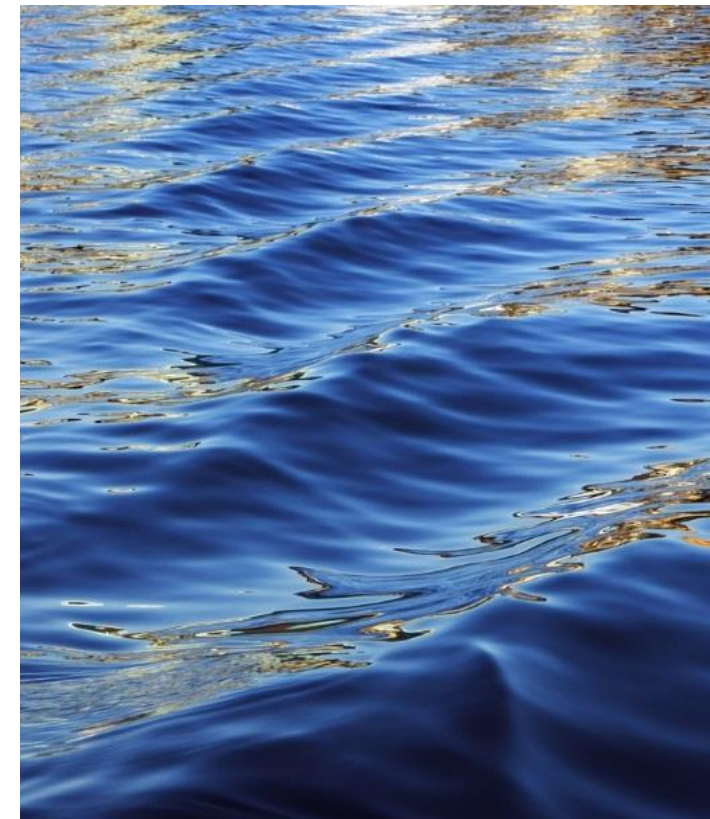




LEHIGH COUNTY CONSERVATION DISTRICT



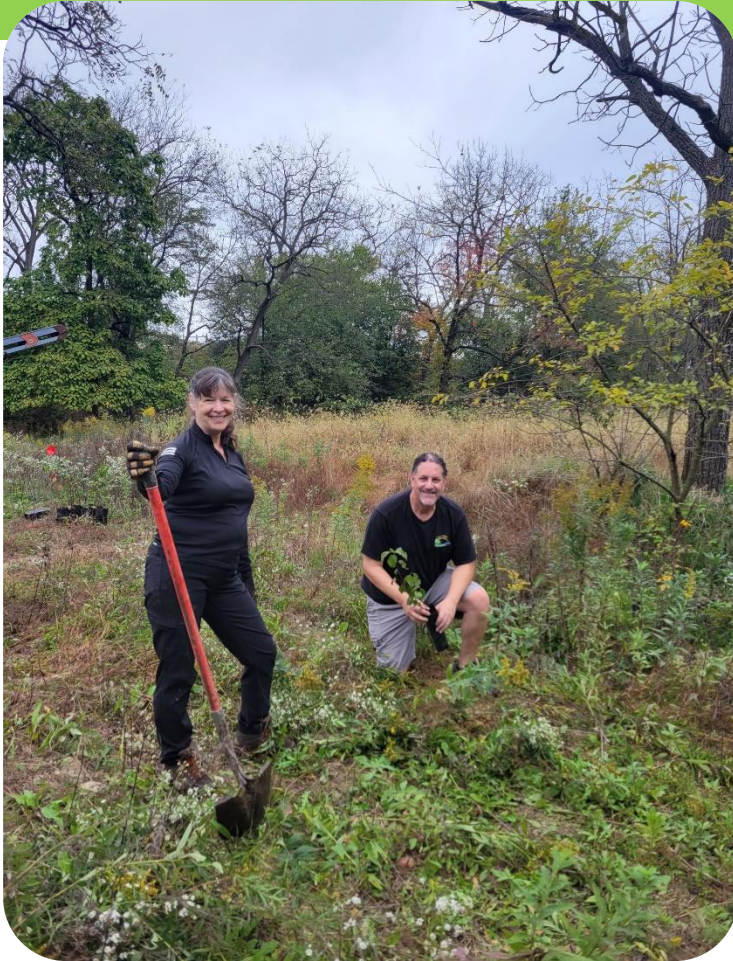
Financial and other support for this project is provided by the Pennsylvania Association of Conservation Districts, Inc. through a grant from the Pennsylvania Department of Environmental Protection under Section 319 of the Clean Water Act, administered by the U.S. Environmental Protection Agency.



Upper Saucon Township Rain Garden Workshop

Upper Saucon Township Environmental Advisory Council

The Lehigh County Conservation District employs 16 staff that address a variety of resource management concerns: agricultural nutrient management, soil conservation, erosion and sediment control from urban development sites, conservation education, and watershed protection.



75th Anniversary

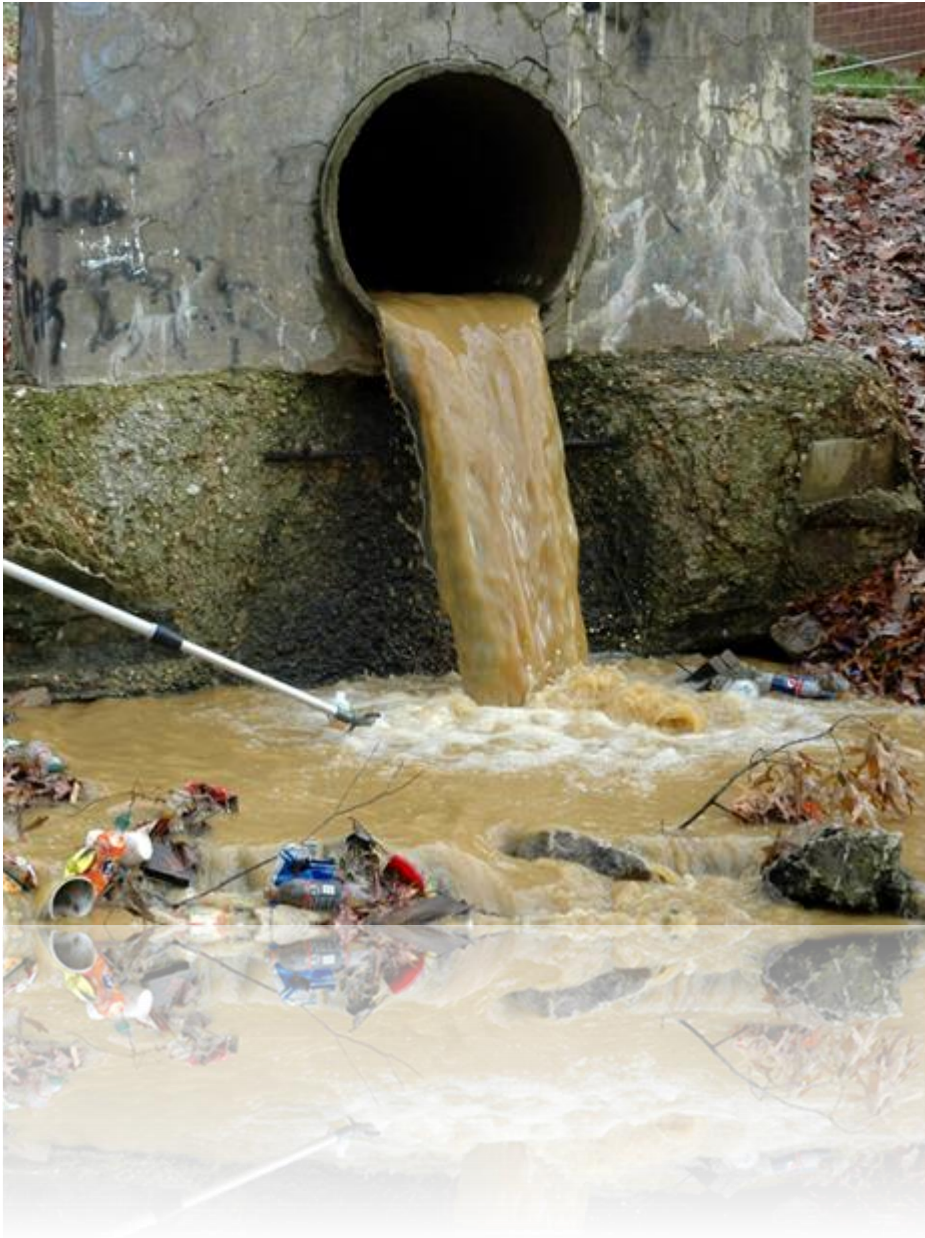
A dynamic partnership of conservation professionals providing quality service to protect Lehigh County's diverse natural resources through leadership, technical assistance, education, land protection, promotion of sustainable development, and protection of water and soil quality.

Water Quality Program





2021/10/28



Municipal Separate Storm Sewer System (MS₄)

Helping municipalities reduce pollution reaching our surface waters through storm sewer system.

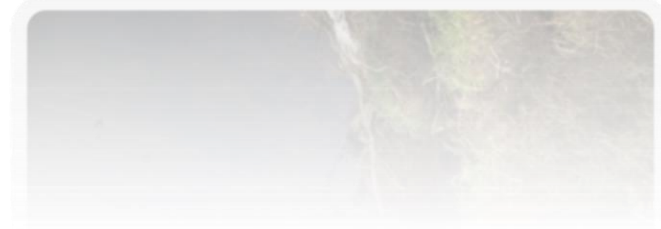


Education and Outreach



Dirt & Gravel Roads Program

10/04/2021



Vector Borne Disease Control Program



Agriculture



Roofed heavy use area and manure storage



Demonstration of planting green

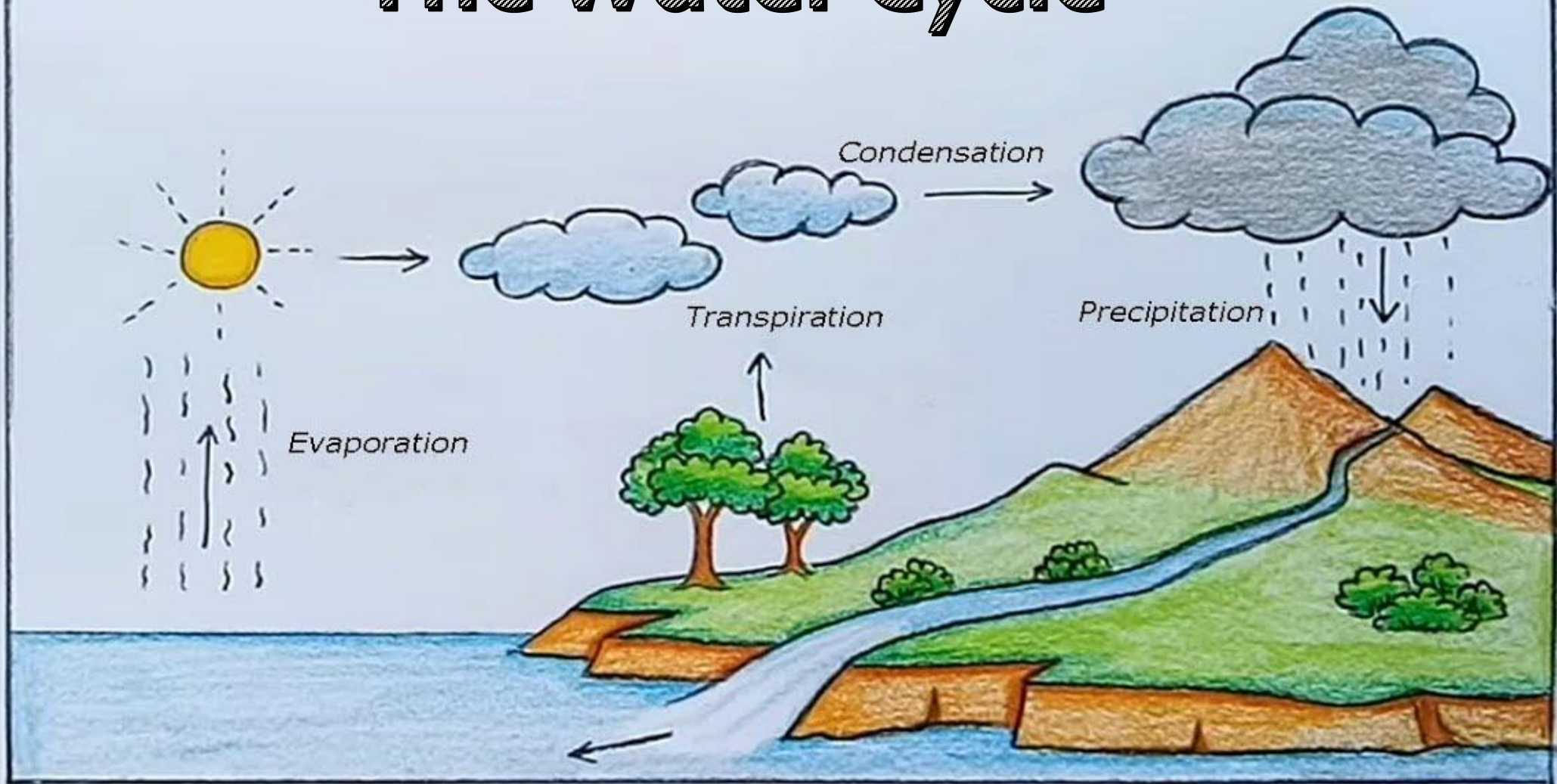
Watershed Conservation







The Water Cycle





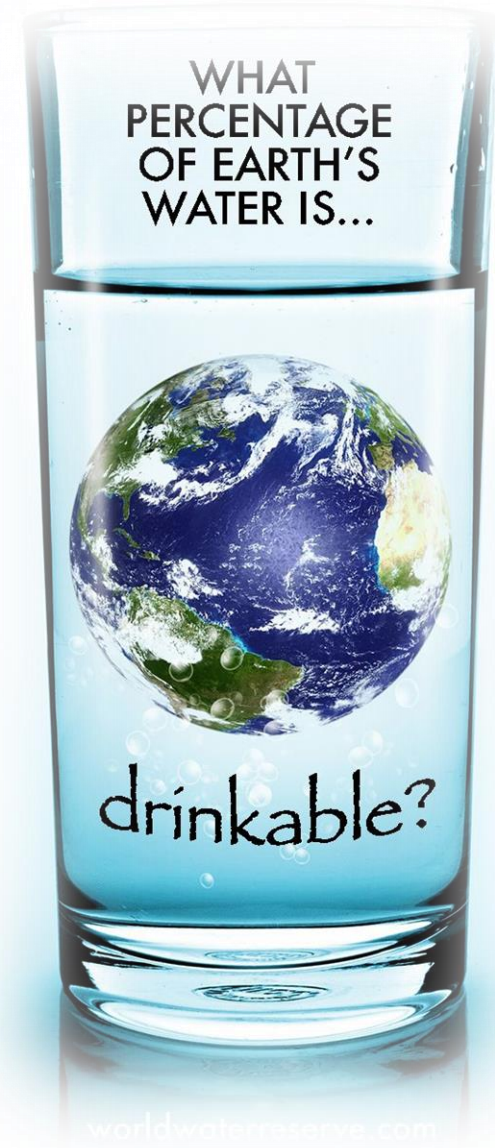
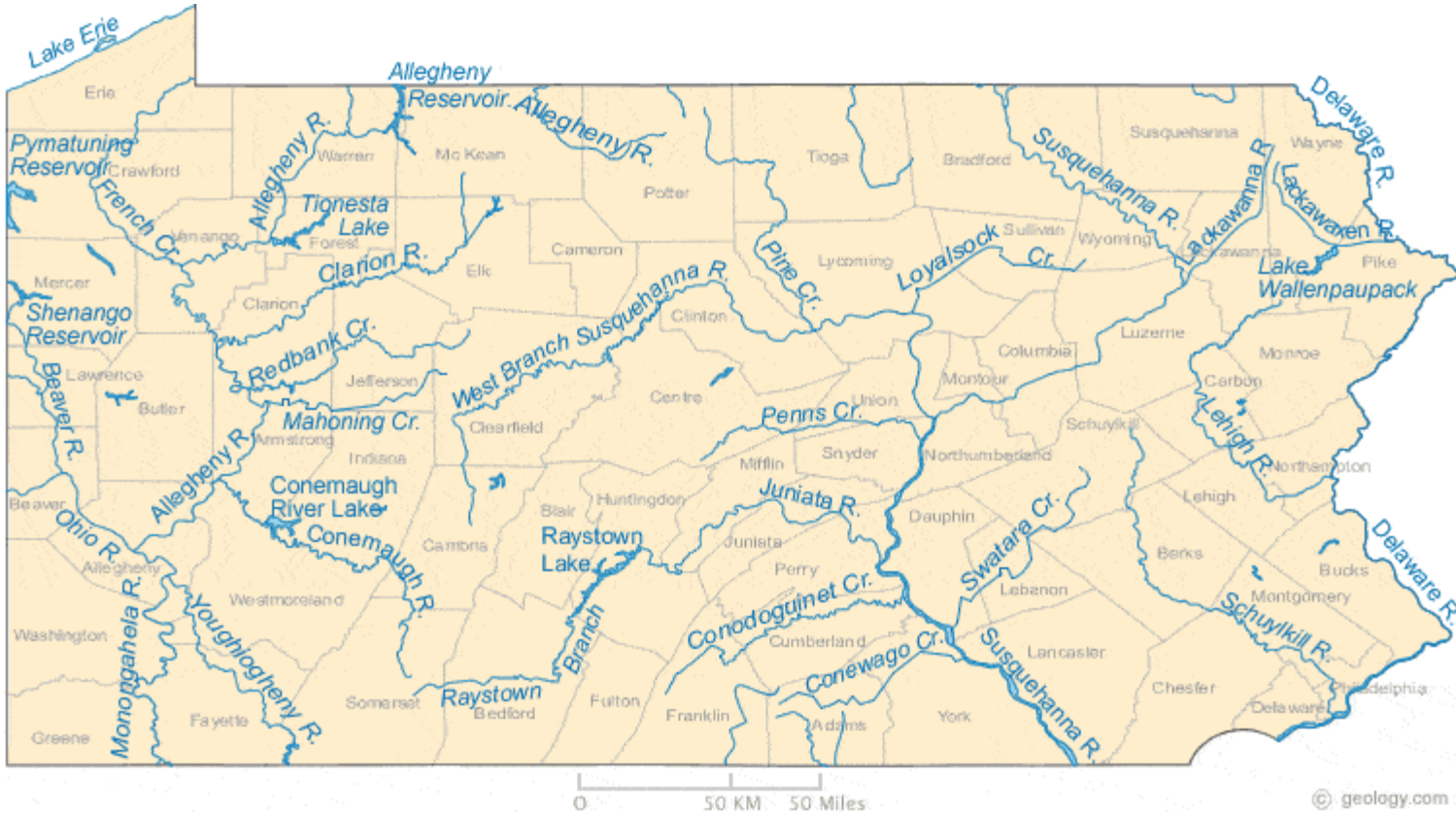




© J. Kelley, <http://SoilScience.info>









VS

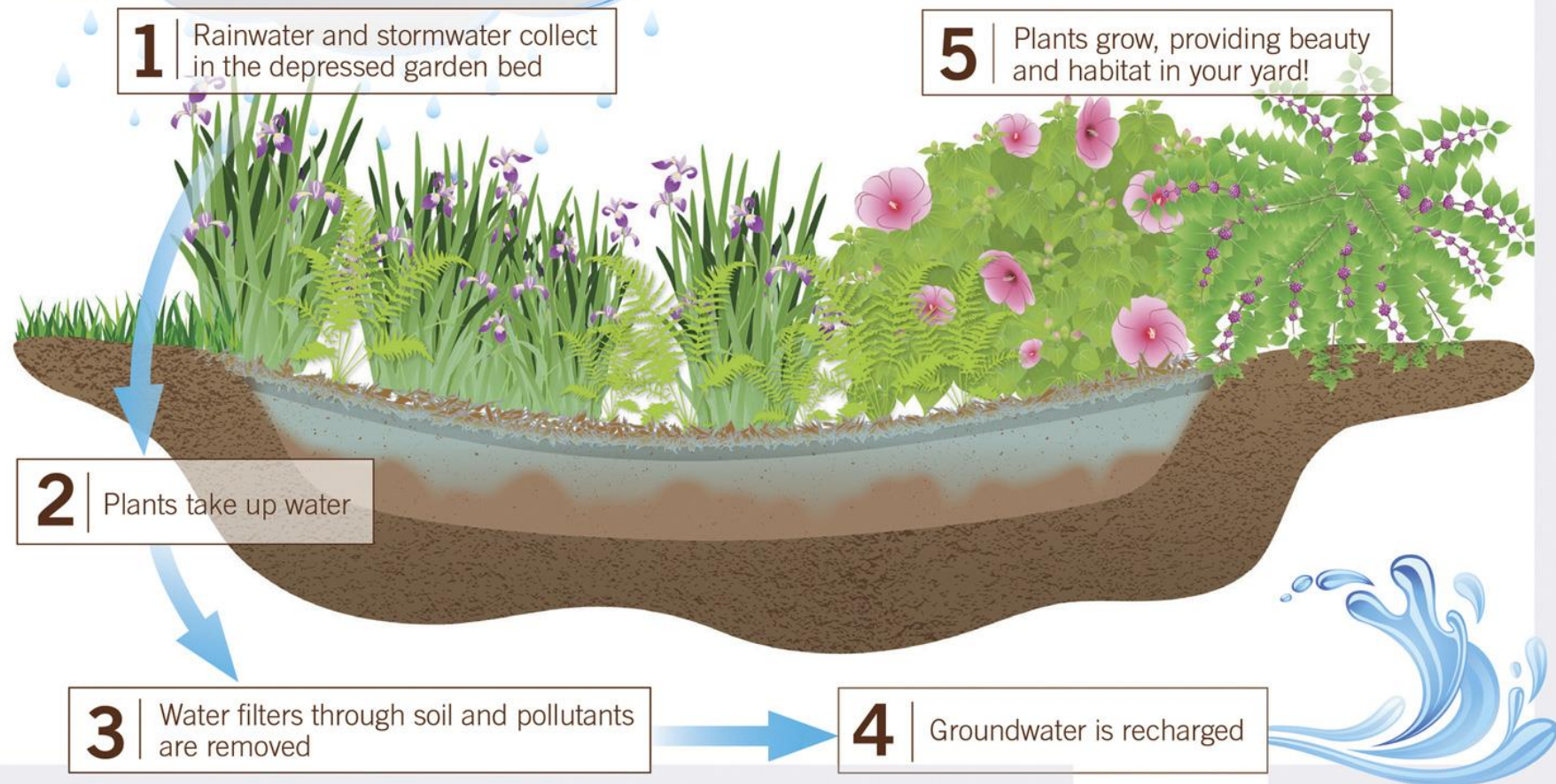


Overview

- What is a Rain Garden?
- Why Plant a Rain Garden?
- Rain Garden Design and Installation



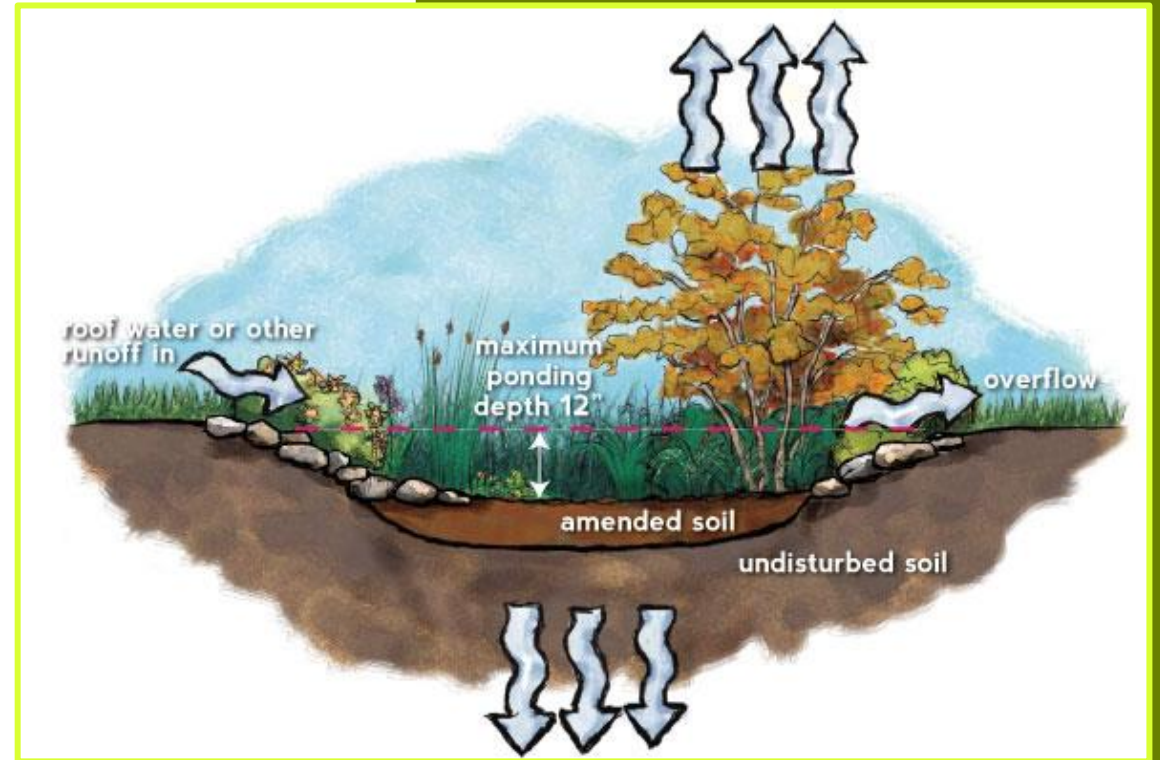
DIAGRAM OF A RAIN GARDEN



What is a Rain Garden?

- ▶ Planted, bowl-shaped depression that can handle inundation of water and periods of drought
- ▶ Captures stormwater runoff from impervious areas
- ▶ Filters and infiltrates runoff

Capture, slow, soak, filter



Why Plant a Rain Garden?

- Hold and infiltrate stormwater runoff
- Filter runoff pollution from stormwater
- Protect water quality in watershed by reducing pollutants and volume
- Increase groundwater recharge and mimic natural hydrology
- Reduce lawn chemicals and the impact of other pollutants
- Beautify a site and create habitat



Why Plant a Rain Garden?

- Protect water quality
- Reduce NPS
- Infiltrate/filter stormwater runoff
- Cool runoff
 - Slower/cooler discharge to stream
- Benefits to property
 - Attractive native plantings
 - Increase habitat value
 - Enhance pollinator habitat
 - Decrease runoff to neighboring properties
 - Increase garden enjoyment
 - Enhance sidewalk appeal
- Increase groundwater recharge-natural hydrology
- Provide habitat for beneficial insects that eliminate pest insects
- Beautify the landscape



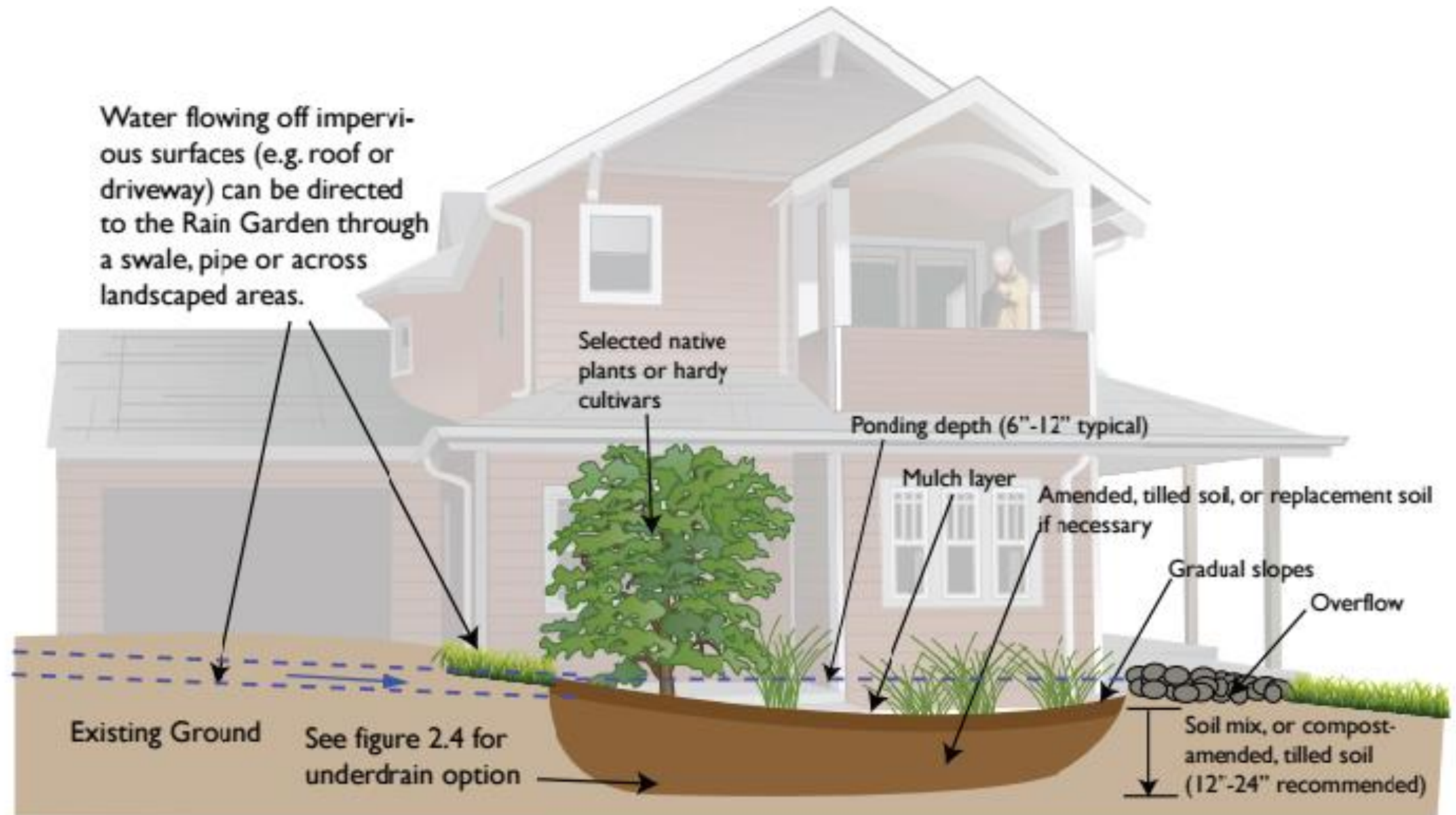


Image courtesy of the Watershed Stewards Academy Rainscaping Field Guide.

Rain Garden Design

- Choose location-Site assessment
- 3 factors to consider:
 - Amount of impervious surface draining to garden
 - Soil type (infiltration capacity)
 - Slope
 - Will determine depth of rain garden



Choose Location – Site Assessment

- Drain impervious areas
- Choose the right location- Not creating a wetland!
- Natural depressions where water already flows
- Where a downspout can be diverted to it
- Downslope from house
- Not over septic system
- At least 10 feet away from foundation (further is better)
- Area that drains-avoid areas with high water table
 - May choose area where water ponds *if* it drains relatively quickly (within 72 hours)
 - Infiltration test
- Avoid steep slopes

Calculate Impervious Area

- Determine how much runoff will drain to rain garden
 - Calculate size of impervious areas that will drain to rain garden: driveway, sidewalks, roof, etc.





Rain Garden Infiltration Test

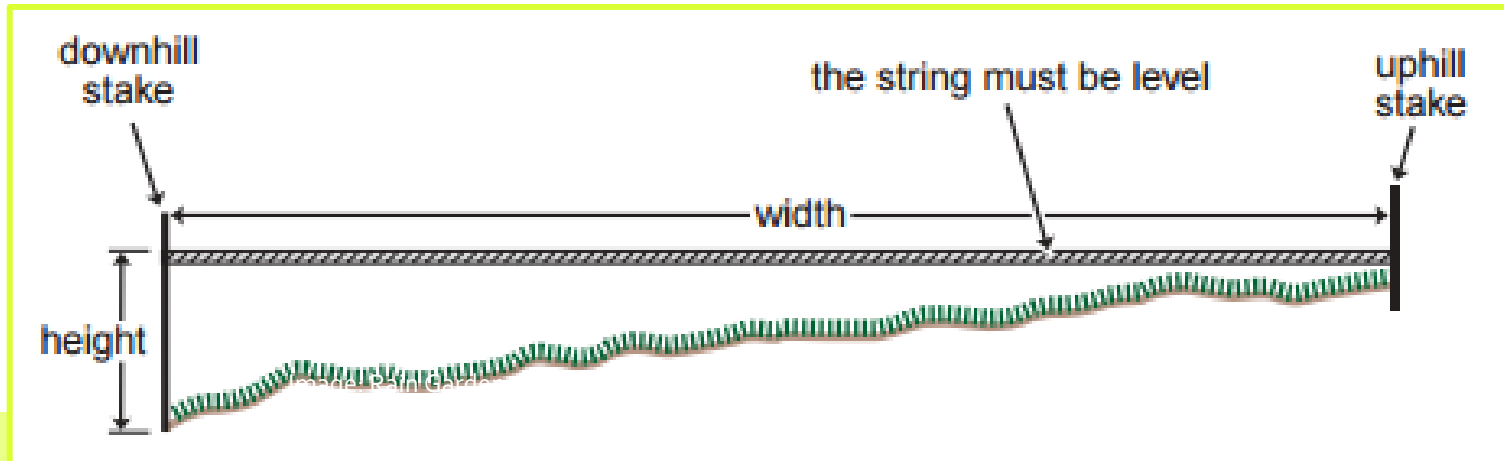
- Various methods-choose one and follow through
- Dig 6-8" deep hole where you want to install rain garden
- Presoak-Fill with water and let drain completely
- Fill with water a second time
 - Use ruler to measure how many inches drain in an hour
 - If $\geq .5$ inches/hour, ideal for rain garden
 - If $\leq .5$ inches/hour, choose another location or amend with soil with sand, topsoil, or compost
- If water does not drain within 24 hours, **choose another site**



Determine Slope-Rain Garden Depth Calculation

- Put stakes 12-15 feet apart, one uphill and one downhill
- Tie string on uphill stake and run it to downhill stake
- Use level to ensure it is horizontal
- Measure horizontal distance between two stakes
- Measure height on downhill stake from ground to string
- $(\text{Height}/\text{Width}) \times 100 = \text{slope percent}$
 - Slope < 4%, build a 4-inch deep rain garden
 - Slope between 5 and 7%, build 6 inch deep rain garden
 - Slope between 8 and 12%, build 8 inch deep rain garden
 - Slope > 12%, choose another location or use other BMPs

Avoid digging too deep as it will pond water too long



Determining Size of Your Rain Garden

- Size of impervious area
- Soil characteristics (infiltration capacity-good location or not)
- Slope (determines depth)

Area of impervious surface = area of rain garden (ft²)
depth



DESIGNING A RAIN GARDEN

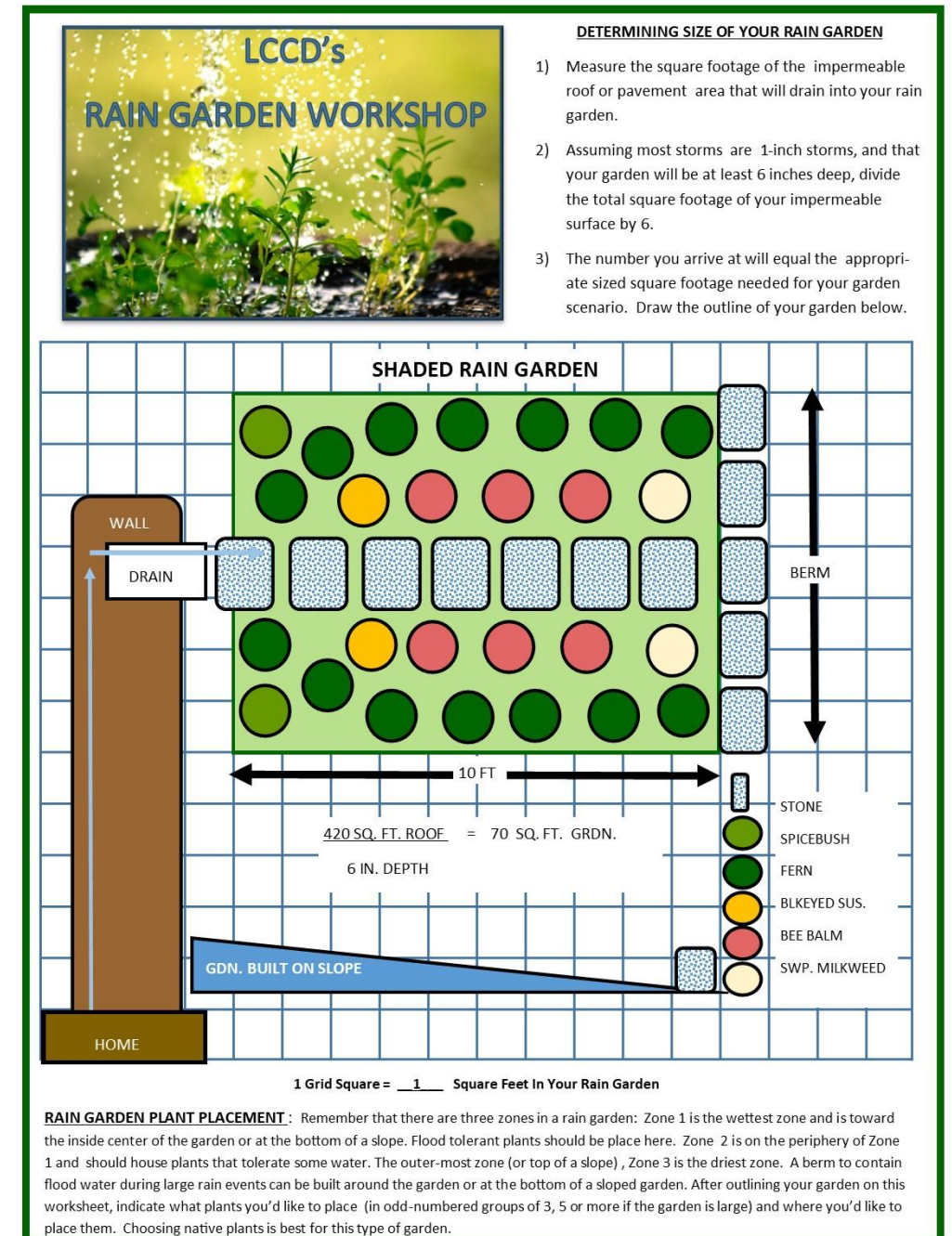
-CALCULATE GARDEN AREA

-DETERMINE LOCATION

-DETERMINE AVAILABLE SUN

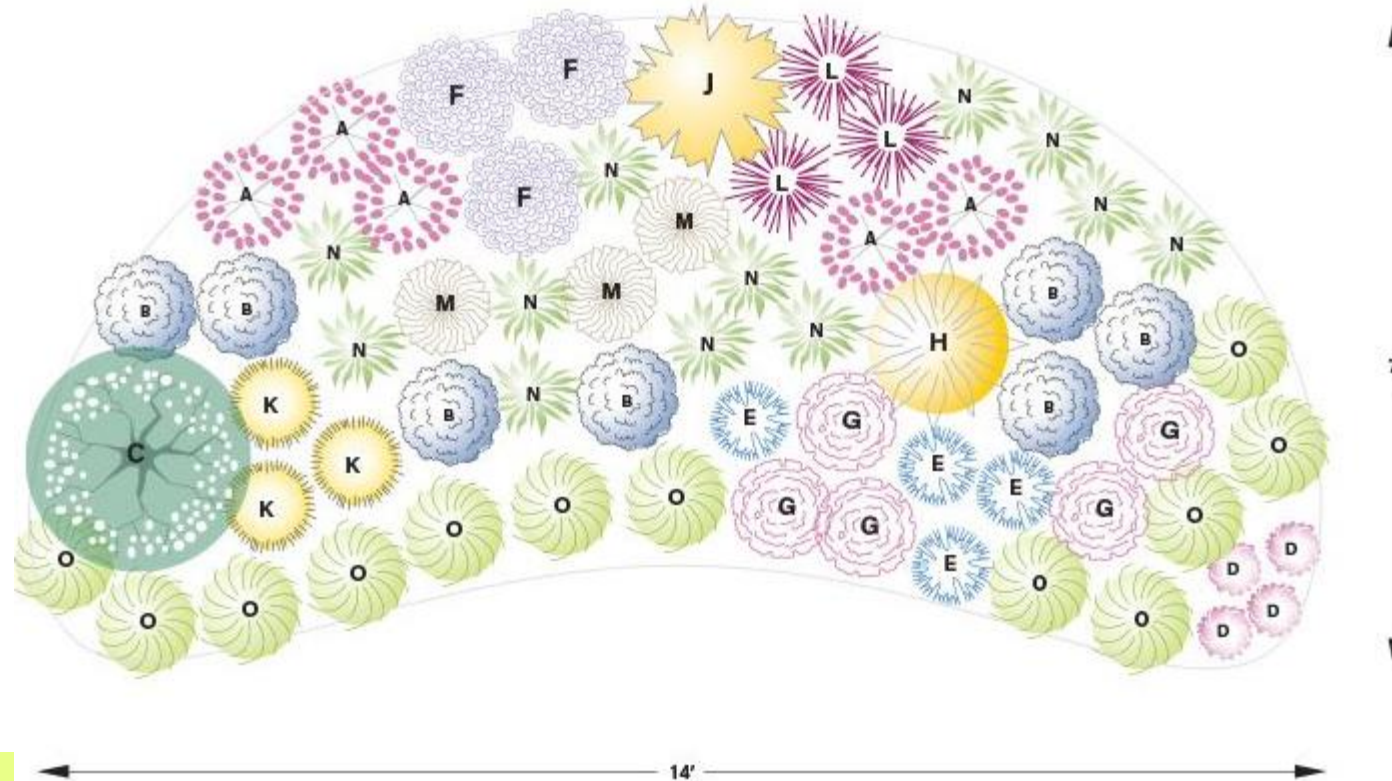
-SELECT APPROPRIATE PLANTS

-DESIGN GARDEN LAYOUT



Rain Garden Design

- Choose a size and shape that fits in your yard
- Shape
 - Kidney, tear drop, crescent shape
 - Many websites/resources offer rain garden templates
 - Rain Gardens-A How-To Manual for Homeowners PDF
 - <http://raingardenalliance.org/planting/design>
 - Ensure plant lists in templates contain native plants





**Know what's below.
Call before you dig.**

Remember septic, utility lines, etc.



Rain Garden Construction

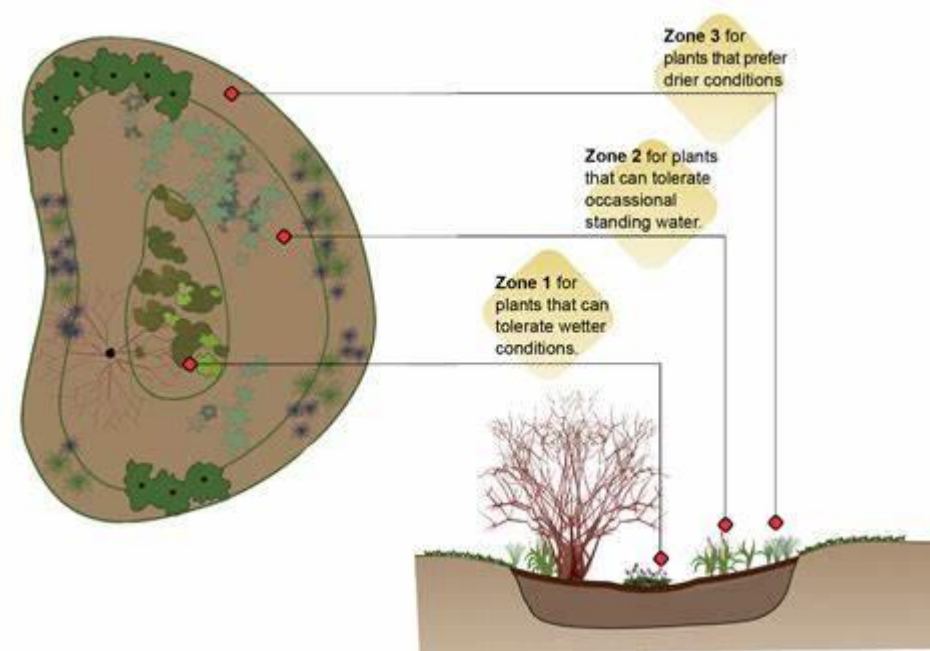


- PA One Call before you dig!
- Define perimeter with stakes/flags
- Can use string across area and level to ensure it is level
- Use extra soil from leveling to create berm at bottom of slope
- Loosen soil for plantings. May need to add soil amendments at this time if high clay content



Rain Garden Planting

- Diverse native plants with year-round interest/color
- Consider height, bloom time, color, texture
- Should be able to tolerate saturated conditions and drought
- Sedges, grasses, flowering plants, woody plants
- Can add mulch, stone, fence, etc.
- Different zones have different plants
 - Drought tolerant vs. water-loving



Plant Species Selection

Perennials and ferns

Anise hyssop	Great blue lobelia
Blazing star	Green and gold
Blue false indigo	Joe Pye weed
Blue flag iris	Mistflower
Boneset	New England aster
Bottlebrush grass	Obedient plant
Broomsedge	Sensitive fern
Butterfly weed	Soft rush
Cardinal flower	Swamp milkweed
Cinnamon fern	Switchgrass
Culver's root	Tickseed
Goldenrod	Tussock sedge



- Talk with local nursery staff to assist with your selections!

Plant Species Selection

Shrubs

Black chokeberry

Buttonbush

Elderberry

Gray dogwood

Inkberry

Ninebark

Red-osier dogwood

Silky dogwood

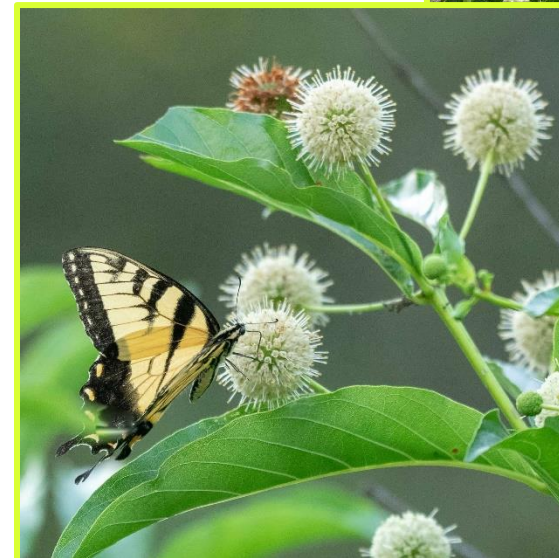
Spicebush

Sweet pepperbush

Virginia sweetspire

Winterberry

Witch hazel

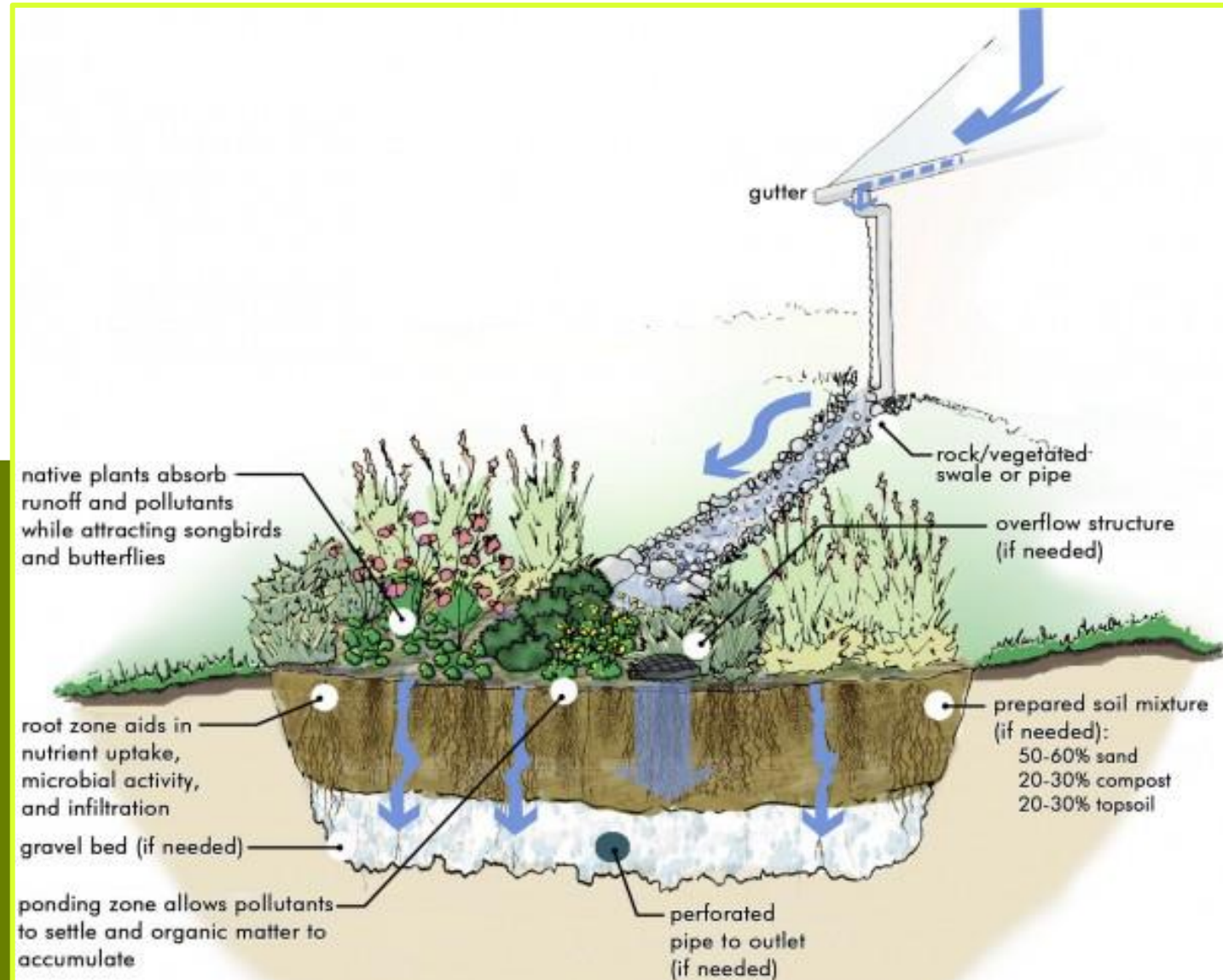






Directing Water to Garden

- Dig depressed grass trench, stone lined trench, or trench for extender pipe
- Can also rely on sheet flow
- Place stone at garden trench to reduce erosion if channelized



Rain Garden Maintenance

- Most maintenance in first two-three years
- Water just like any other garden after planting for the first year to establish healthy, deep roots
- Native plants will begin to outcompete weeds in 3rd year and beyond
- Weeding/Invasive removal
- Hardwood mulch
- Sediment removal
- Revegetate-after first year

Rain Garden Limitations & Considerations



- Water should drain within 72 hours
- Need to pick good location to avoid extended ponding
- Planning/design can be time-consuming
- Materials and construction may be costly
- May not have enough room to install desired size garden
- Rain garden seed mixes get more weeds/invasives
- Can create a “treatment train” with multiple practices (i.e. rain barrel overflows to rain garden with a pollinator garden on the downslope side).
- Check with your municipality for regulations/ordinances!

Additional Resources



- Raingardenalliance.org
- Montgomery County Maryland Rainscapes – Rain Garden Resources
- Rain Gardens: A How-To Manual for Homeowners (University of Wisconsin Extension)
- <http://www.stormwater.allianceforthebay.org/yard-design>
- Nemo.uconn.edu



Thank you!





Submit your evaluation form to
Laura Hopek at
Lhopek@LehighConservation.org

You are invited...

Rain Garden Open House

Wednesday, April 13, 2022

6pm – 7:30pm

Upper Saucon Township



THANK YOU!

LEHIGH

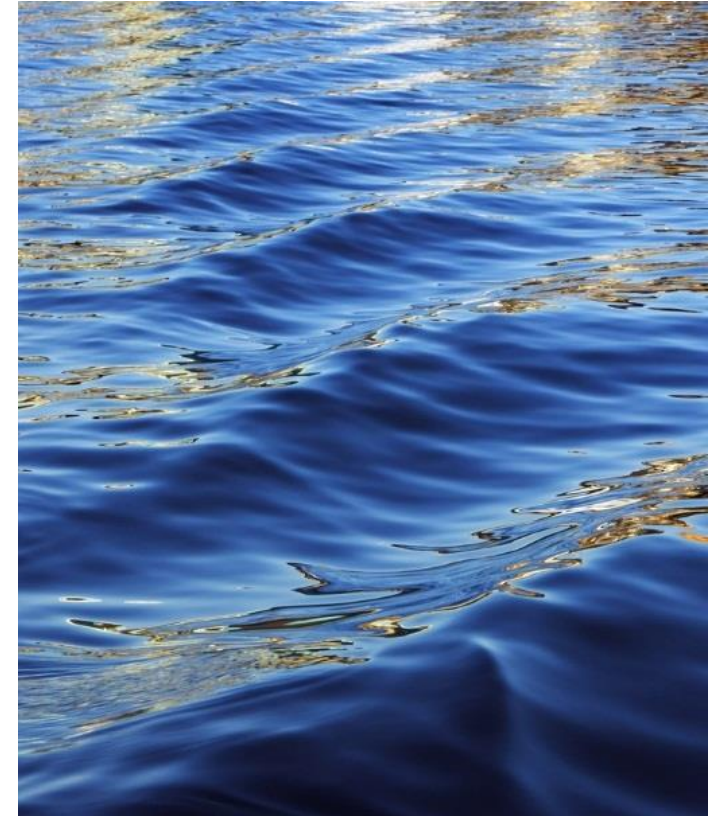
COUNTY

CONSERVATION

DISTRICT



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