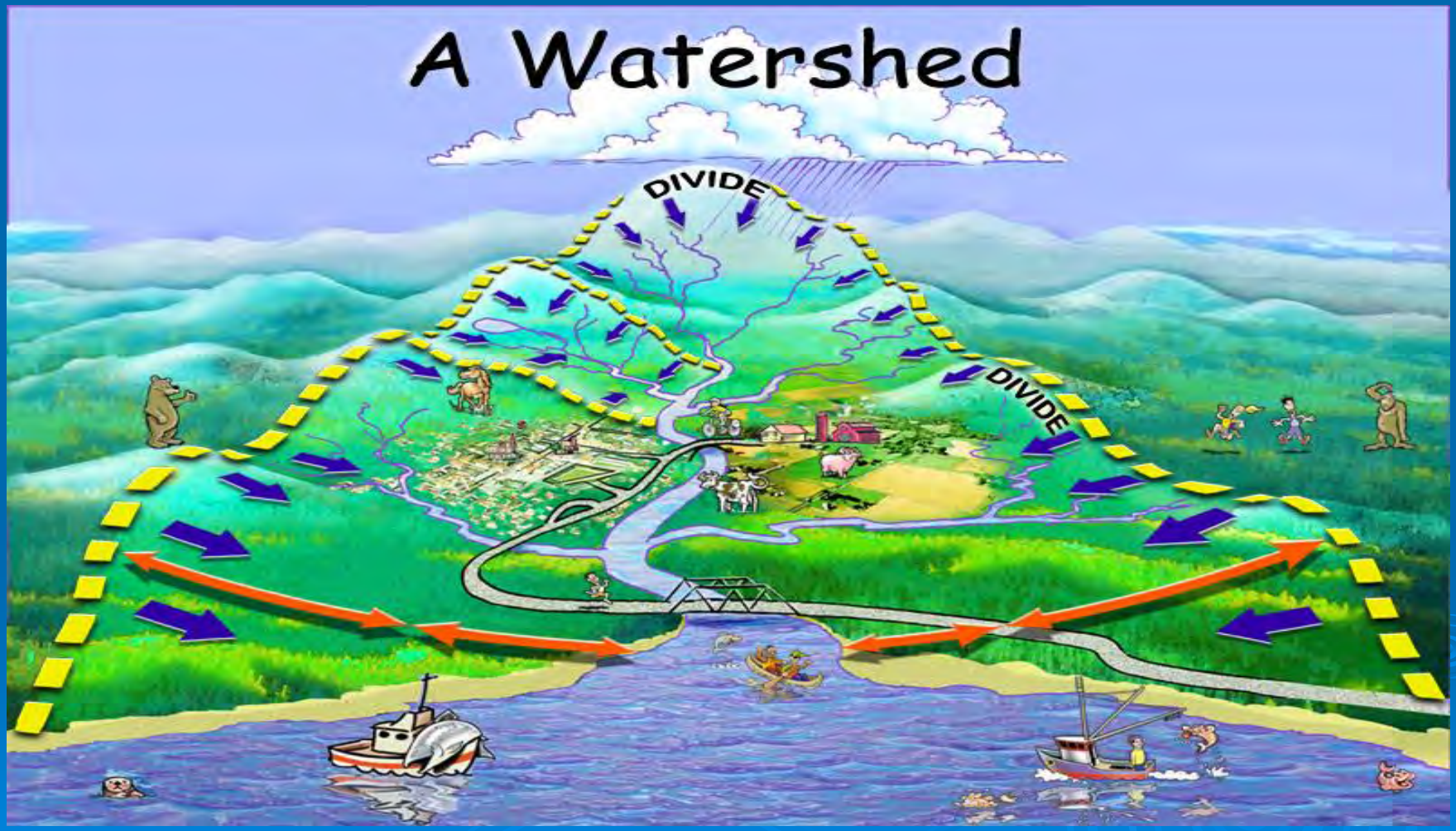
Healthy Watershed Practices

Summit County Soil and Water Conservation District

- Mission Statement:
- "To provide local leadership and technical assistance for innovative programs to conserve soil, improve water quality, and enhance the natural resources of Summit County.

Watershed Conservation



Watershed

- The territory for every stream, lake, or pond, from which the stormwater flows.
- Rain falls on every part of the watershed.
- How clean the water is when it reaches the lower levels, depends on the condition of the ground that it flows across.
- Flooding can be prevented by conservation practices.

Stormwater Flooding

Community Cooperation

- Watershed boundaries cross community boundaries such as cities, counties, villages and townships.
- Watershed based storm water management requires cooperation between neighboring communities.
- Every conservation practice is multiplied many times over in results to save our environment.

Man Made Structures

Surface Runoff

- Huge volumes of runoff flow over impervious surfaces.
- Overland flows carry pesticides,motor oil and other pollutants to streams and lakes.
- Sediments foul surface waters.
- Aquatic plants and animals die.
- One city block generates nine times the runoff of a wooded area of the same size.

Nature’s Blueprint----------Man’s Footprint

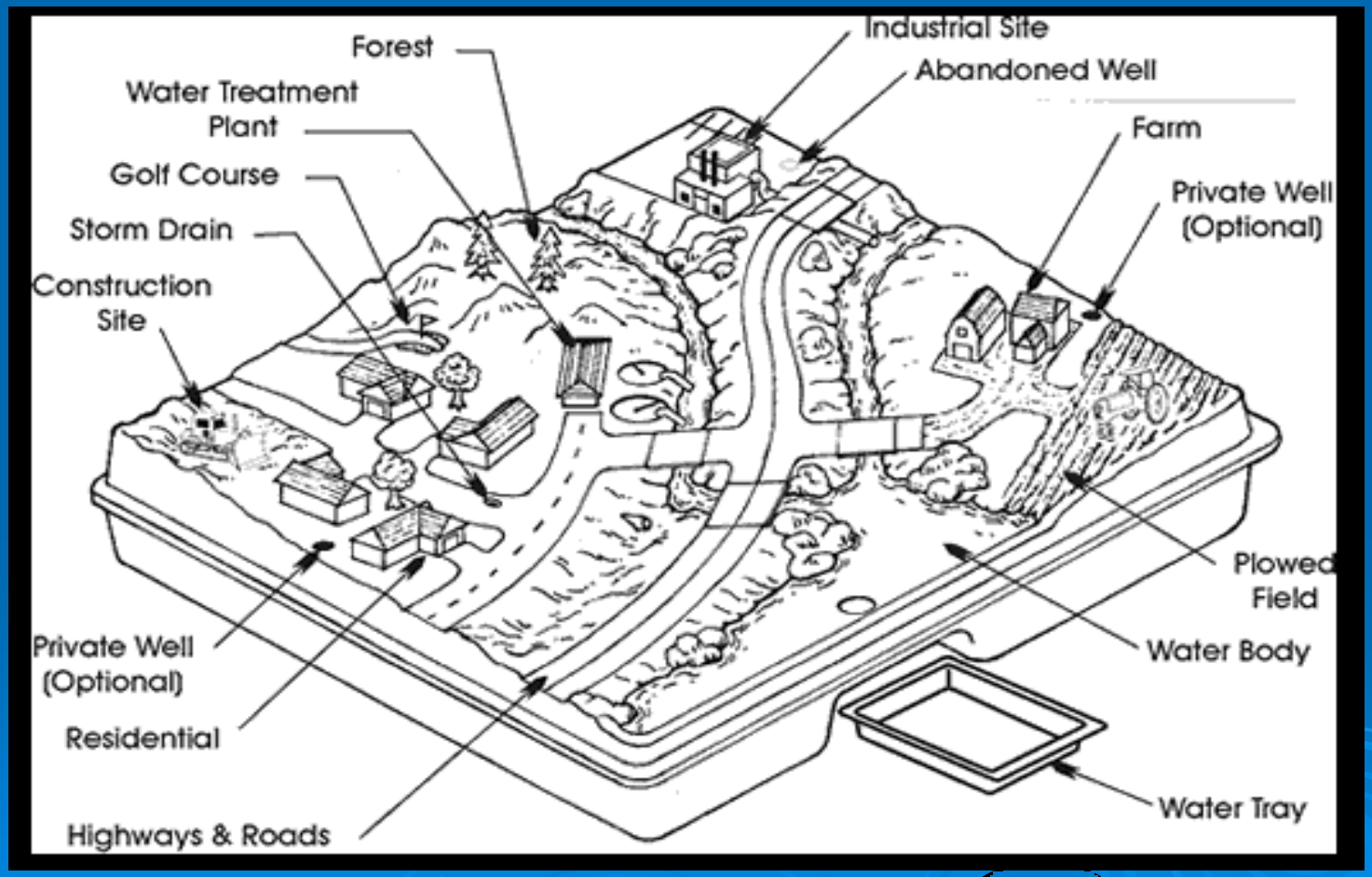
Land use changes affect water quality and quantity.

Natural Forest Floor

Water Absorption

- Natural landscape has little runoff.
- Soil and leaf litter act as a sponge, absorbing most rainfall.
- Plant roots filter out toxins and contaminants.
- Plants hold the soil in place and prevent erosion.

Helping Your Watershed by Building Your Own Raingarden



Backyard Rain Garden

Site Design

Good for low lying areas where runoff from roof and driveway collects

Soil

Sandier, well draining soil preferred

Plants

Native plants that prefer wet conditions

Want More Information?
Visit http://www.bae.ncsu.edu/topic/raingarden

DONORS

North Carolina Cooperative Extension
N.C. Department of Environment and Natural Resources
Logan's Trading Co.

NCDENR

Before and After

Photos by Roger Bannerman

Create Your Own Rain Garden

Characteristics of a Raingarden

Shallow depression in your yard.

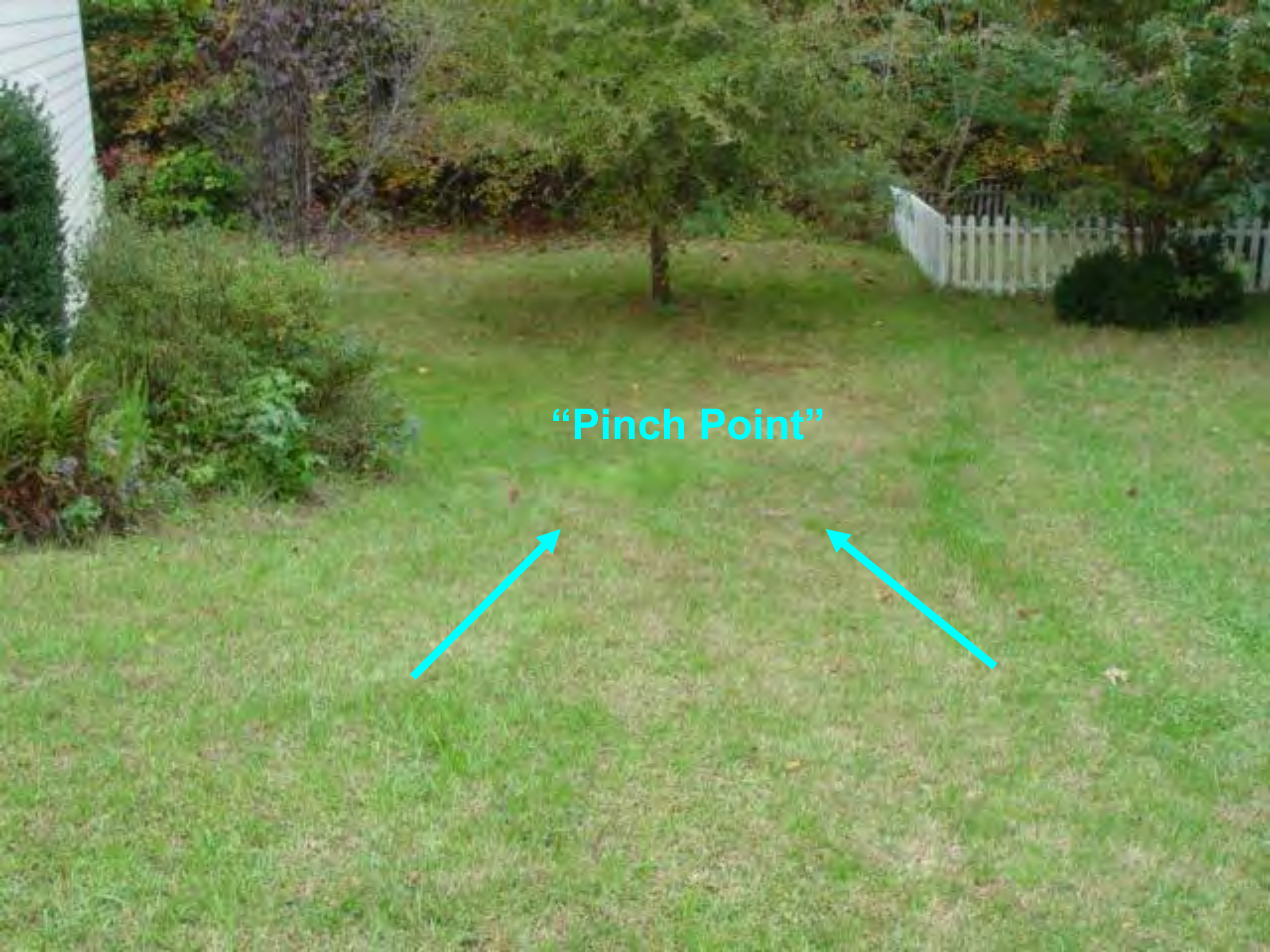
- Planted with native, native wetland, and native prairie, grasses and wildflowers.
- Popular new type of perennial garden.
- Strategically located to capture runoff from impervious surfaces, such as roofs, driveways, and patios.

Raingardens

- Beautify your property.
- Create habitat for wildlife such as small mammals, birds and butterflies.
- Absorb water, sifting out toxins.
- Reduce runoff and erosion.
- Protect surface and groundwater quality.
- Prevent flooding.
- Prevent stormwater pollution.
- Boost community compliance with phase II non-point source pollution regulations.
- Enhance property values.

Making Your Rain Garden

- Observe your yard during a rainfall.
- See where the water flow begins, and ends up.
- Plan to install your garden where it will capture the most rain water runoff.


“Pinch Point”

Garden Location

Place your garden between runoff source and destination.

We want to intercept water before it reaches surface waters or low spots!

Garden Location

Siting guidelines:

- >10 feet from house foundation or wellhead
- > 25 ft from septic system drain field
- Away from utility lines
- In full to partial sun if possible

Garden Timing

- Add garden after other construction is finished.

- Planting best done between May and September.

Soil Evaluation

Soils and Drainage

- Signs of an impermeable soil
  - Ponding water
  - Wetland soils – grey with areas of brown color
  - Water remains after two days of no rainfall.

Design as a Backyard Wetland!

Wetland Soils

Backyard Wetland

What is it?

- An area where the soil is saturated or covered with water for 2-3 weeks during the growing season.

- Located in spots where water collects much faster than it drains.

Backyard Wetland

- Install in an area where there is a naturally occurring wet spot or drainage way.
- Can be as simple as installing wetland plants in the wet area.

Sizing your Rain Garden

How much runoff is coming from impervious areas?

Sizing Rain Gardens

- Roof Area
- Driveway Area
- Total Impermeable Drainage Area

- Depth → Dimensions
  - Ponding depth 6” – Divide Impermeable area by 20
  - Ponding Depth 3” – Divide impermeable area by 10

- Use chart: Sizing Your Rain Garden

Sizing Chart

Impermeable Surface Area	Required Size of Rain Garden (6” deep)	Potential Rain Garden Dimensions (ftXft)	Required Size of Rain Garden (3” deep)	Potential Rain Garden Dimensions (ftXft)
800 ft^2	40 ft^2	4X10, 5X8, 6X7	80 ft^2	7X12, 8X10, 9X9
1000 ft^2	50 ft^2	5X10, 6X8	100 ft^2	7x15, 10X10
1200 ft^2	60 ft^2	4X15, 5X12, 6X10, 8X8	120 ft^2	10X12, 8X15
1400 ft^2	70 ft^2	5X14, 7X10	140 ft^2	10X14, 7X20
1600 ft^2	80 ft^2	7X12, 8X10, 9X9	160 ft^2	8X20, 10X16
1800 ft^2	90 ft^2	6X15, 7X13, 8X12, 9X10	180 ft^2	9X20,10X18, 12X15

Sizing Example

EXAMPLE: A house is 60 feet
by 60 feet.

Based on owner estimation:

- 25% of the roof area
is draining to the downspout.

- The driveway area draining
to the rain garden is 500 square feet.

For a desired 6 inch ponding depth, what size should the rain garden be?

Sizing Example

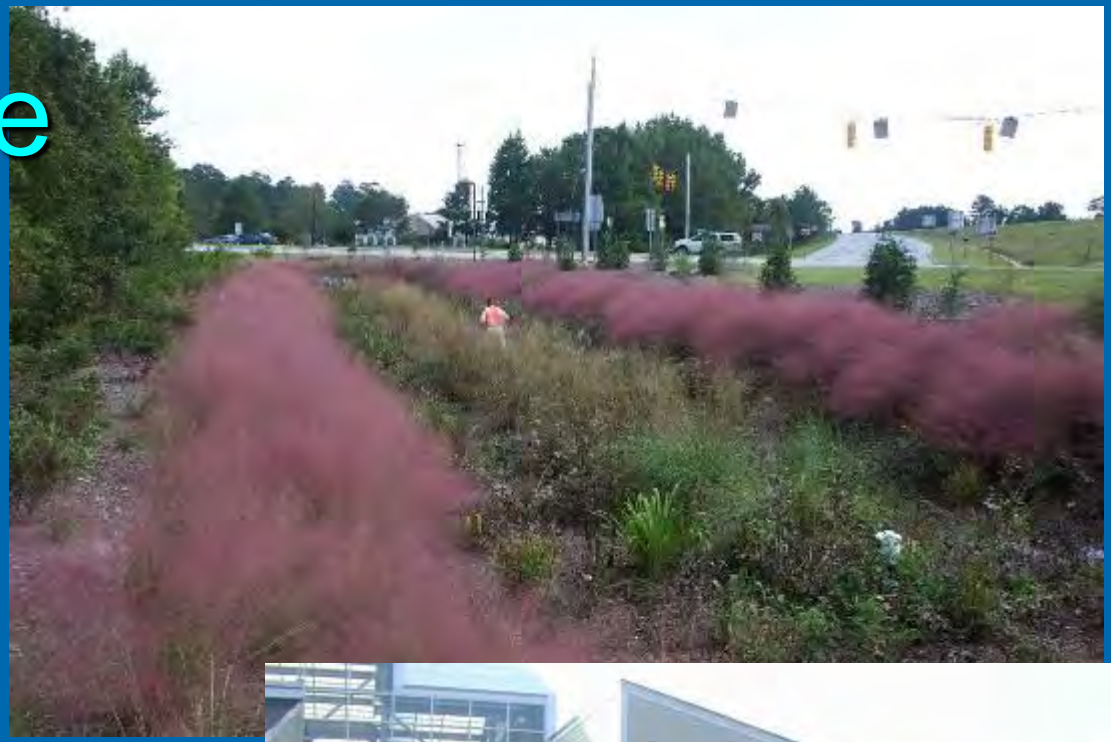
- Roof area: 60 X 60 = 3600 sq. ft.
- ¼ of the flow to downspouts: (3600 sq.ft) X 25% = 900 sq.ft
- Roof area plus driveway: 900 + 500 = 1400 sq. ft
- Divide square footage by 20: 1400/20 = 70 sq. ft.

ANSWER: The water garden should be at least 70 square feet.

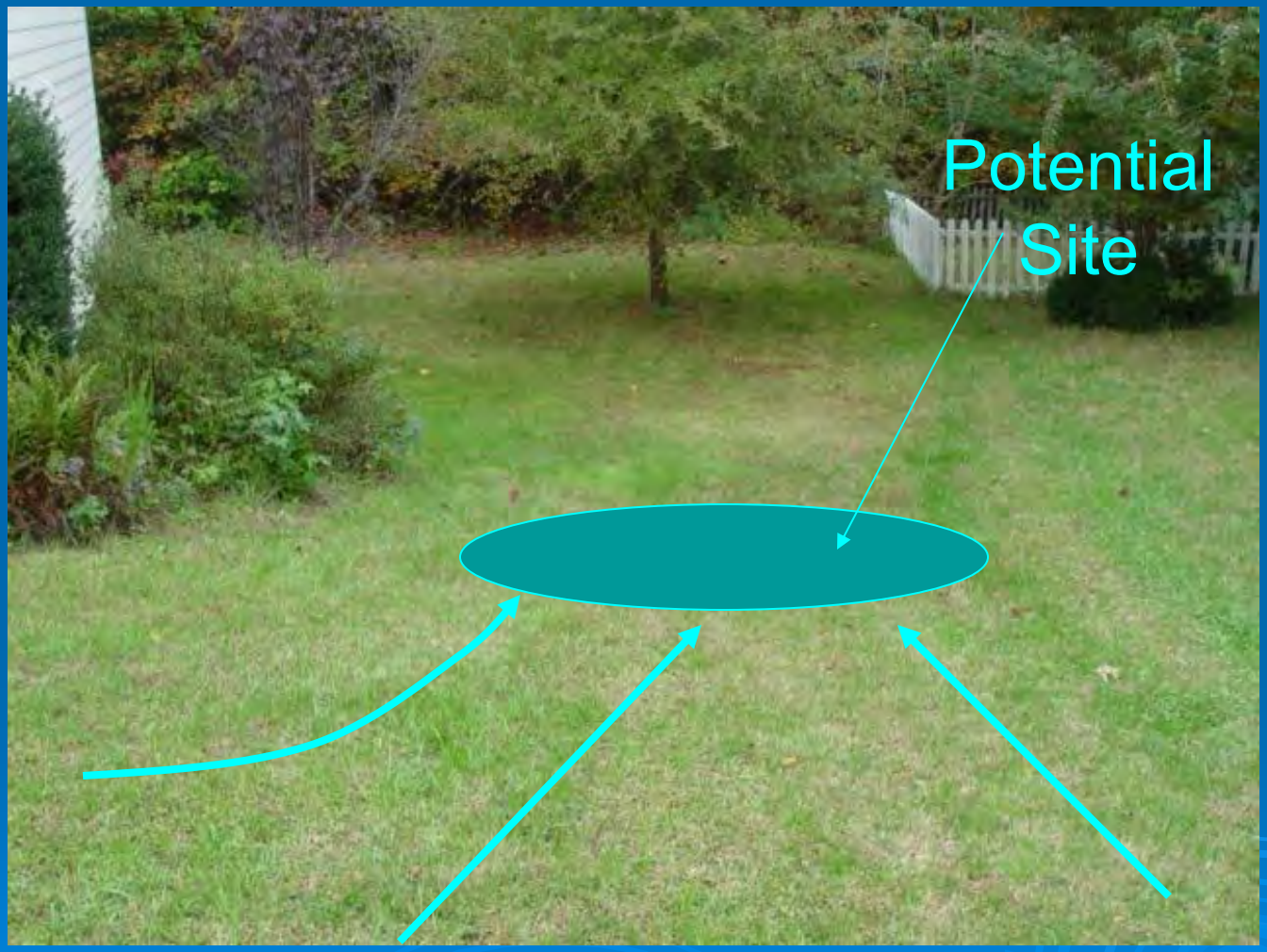
A 5 x 14 or 7 x 10 foot garden design would be sufficient

Size is flexible

- Depth of 3 – 8 inches
- Larger for clay soils, smaller for sandy ones
- Work with the area you have!



Rain Garden Construction



Before digging, lay out the area

Define the boundary by using string or spray paint

Digging your rain garden

Dig garden 4-6 inches, with a slight depression in the center.

Digging your rain garden

On sloped sites:

- Use dug out soil to create a berm along one side of garden.

- This will serve to retain water during a storm.

Planting and Mulching

Cover the berm with grass or mulch to prevent erosion.

Berm

Planting and mulching

MULCH WITH 2-3 INCHES OF HARDWOOD MULCH


Avoid pine straw and lighter mulches –
They will float!

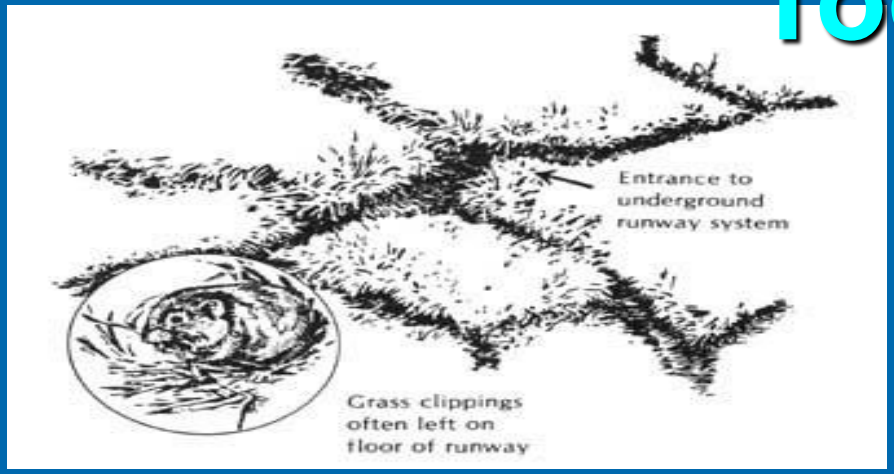
Mulching

- Removes pollutants.
- Maintains soil moisture.
- Prevents erosion.

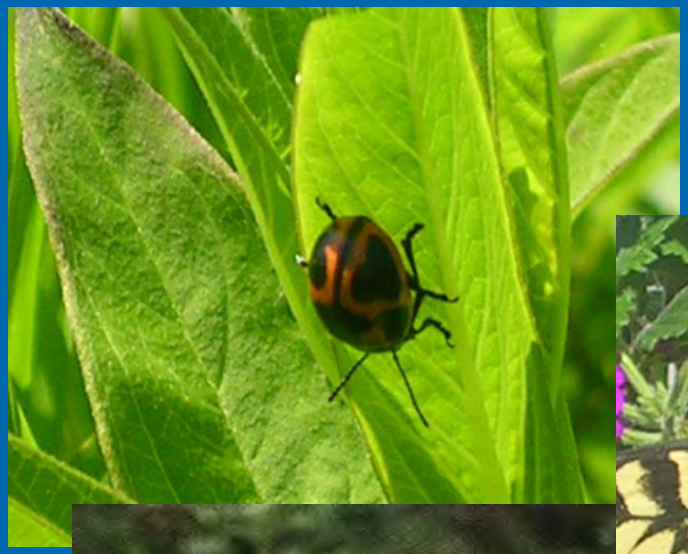
Native Plants

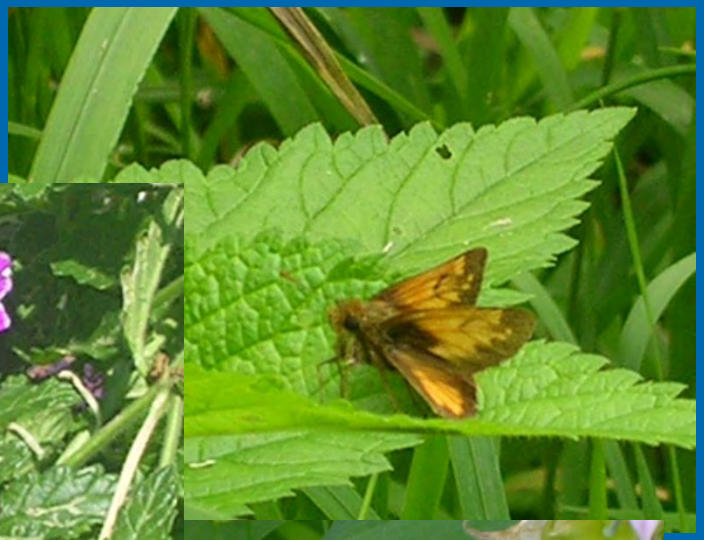
- Native plants thrive in their own climate and soils.
- Native plants prevent erosion.
- Native plants provide food and shelter for all wildlife.
- Native plants add diversity to a natural habitat.

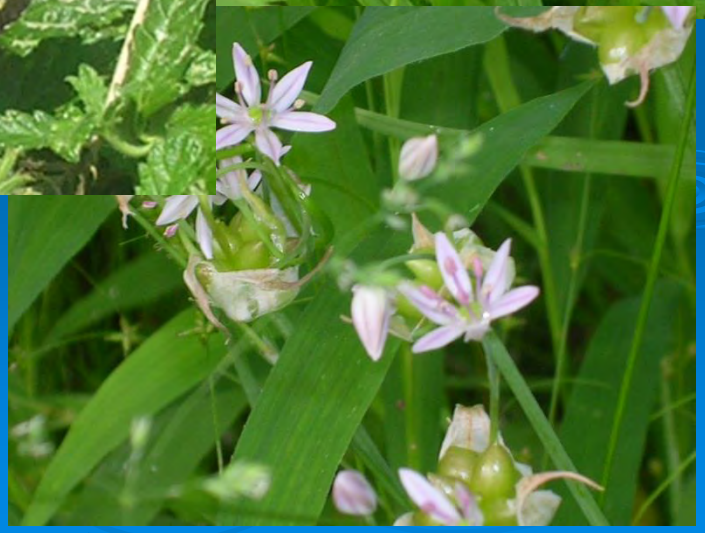
Wildlife Needs Healthy Soil Too



Create a Native Plant Wildlife Garden







Raingardens and Wildlife Gardens are Conservation Practices

- Every conservation practice is multiplied many times over to save our environment.

Keeping Our Soils Healthy

Healthy soil performs many functions-it can serve as a:

- Sponge, soaking up excess rainwater and slowing down runoff.
- Spigot, turning water flow on and off by storing and releasing water for plants.
- Snare, trapping urban pollutants such as oil, metals, and pesticides.
- Strainer, filtering and purifying the air and water that percolate through it.
- Supermarket, supplying valuable nutrients and antioxidants to plants.

Native soils can easily perform these functions.

Disturbed Soils Need Help!

Best Management Practices-(BMP's), During Construction

Retain and protect native topsoil and vegetation where practical.

Restore disturbed soils:

- Stockpile and reuse good quality site soil.
- Till 2-3" of compost into poor site soils.
- Bring in 8" of compost-amended topsoil.
- Loosen compacted subsoil by ripping to 12."
- Mulch landscape beds after planting.
- Protect restored soils from erosion or re-compaction by heavy equipment.

Successful BMPs

- Preserving vegetation
- Stockpiling topsoil

- Amending existing soil with topsoil.

What you can do to keep your own soil healthy.

Invest In Your Own Backyard

Don’t Guess

Soil Test

Know Your Own soil

- Know the soil types on your property-use the county soil maps and soil test.
- Know the fertility and organic content ratio-provided by the soil test.
- Know prior land use-county records.
- Summit county soil maps are available in book form, on cd's, and on-line.

THE OHIO STATE UNIVERSITY EXTENSION

SUMMIT COUNTY COMMUNITIES FOR CLEAN STORM WATER

SUMMIT
Soil & Water Conservation District

Fertility Can Fluctuate

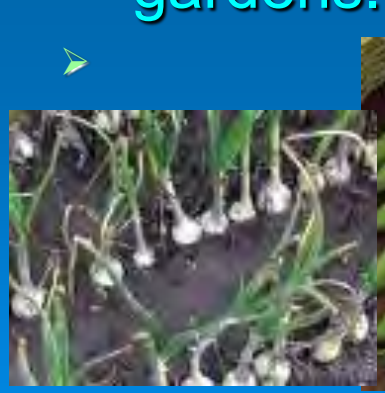
- Quantity and quality of available nutrients are altered by:

  Leaching-(downward movement of materials in solution).

  Addition of fertilizers, manure, compost, mulch, lime, and sulfur.

  Mineral nutrients are removed by plant growth and development.

  Mineral nutrients are removed by harvesting of vegetable gardens.





Ph Is Important

- Ph is an indication of the acidity of the soil.
- Ph 7 is neutral. Below 7 is acid. Above 7 is basic.
- Your soil tests provides the ph information.

Know Your Soil PH

- Most turf grasses, flowers, ornamental shrubs, vegetables, and fruits, grow best in slightly acid soils.

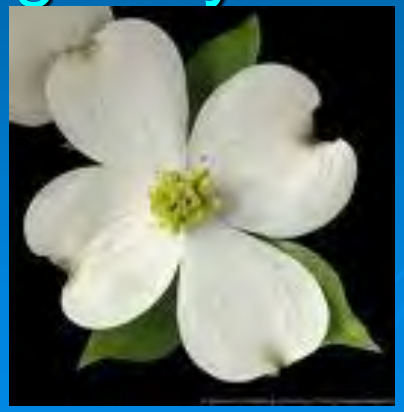
More About PH

- Plants such as rhododendron, azalea, mountain laurel, and blueberries, require a more acidic soil to grow well.




PH Influences Soil Nutrients

- Most soil nutrients are available when ph is 6.5.
- When ph is above 6.5, phosphorus, iron, manganese, copper, and zinc will become less available.
- When soil ph drops below 6.5, manganese and aluminum can reach a toxic level for some sensitive plants, and important microbial activity is greatly reduced.



Keeping a Healthy Soil PH

- If your soil is acidic, you can add lime in the fall to raise the ph to be more alkaline.
- If your soil is alkaline, you can apply sulfur in the spring to lower the ph to be more acidic.

All lawn and garden care programs should begin with a soil test

- A soil test tells you which nutrients are deficient in your soil.
- The test provides specific fertilizer recommendations.
- The test will help to avoid over-fertilization.
- Fertilizers are one source of non-point source pollution, which accounts for 60% of the water quality problems in Ohio.
- When it rains, excess fertilizer runs off into the storm sewers, and ends up in our rivers and lakes.

Excess Fertilizer Can Cause Eutrophication

Problems resulting from excess fertilizers in our waterways:

- Poor storm water quality
- Dead fish and aquatic animals
- Loss of habitat and species richness
- Weed-choked lakes and recreation sites
- Flooding

This is how it works.

- Excess nutrients cause algal blooms.
- Sunlight is cut off, stopping photosynthesis in underwater plants.
- Nesting and habitat sites are fouled.
- Decomposing algae use up all the oxygen.
- Fish and other aquatic creatures have no oxygen, no food, and no place to nest and reproduce.
- Dead zones are created in our lakes and oceans.

Know Your Fertilizer

The fertilizer label is important because it tells you the percentage of nutrients in the bag.

- Nitrogen is for greeness-promotes leafy top growth.
- Phosphate gives phosphorus for root growth.
- Potash gives potassium which promotes winter hardiness, disease resistance, and general plant durability.

Ways to Improve Your Soil

- Composting

- Mulching

- Using organic fertilizer

Composting

- Recycle yard waste

  Leaves, chopped stalks, flowers, and grass, make great compost.

  Instead of raking clippings and leaves in the street to go down the storm drain, put them in a pile, add water, turn frequently, and make great compost.

  Turning over frequently will speed up the process.

This

Not this

Mulching

- Mulch feeds the soil, conserves water and prevents weed growth.
- Add a layer of organic material such as leaves, wood chips, compost or grass clippings around your plants, (keeping it an inch away from stems,) in the spring or fall.
- Spread one to two inches over garden beds, sprinkle one-half to three-fourth inch on lawns , and till one to four inches into new garden beds and lawns.

Mulching

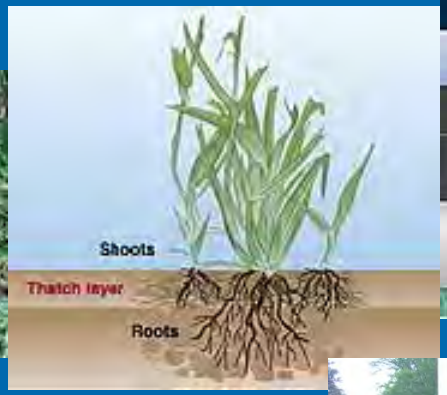
Healthy Lawn Practices Improve Soil

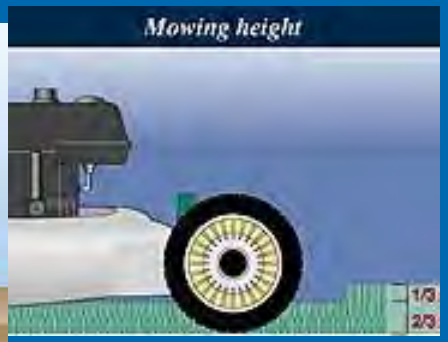
- Mow high-makes stronger, healthier grass.
- Fewer insect problems.
- More leaf surface for photosynthesis.
- Thicker, deeper roots, for drought survival.
- Keep blades sharp and mow often.
- Never mow more than 1/3 of height.
- Leave short clippings on the lawn.
- Clippings add nitrogen, reducing nitrogen needs by 25%-50%.
- Saves on fertilization costs.
- Saves 20% on solid wastes collected.

More healthy practices

- Aerate your lawn to prevent thatch, usually in the fall.
- Thatch creates impervious ground cover.
- Use smart watering with rainbarrels and stormwater.
- Use manual power tools.
- Create wildlife habitat.
- Plant native plants.
- Install a raingarden.
- Use integrated pest management.
- Save money-little or no use of synthetic fertilizer, pesticide, or herbicide.

Healthy Lawn Practices





If you must fertilize, choose wisely

- Organic fertilizers are slow-release. These are best used where the soil is moist and warm and promotes microbial activity. Fast release fertilizers are useful because their nutrients are immediately available to plants but plants only take up what they can use and the unused fertilizer ends up in the lake. Fewer applications are needed with slow-release fertilizers.

Timing is Everything

- Begin lawn fertilization in early October, not early May.
- Spring application can harm a lawn by promoting too much top growth.
- Shallow root systems are not able to sustain a lawn through a drought or harsh winter.

Autumn Fertilizing

- Begin applying when temperature drops to 50 degrees f.
- To calculate the average daily temperature, add the daily high and the daily low, and divide by 2.
- Fertilizer rates should be based on soil test results.
- Fall nitrogen fertilizers should be water-soluble and contain nitrate or ammonia forms of nitrogen, such as urea.

- Smart watering:
- Plants do best if the soil is allowed to dry out between waterings.
- A loss of shine on the ground, or lack of footprints, indicates that it is time to water.
- Vegetables and other annuals should be watered at the first sign of wilting.
- Perennials are tougher, and need water only if they stay droopy after it cools off in the evening.
- Trees and shrubs usually don't need any watering once their roots are fully established, (two to five years,) except in very dry years.

Who Benefits From Healthy Soil? We All Do!