Culver's Root	59 Species	5'	June-Aug	White	◑	Moderate
6. Liatris spicata	Marsh Blazingstar	60 Species	5'	July-Sept	Violet	◑	Moderate-Wet
7. Carex lurida	Sallow Sedge	12 Species	3'	May-Aug	n/a	ALL	Wet
8. Carex muskingumensis	Palm Sedge	18 Species	3'	June-July	n/a	ALL	Moderate
9. Sporobolus heterolepis	Northern Dropseed	14 Species	3'	Aug-Oct	Gold/Brown	◑	Moderate-Dry
10. Ruellia humilis	Wild Petunia	20 Species	1'	June-Aug	Violet	☼	Moderate-Dry
11. Echinacea palilida	Pale Purple Coneflower	98 Species	3'	June-Aug	Lavender	◑	Moderate-Dry
12. Coreopsis palmata	Prairie Coreopsis	147 Species	2'	June-Aug	Yellow	◑	Moderate-Dry

Installation- Dreams to Reality!

-Excavate
- -Remember to layout out stakes
- -Figure out your shape
- -You may need a berm or more complex basin; contour to land
- -Smarter not harder!
- -Hose and Yard Stick Method- understanding conveyance
- -Buried Pipes- Sump Lines
- -Level Basin-(keep sides around 60%)
- -Outlet (need overflow!) is lower than inlet and safe from erosion (berm/stones)
- -Install your grey infrastructure first- connect all pipes!

-Soil
- -Add and make sure to accou

-Plant
- -Center- wettest plants
- -Sides- occasional flooding
- -Berm- dry!

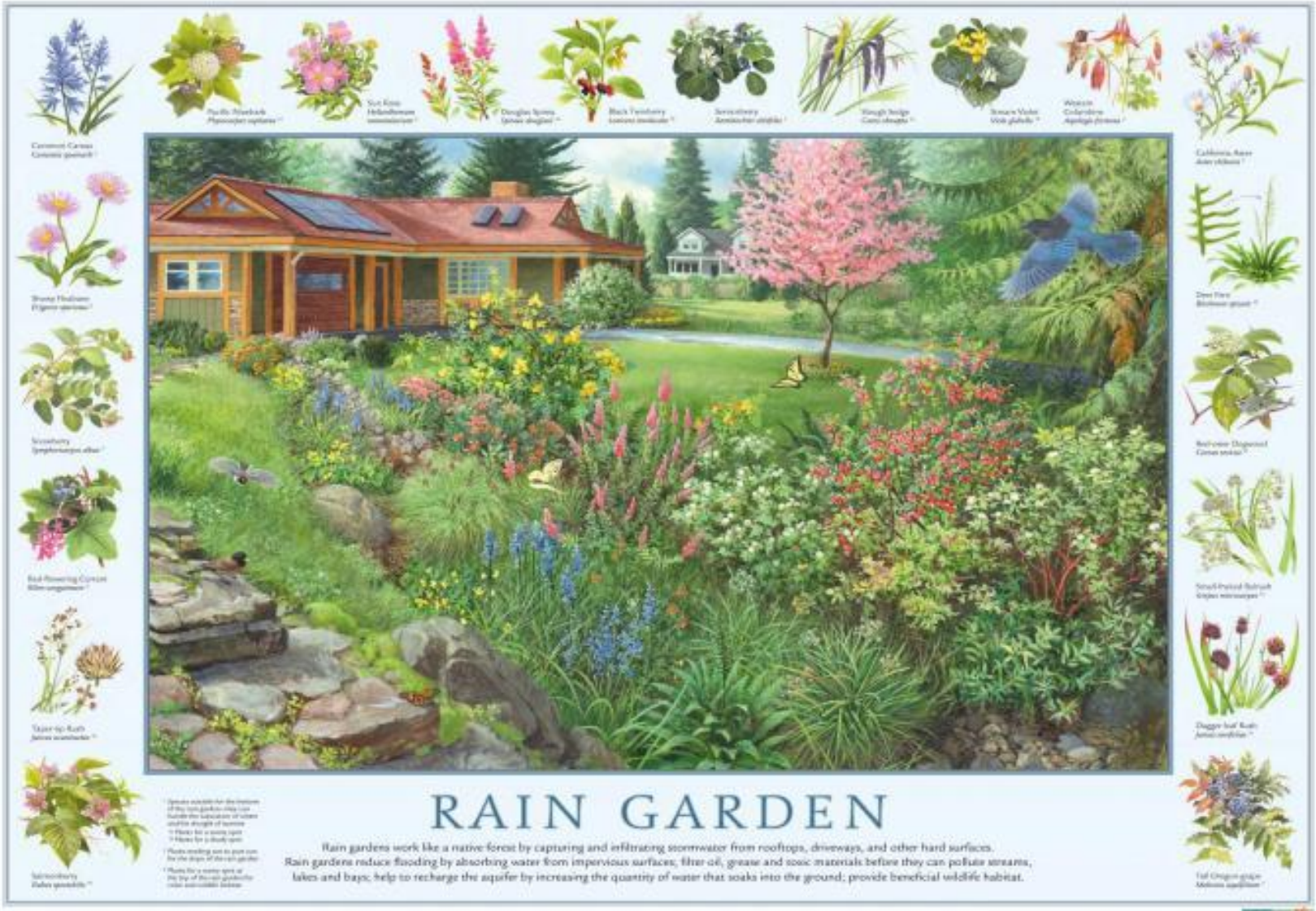
-Enjoy!

Management and Care

-After installation- Now What?

- -Cover and Care-
  - -Mulch or cover first couple of years
  - -Plant for overlap and competition
  - -Check inlet/outlet for erosion and slope/level over time
  - -Clean downspouts and remove debris as needed
- -Weeding-
  - -You will always have to weed (plant and plan for just a little!)
- -Cutting back- spring cut backs
  - -Ignoring, editing, removing
- -Adding the details
  - -Bird houses/Nesting Boxes
  - -Benches
  - -Hummingbird Feeders
- -Be flexible with change
  - -Monitor and adapt

Final Thoughts



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THANK YOU!

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IMAGE NOTES:

FEEL FREE TO CONTACT FOR DIRECT LINKS AND NOTATIONS:

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