

Connecting Rainwater to Your Yard

Hosted by: Sarah E. Matheny, Storm Water Manager

Co-hosts: Megan Liggett (Technician/Educator) & John Weedon (Executive Director)



March 25, 2021

6:30 p.m.



2021 District of the Year

Tonight's Topics

- What is the water connection?
- What is a rain garden?
- What are the benefits of a rain garden?
- Where should you locate a rain garden on your property?
- How do you design the rain garden?
- How should you choose your plants?
- How do you maintain your rain garden?

The Natural Connection

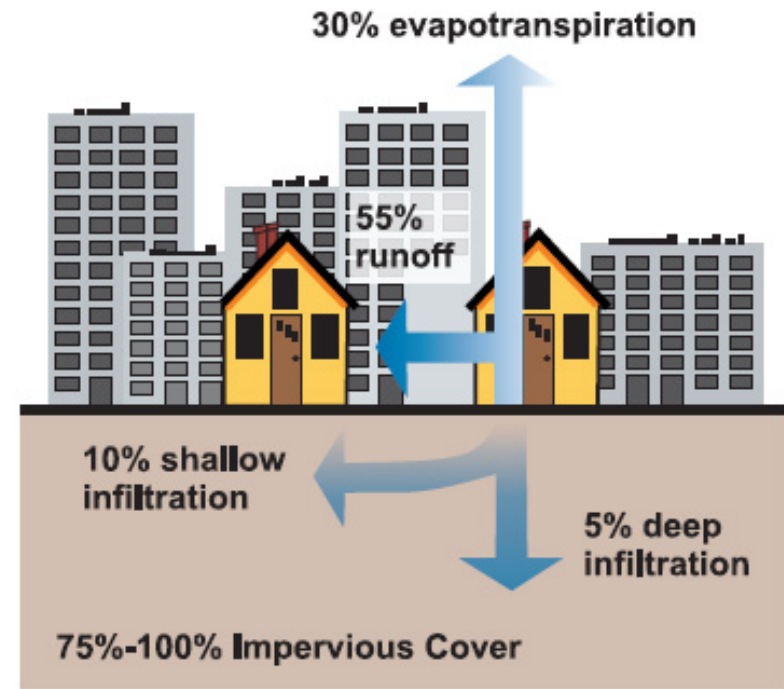
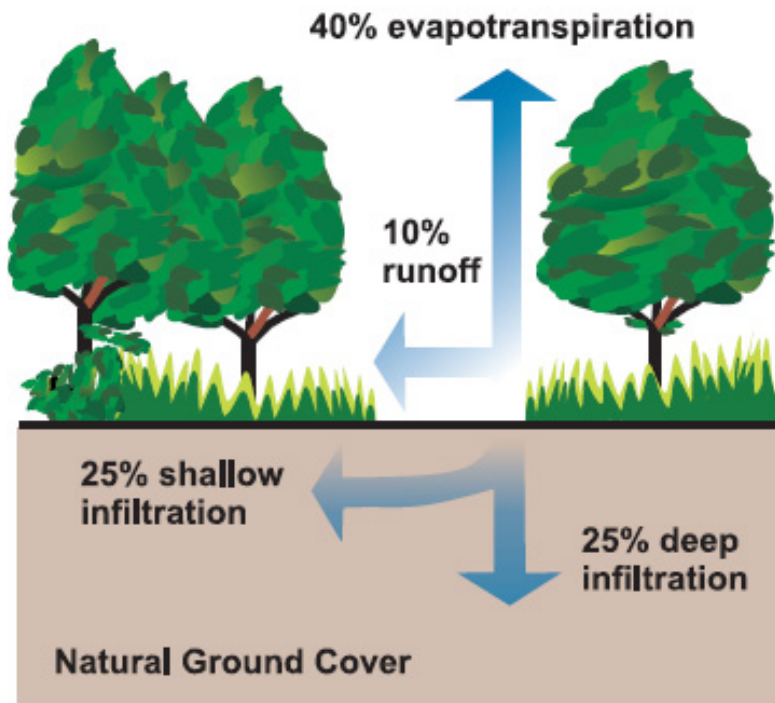
Water moves ***very slowly*** from cloud to creek in a forest or field.

- Rain collects on leaves and branches.
- Rain runs down tree trunks.
- Rain is soaked up by leaf litter and mulch.
- Rain infiltrates/percolates through the soil profile, replenishing ground aquifers.
- Only **10%** of rain water leaves the landscape as surface water.

The Broken Connection

Water moves ***very very rapidly*** from cloud to creek in the city.

- Storm water runs off roofs, sidewalks, driveways, and patios to streets.
- Storm water picks up **pollutants** such as oil, dirt, garbage, pet waste, and junk.
- Storm water with pollutants rushes into curb drains and connects to storm sewers that dump into a waterbody.



What is the number one threat to water quality in our lakes and streams?

Storm water runoff!

The Reconnection

- Rain gardens can repair the broken connection.
- It mimics some of the benefits of the natural landscape and that raindrop “journey.”



What is a rain garden?

A rain garden is a depression in your yard to capture rain water and grow annual and perennial plants that flourish in wet or moist soil.

Less runoff from our homes means reducing and filtering pollutants.

How did it all begin?



U.S.

In the early 1990's in Maryland, they started with bioretention basins/cells to treat nonpoint source pollution entering Chesapeake Bay



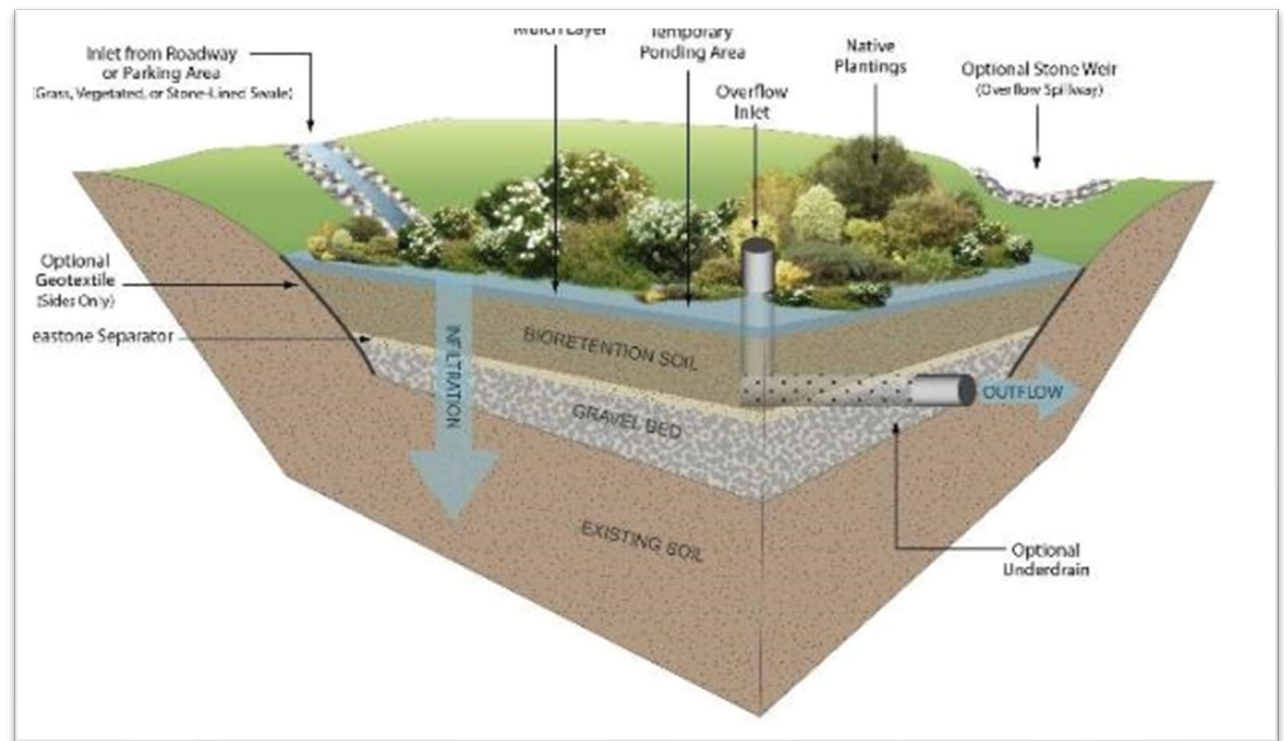
AUSTRALIA

Melbourne's 2009 Healthy Waterways Raingardens Program raised awareness for stormwater treatment and built 10,000 raingardens by 2013!

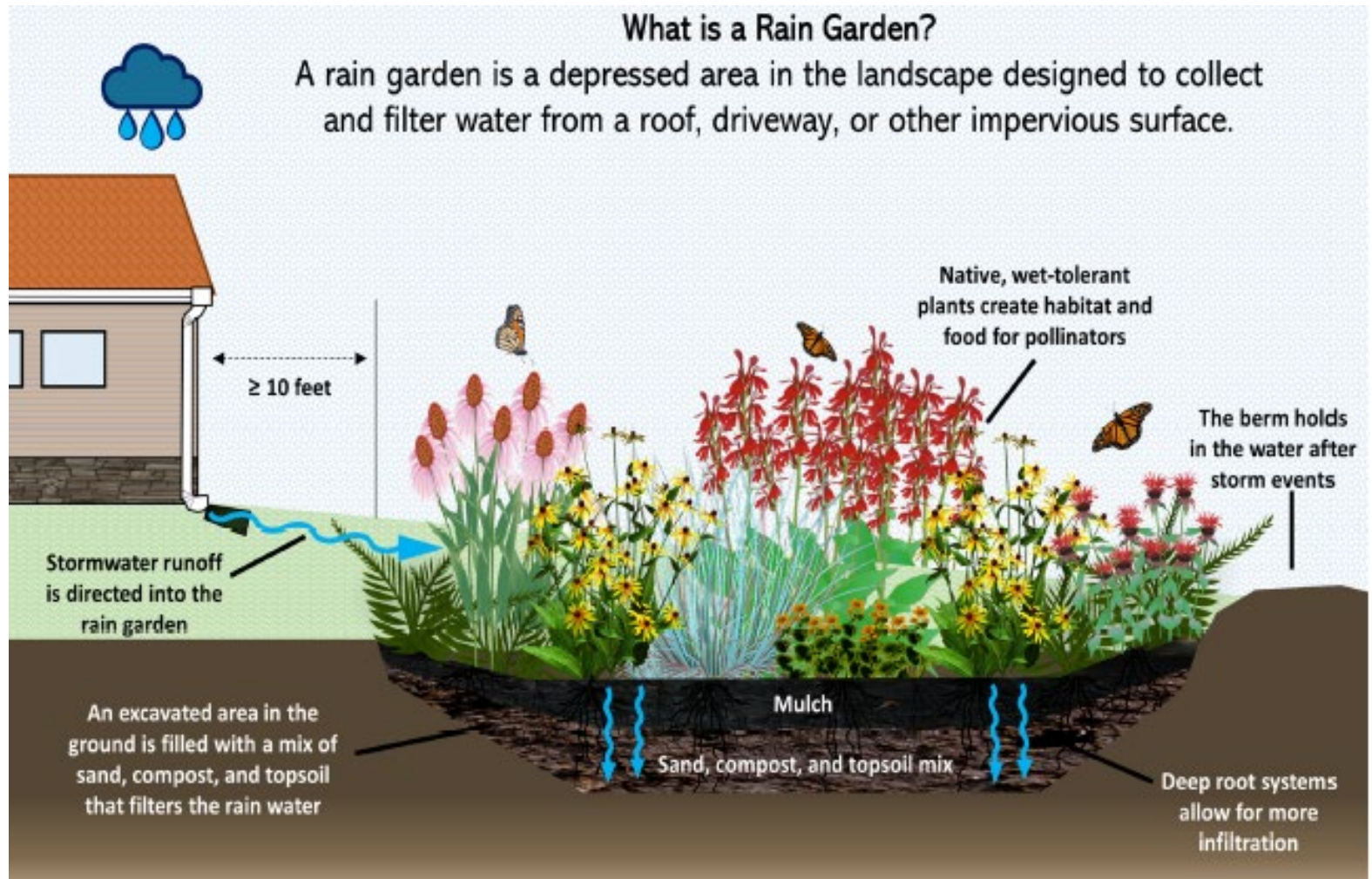


CHINA

Starting in 2011, observed a rain garden for 4 years and 28 large storm events later, it only overflowed 5 times.



Rain Water Gardens



Rain Water Gardens



Rain Water Gardens



Rain Water Gardens



What are the benefits of rain gardens?

- Big Picture
 - Replenishes groundwater aquifers.
 - Reduces pollutants in our streams and rivers.
 - Decreases stress on storm sewer system.
 - Reduces erosion.



What are the benefits of rain gardens?

- Little Picture (aka, your yard)
 - Provides aesthetic beauty for everyone.
 - Provides habitat for pollinators and other wildlife.
 - Reduces wet spots in your yard.
 - Lessens how long you have to mow when you could be listening to baseball.

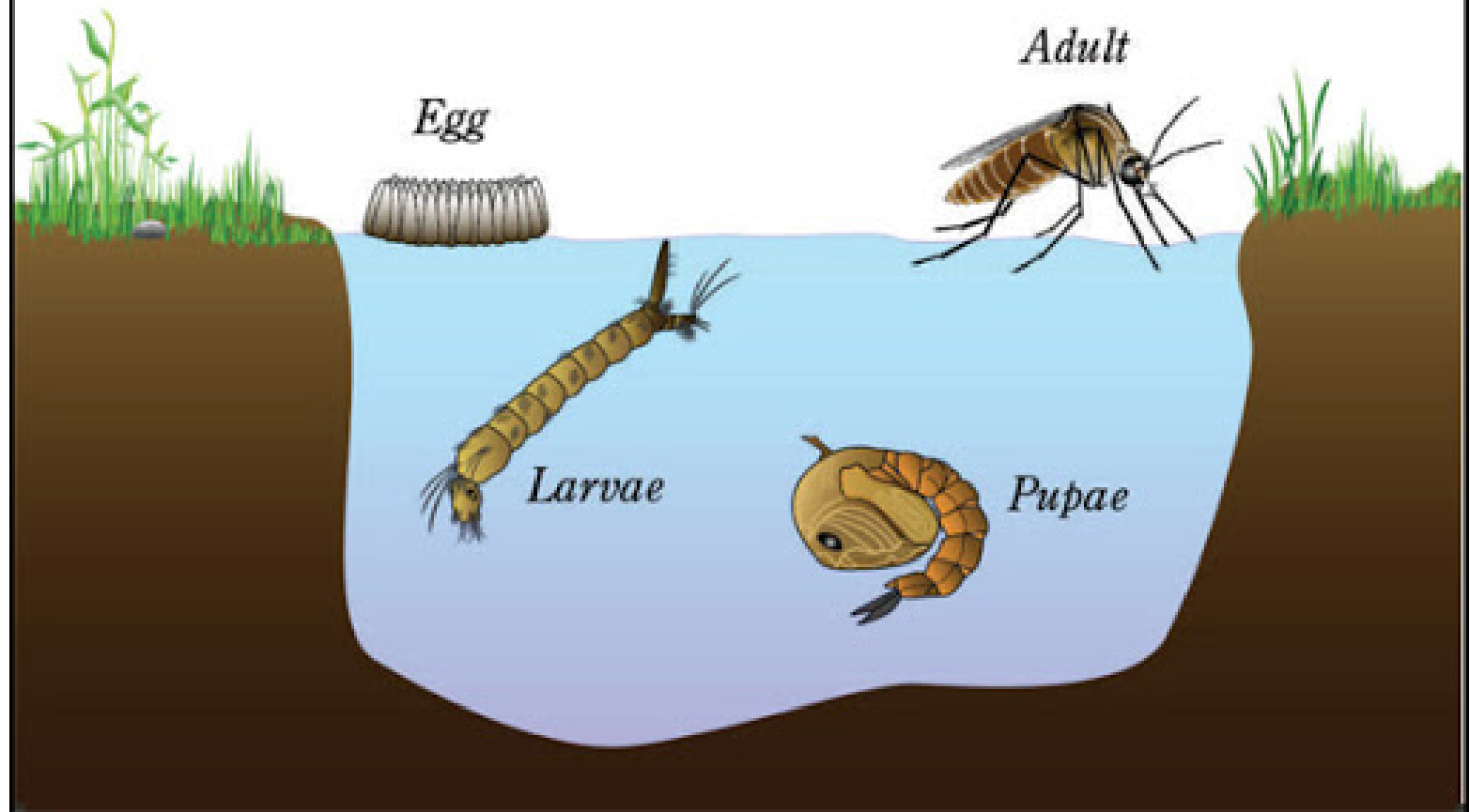


What about mosquitos?

Mosquitos lay eggs in water.

The transition from larva to flying insect takes three to seven days.

Mosquito Life Cycle



What about mosquitos?

If the water in your rain garden infiltrates in one day, the insects have no time to develop.

Your garden is a mosquito death trap!

Step-by-Step

1. Reconnaissance
2. Site Selection
3. Sizing(Area, Depth)
4. Designing (Features, Shape)
5. Ground Preparation
6. Plant Design
7. Maintenance

STEP ONE: Reconnaissance

- How does the water flow on your property?
- Do you have natural depressions in your yard?
- Where are your downspouts? Do the downspouts empty onto your lawn or to the street via an underground pipe?
- Do you have French drains? Where is the outlet?
- What is the orientation of your yard?
 - North aspect? Cooler, wetter
 - South aspect? Sunnier, drier

STEP TWO: Site Selection

- Select location downhill of water source (downspouts, roofs, sidewalks, driveways, outlet).
- Will you use a downspout disconnect or sheet flow of yard?
- Select location at least 10' from house foundation or ~4' for slab foundation.
- Select location that avoids the “no-no” areas.

STEP TWO: Site Selection

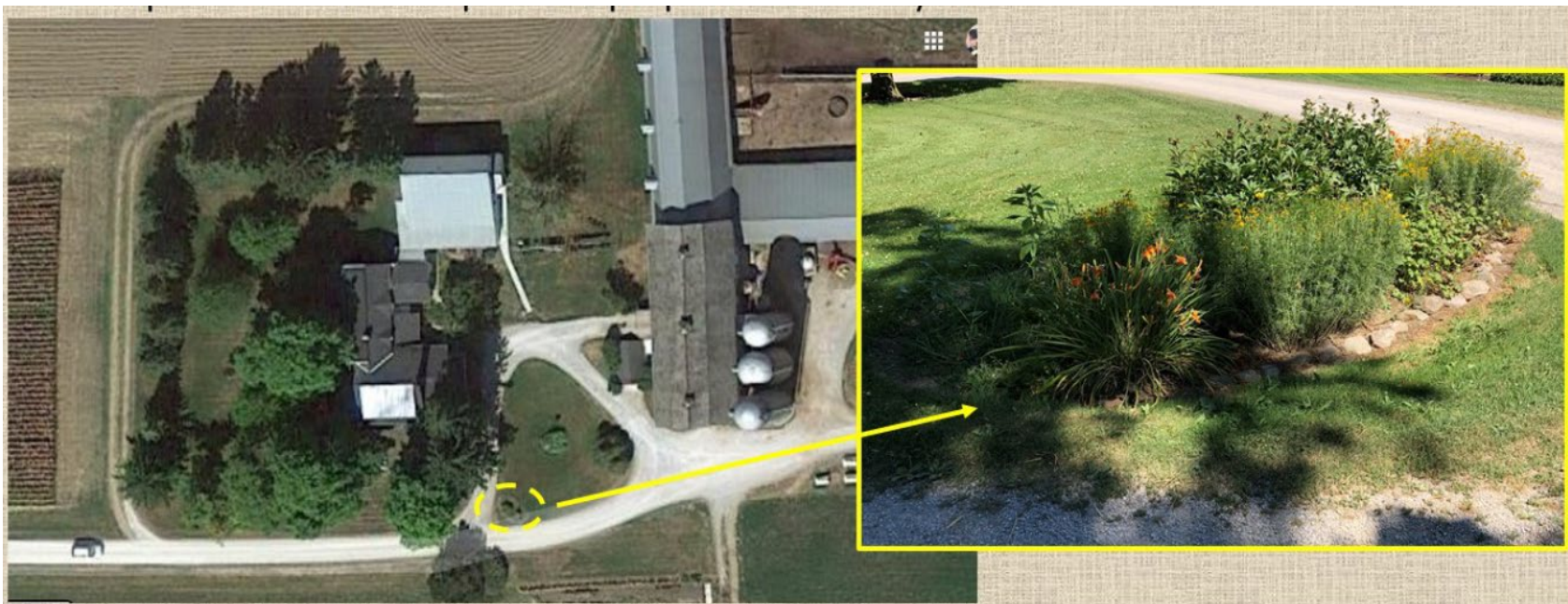
“No-No” areas

- Buried utility lines
- Septic leach fields
- Water well lines
- Tree lawns (grassy area between sidewalk and street)
- Structural (retaining) walls
- Trees
- Shallow bedrock or groundwater
- Areas that already pond water

Call before you dig!



STEP TWO: Site Selection



STEP TWO: Site Selection



STEP THREE: Sizing

- Measure the length and width of the impervious surface that will flow to your garden.
- Length x Width = Area (ft²)
- Divide by the number of downspouts (if more than one)



STEP THREE: Sizing

- Need to design the garden to be 3 – 6” deep and 20 – 30% the size of the impervious surfaces.
- Time for a percolation test!!

Test the Soil Percolation Rate

BASIC SOIL PERCOLATION TEST

- ☐ Within the garden, dig a hole spade-wide and 12-inches deep.
- ☐ Fill the hole with water.
- ☐ Wait for it to infiltrate (could be a few hours or the next morning).
- ☐ Fill it again to the soil surface with water.
- ☐ Note the time it takes to percolate into the ground. Mostly we are looking for either:
 - “under/within 24 hours”
 - “longer than 24 hours”

Test the Soil Percolation Rate



STEP THREE: Sizing

- *Need to design the garden to be 3 – 6” deep and 20 – 30% the size of the impervious surfaces.*

Time to Drain	Impermeable Multiplier	Lawn Multiplier	Depth in inches
within 24 hours	0.2	0.05	4-6
longer than 24 hours	0.3	0.1	3

Example

If the impermeable surface draining into my rain garden is 750ft² and my test hole takes longer than 24 hours to drain

$$750 \times .3 = 225\text{ft}^2$$

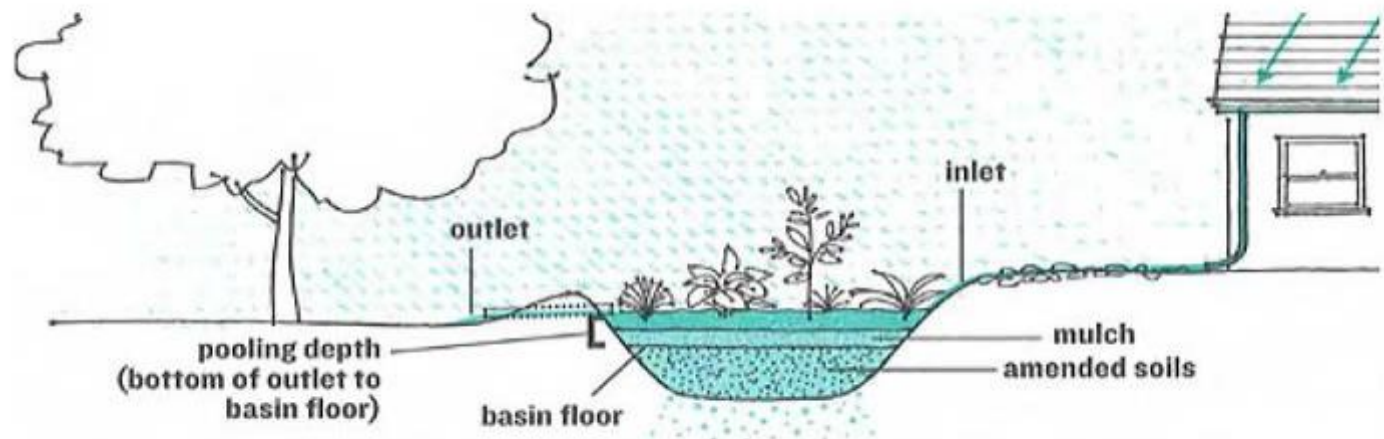
Then my rain garden must be at least:

225ft² in size & 3” deep*.

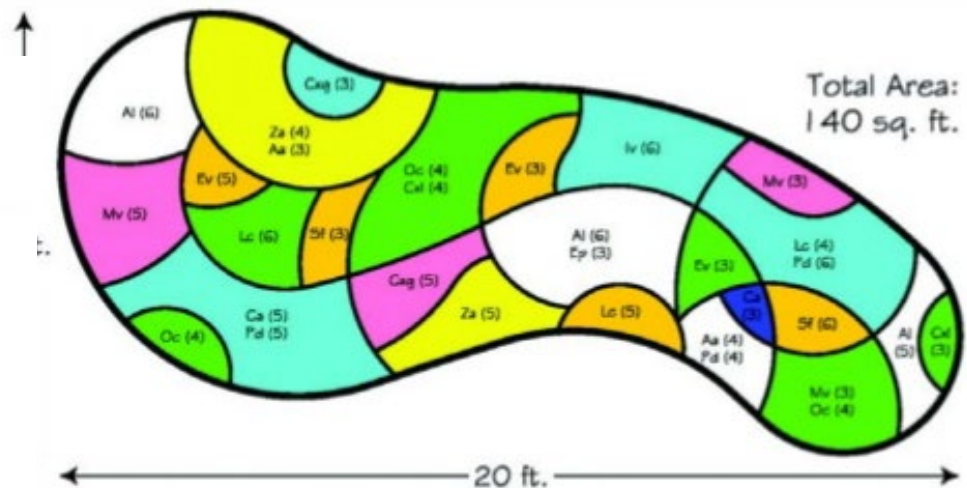
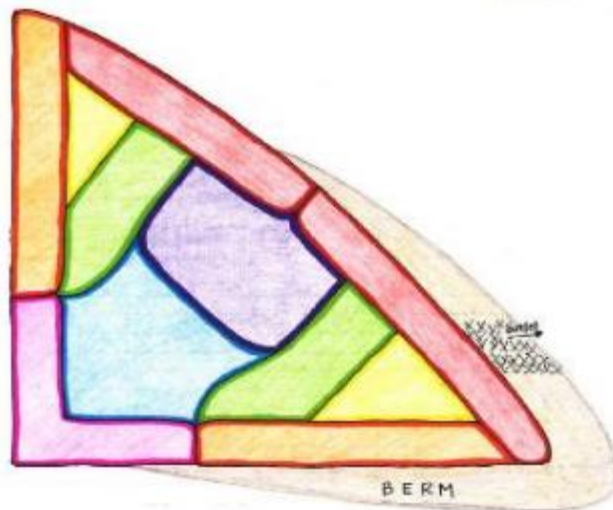
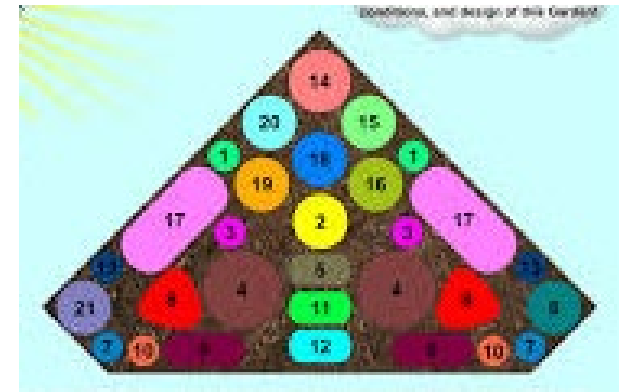
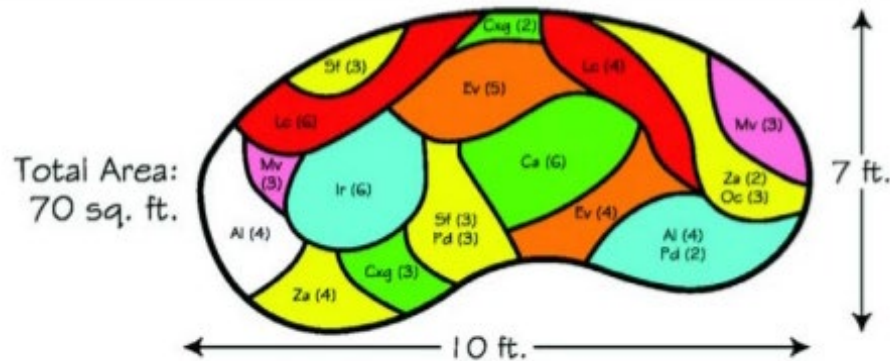
The dimensions could be 22.5’x10’ or 15’x15’.

STEP FOUR: Designing

- Inlet point
- Wide, flat bottomed depression
- Ponding (deepest part of depression)
- Berm
- Overflow or exit



STEP FOUR: Designing



Some tools you might need



Bucket



Hose



Sod cutter



Shovel



Garden rake



Wheelbarrow



Hacksaw



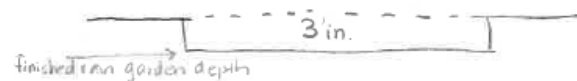
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STEP FIVE: Ground Preparation

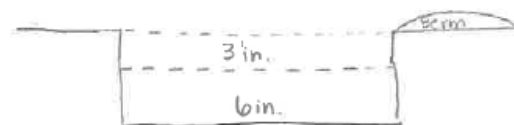
- Mark garden shape (flags, spray paint)
- Remove and save sod
- Remove soil to desired level and save
- If soil drained poorly, dig 6” deeper and add soil amendments (compost, topsoil)
- Bring back up to desired level
- Loosen soil to prepare for planting
- Install berm with sod and/or removed soil



- ① Dig 3" to rain garden depth. Deposit topsoil on tarp.



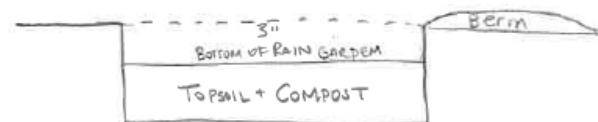
- ② Dig 6" below finished rain garden depth



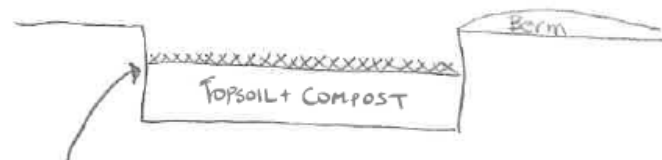
Use the 6" to build the berm



- ③ Mix the 3" of topsoil with compost to fill the bottom 6" of your rain garden hole



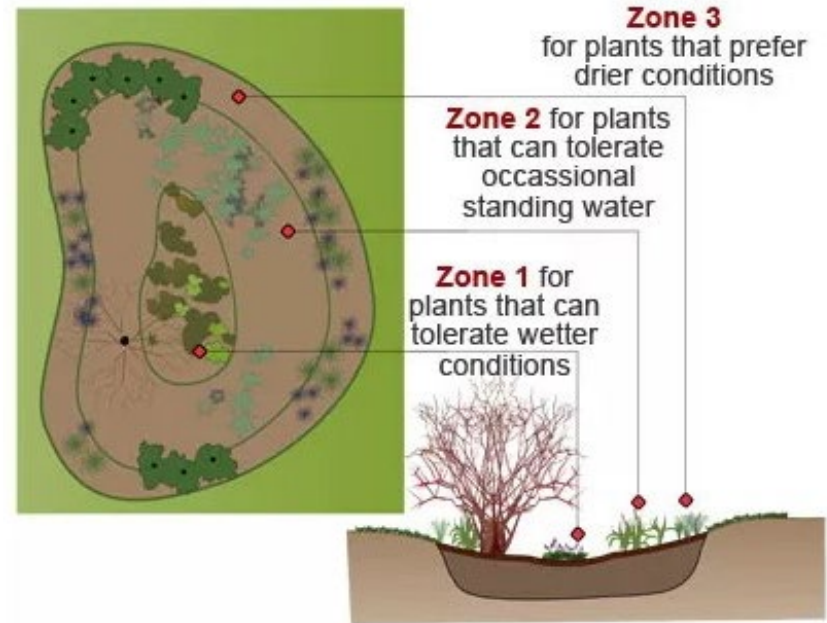
Compact the soil mix, check to make sure bottom is level.



- ④ Apply mulch and plant!

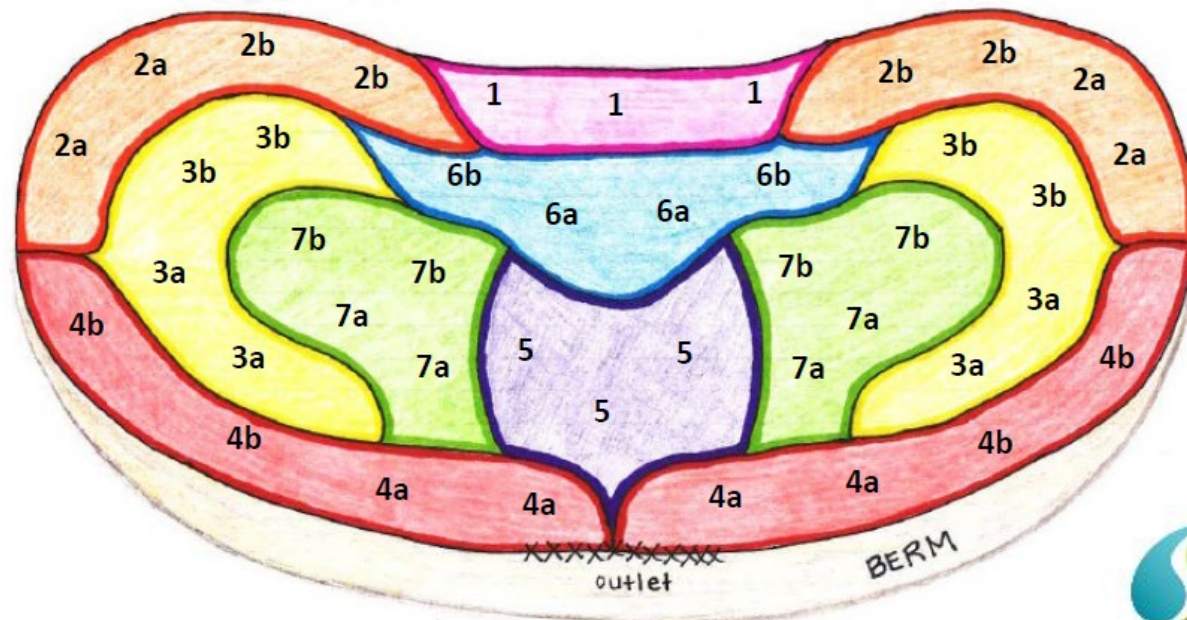
STEP SIX: Plant Design

- Moisture tolerances
- Sun preferences
- Plant size
- Plant aggressiveness
- Seasonal interest
- Bloom color
- Birds & butterflies
- Have fun!



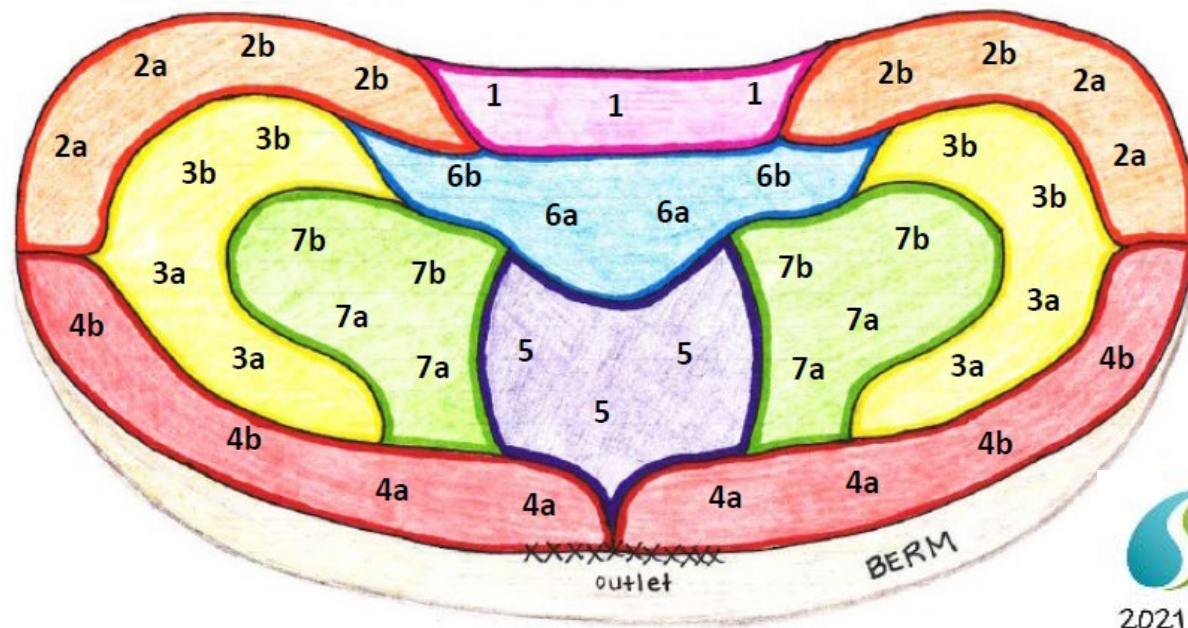
STEP SIX: Plant Design

Zone	Locations for planting within the garden	Soil Condition-Moisture	Anticipated Water Depth	Recommended Plant Height
1	Back edge of the garden	Dry to average soil moisture	Shallow water levels	Tall plants
2	Side edges of the garden	Dry to average soil moisture	Shallow water levels	Medium height plants
3	Side slopes of the garden	Average to moist soil	Medium water levels	Medium height plants
4	Front edge of the garden	Dry to average soil moisture	Shallow water levels	Shorter plants
5	Center of the garden	Moist soil	Deepest water levels	Medium to tall plants
6	Center of the garden	Moist soil	Deepest water levels	Medium to tall plants
7	Transition zone between the base and sides of the garden. This is the lower portion of the sides of the garden	Average to moist soil	Medium to deep water levels	Average height plants



STEP SIX: Plant Design

Site B: Front East Area	Average Bloom Period																																				
COMMON NAME	March				April					May					June					July					August				September				October				November
Lance-leaved Coreopsis, <i>Coreopsis lanceolata</i>																																					
Hairy Penstemon, <i>Penstemon hirtus</i>																																					
Rattlesnake Master, <i>Eryngium yuccifolium</i>																																					
Prairie Sundrops, <i>Oenothera pilosella</i>																																					
New England Aster, <i>Symphyotrichum novae-angliae</i>																																					
Wild Petunia, <i>Ruellia humilis</i>																																					
Purple Prairie Clover, <i>Dalea purpurea</i>																																					
Marsh Marigold, <i>Caltha palustris</i>																																					
Shooting Star, <i>Dodecatheon meadia</i>																																					
Great Blue Lobelia, <i>Lobelia siphilitica</i>																																					
Wild Hyacinth, <i>Camassia scilloides</i>																																					
Blue Vervain, <i>Verbena hastata</i>																																					



STEP SIX: Plant Design

- Tall plants in back, short plants in front
- Stick tags next to each plant



- *Sesame Street* principle: plant likes things next to like things so you don't weed the wrong things



STEP SEVEN: Maintenance



- Same as vegetable or flower garden
- Keep 3” mulch layer
- Water, if necessary (1” a week for first growing season)

Sarah's Experience

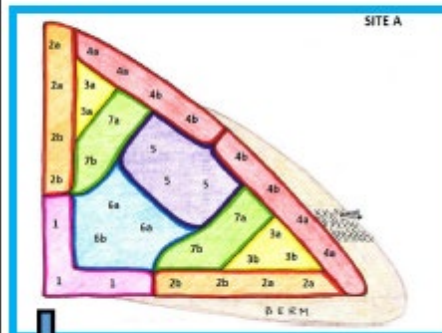


Partnership Connection

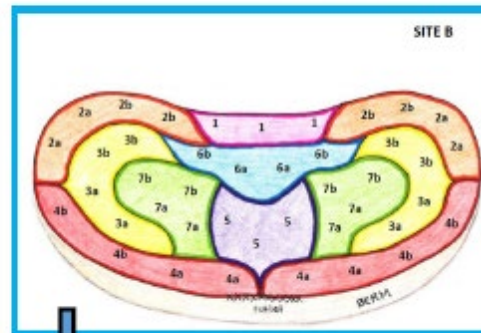
Site A: Back West Corner



Site B: Front East Area



Zone	Plant Name	Color
1	Columbine, <i>Aquilegia canadensis</i>	Red / Yellow
2a	Downy Skullcap, <i>Scutellaria incana</i>	Blue
2b	Heart-leaved Aster, <i>Symphyotrichum cordifolium</i>	Blue
3a	Foamflower, <i>Tiarella cordifolia</i>	White
3b	Mistflower, <i>Conoclinium coelestinum</i>	Blue / violet
4a	Wild Geranium, <i>Geranium maculatum</i>	Lavender
4b	White Snakeroot, <i>Ageratina altissima</i>	White
5	Marsh Marigold, <i>Gallthia palustris</i>	Yellow
6a	Grey's Sedge, <i>Carex grayi</i>	n/a
6b	Brown Fox Sedge, <i>Carex vulpinoidea</i>	n/a
7a	Virginia Bluebell, <i>Mertensia virginica</i>	Pink / Blue
7b	Hairy Wood Mint, <i>Biophila hirsuta</i>	White



Zone	Plant Name	Color
1	Lance-leaved Coreopsis, <i>Coreopsis lanceolata</i>	Yellow
2a	Hairy Penstemon, <i>Penstemon hirsutus</i>	Pink / Purple
2b	Rattlesnake Master, <i>Eryngium yuccifolium</i>	Green / White
3a	Prairie Sundrops, <i>Oenothera pilosella</i>	Yellow
3b	New England Aster, <i>Symphyotrichum novae-angliae</i>	Purple
4a	Wild Petunia, <i>Ruellia humilis</i>	Purple
4b	Purple Prairie Clover, <i>Dalea purpurea</i>	Purple
5	Marsh Marigold, <i>Gallthia palustris</i>	Yellow
6a	Shooting Star, <i>Dodecatheon meadia</i>	White
6b	Great Blue Lobelia, <i>Lobelia siphilitica</i>	Blue
7a	Wild Hyacinth, <i>Camassia scilloides</i>	White - Blue
7b	Blue Vervain, <i>Verbena hastata</i>	Blue



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2021 District of the Year

Tonight in Review

- Take initiative for backyard conservation
- Repair the water connection
- Add value to your home
- Get your hands dirty

Thank you for attending!



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