Rain Gardens in Home Landscapes

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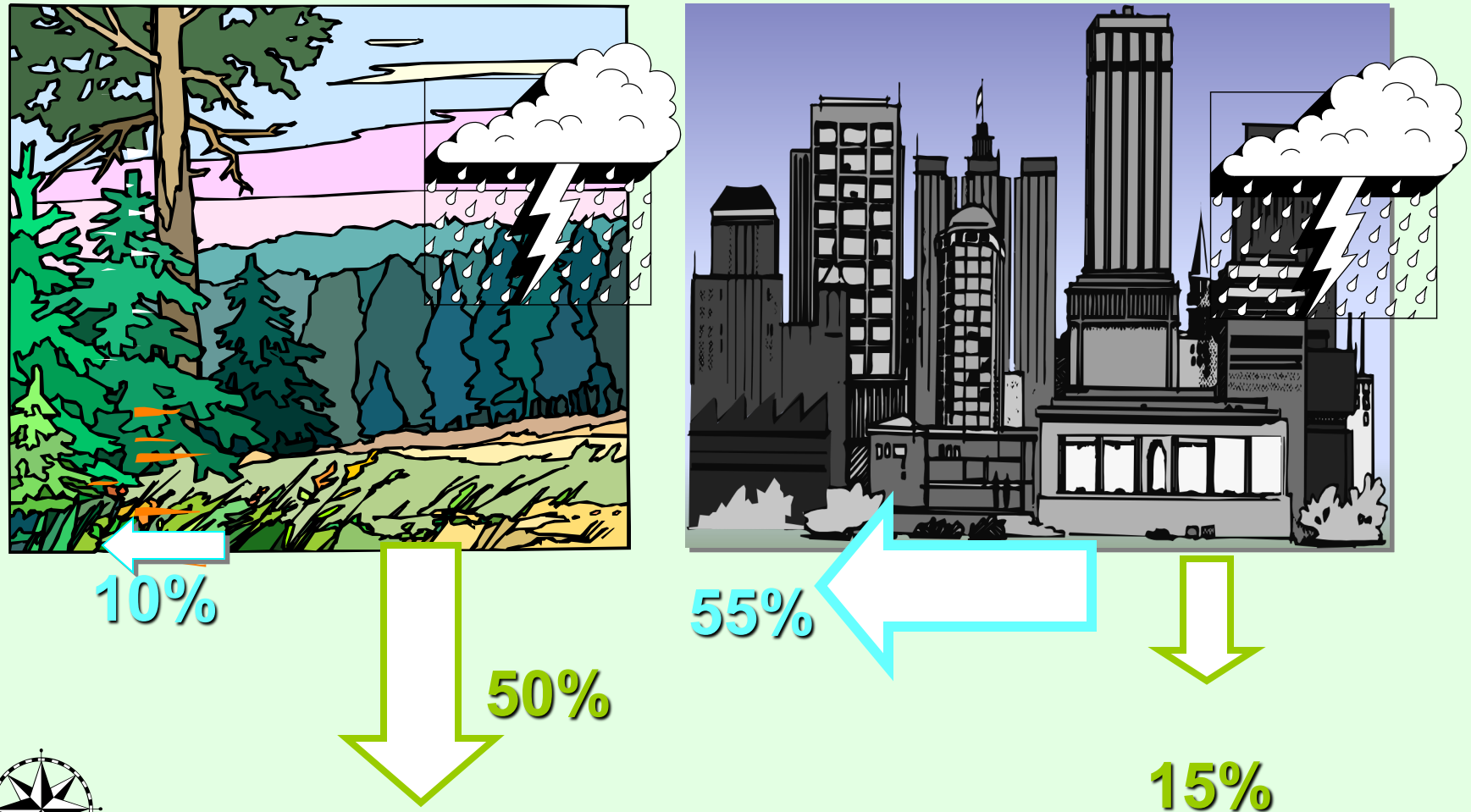
UNIVERSITY OF GEORGIA
EXTENSION

Outline of Rain Garden Presentation

- **Why Do We Want to Create Rain Gardens in Our Landscapes?**
  - Discussion on stormwater and how it contributes pollution to streams and other water bodies
  - Solutions to stormwater pollution include beneficial uses of stormwater on-site to reduce stormwater volumes
- **Build Your Own Rain Garden**
  - Define terms, benefits and purpose
  - How to design a simple rain garden

Why Do We Want to Create Rain Gardens in Our Landscapes?

Development Impacts on the Water Cycle



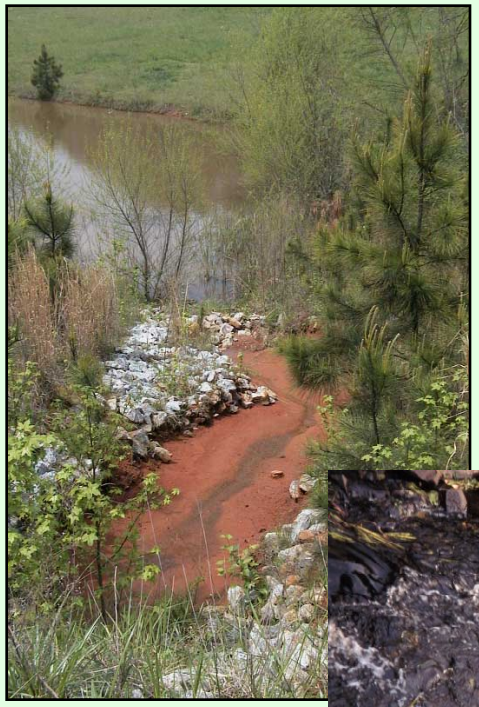
Impervious Surfaces

- Impedes or prevents infiltration
- Prevents natural processing of pollutants in soil and through plants
- Inhibits recharge of groundwater
- Provides a surface for accumulation of pollutants
- Provides an express route for pollutants to waterways

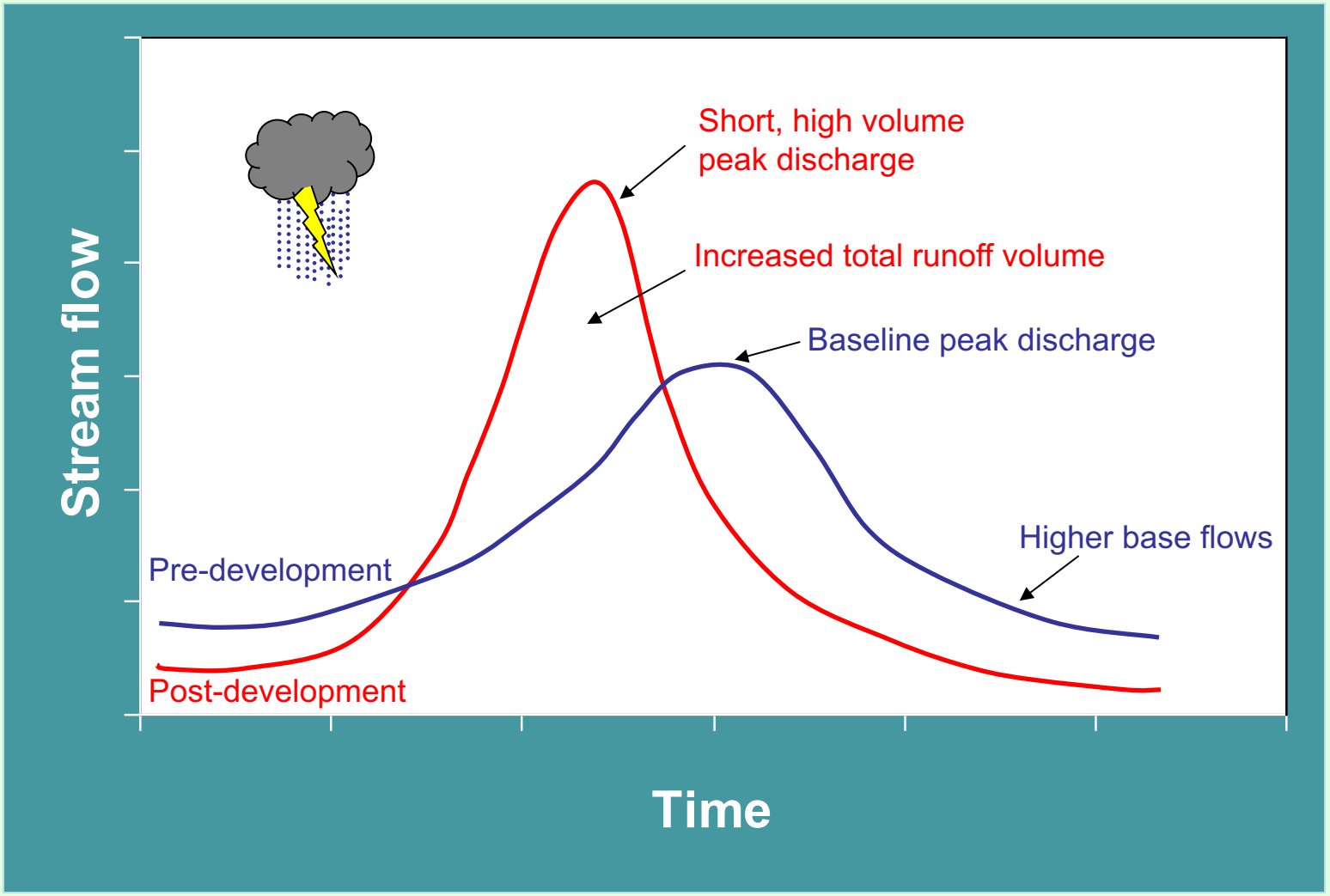

Polluted Runoff is the #1 Water Quality Problem in the U.S.*
* USEPA

Stream Pollutants from Urban and Developed Land

- Nutrients
- Pathogens
- Sediment
- Toxic Contaminants
- Debris
- Thermal Stress

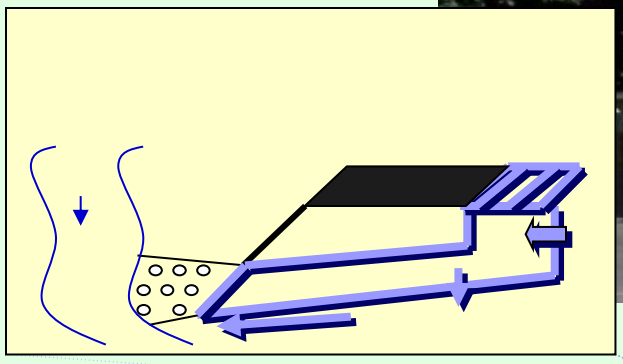


Two Storm Hydrographs



Traditional Drainage Systems

- Collect, Concentrate, Convey



The Traditional Approach

Methods:

Conveyance and detention

Goal:

Minimize flooding

Other Issues:

- Downstream hydrology disrupted
- Little water quality control
- Flooding sometimes becomes worse

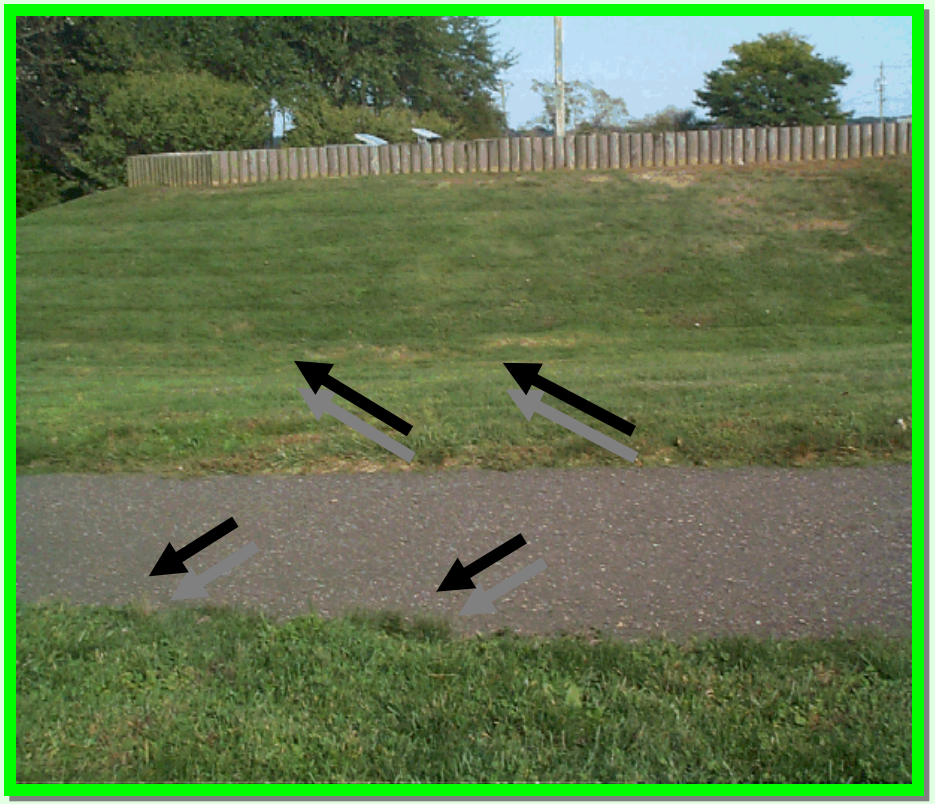
Better Site Design Practices

Connected

Disconnected

Better Site Design Practices

Connected



Disconnected

On-site vs. Regional Approaches

On-site: Manage stormwater as close to the source as possible

A residential "rain garden"

North Griffin Regional Detention Pond

Regional: Rely on large, regional detention facilities

Green Space & Water Quality

Green spaces:

- Promote infiltration
- Decrease runoff
- Provide buffers
- Filter pollutants

Importance of Infiltration

- Preserves natural hydrology
  - Reduces runoff and flooding
  - Maintains base flows
- Cleans water, removing pollutants
- Inexpensive water quality control

Build Your Own Rain Garden

What is a Rain Garden?

- An area in a man-made landscape that captures a shallow amount of water and holds it for a short time period
- Runoff water is captured and infiltrated into the soil in an indented area where plants and soils utilize and filter the water
- An attractive addition to a landscape

Purpose of a Rain Garden

- Capture runoff from impervious areas such as roofs, driveways, patios
- Reduce runoff leaving the site

Other Facts About Rain Gardens

- Ponding should last no more than 48 hours after rain stops
- Typical depths for rain gardens range from 4 to 12 inches with 6 to 8 inches recommended
- Will not increase mosquito numbers
- Will attract water loving critters such as frogs, toads and snakes

Benefits of Rain Gardens

- Low maintenance, low water use, beautiful landscape feature
- Increases infiltration of rainwater in landscapes with impervious surfaces
  - infiltrates as much as 30% more water than a flat or sloped lawn area
- Reduces flooding risks and stream bed destruction downstream
- Can provide a different kind of habitat in the landscape

Planning Your Rain Garden

- Location
- Size
- Plant Mix

Locating a Rain Garden in a Landscape

- At least 10 ft from a building foundation
- Near patio, driveways, roads
- Area where water will naturally move to low areas
- Fitting into the rest of the landscape

Locations to Avoid

- Next to a building foundation
- Over a septic system
- Where water stands for long periods already
  - High seasonal water table area
- Inside the dripline of any large trees
- Slopes greater 12%

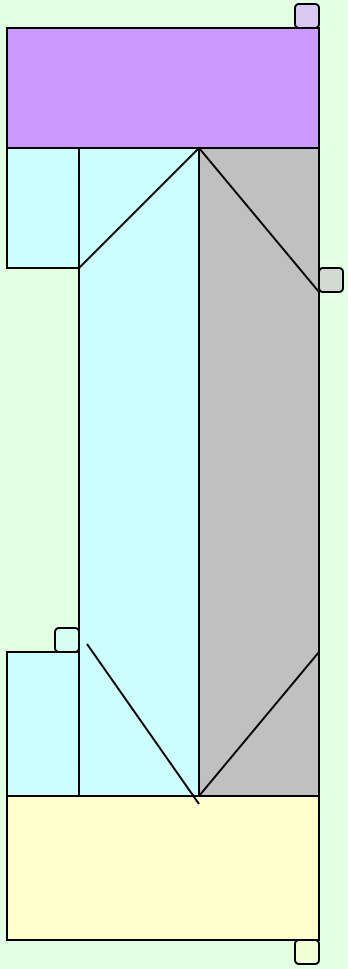
Rain Garden Size

- Depends on
  - Area of drainage (impervious area)
  - Depth of ponding of rain garden
  - Soil and slope of location

Sizing a Rain Garden

Determine drainage area

- Calculate or estimate the size of the area that will have runoff going to the rain garden
- For a house,
  - Draw a plan view of the roof
  - Divide the roof into areas going to each downspout
  - Calculate areas draining into the downspouts that will go into the rain garden



Soil Permeability Testing

1. Dig a hole 6 inches deep and wide.
2. Fill hole with water.
3. After 12 hours - if water has not infiltrated into soil around hole, the soil or location is not suitable for a rain garden.
4. If water has infiltrated within the first 12 hours, repeat the test in the same hole.
5. If water is standing in the hole after the second 12-hour test.
   - Soil has permeability unsuitable for a rain garden
   - Or, a high water table is preventing infiltration

Problem Soils

- If soils are high in clay or have been compacted during development, they may not have the capacity to infiltrate well
- Remove the soil and replace it with a better draining soil

Problem Soils

- Ideal rain garden soil mix – 50-60% sand, 20-30% topsoil, 20-30% compost
  - No more than 10% of mix should be clay
- Be careful of the nutrient content of composts – lower nutrient concentrations are preferred

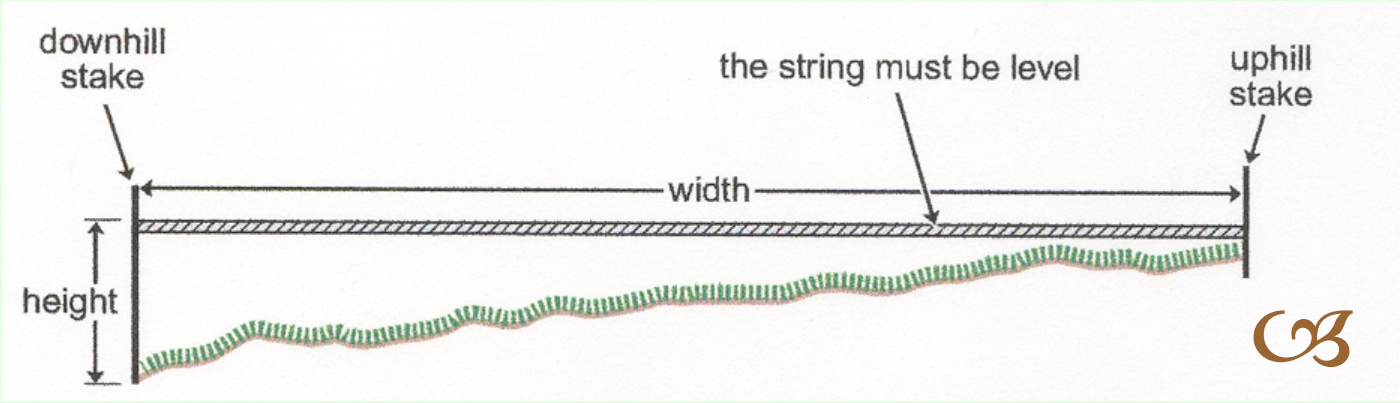
Soil Chemistry Test

- Take 2 cups of soil and request a standard soil test from the local county extension agent
  - Results indicate whether pH or nutrients need adjusting for good plant health
  - Takes about 2 weeks and will cost an analysis fee

Deciding the Size

A rain garden on a steeper slope can be smaller and deeper than a rain garden on a flatter slope

Measuring Slope

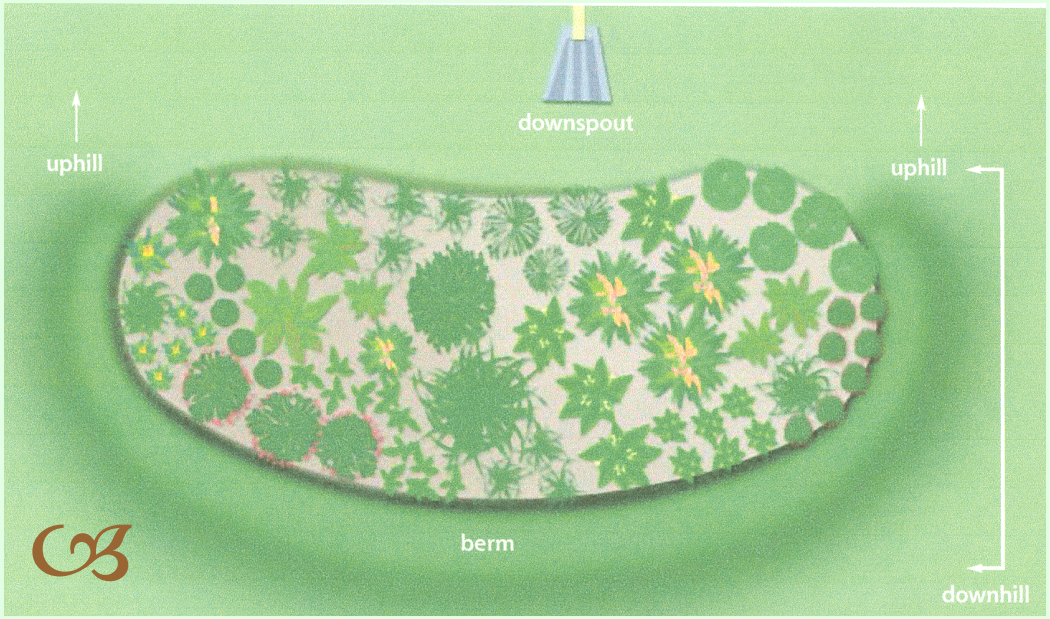


Estimating Rain Garden Size

- Sandy soils – 5-8% of runoff area
- Clay soils – 10-15% of runoff area
- Example – Area = 1800 sq. ft.
  - Sandy soil - .06 X 1800 = 108 sq. ft.
  - Clay soil - .12 X 1800 = 216 sq. ft.
- If the area of the rain garden needs to be > 300 sq. ft., consider making two smaller ones or bring in the earth moving equipment

Rain Garden Shape

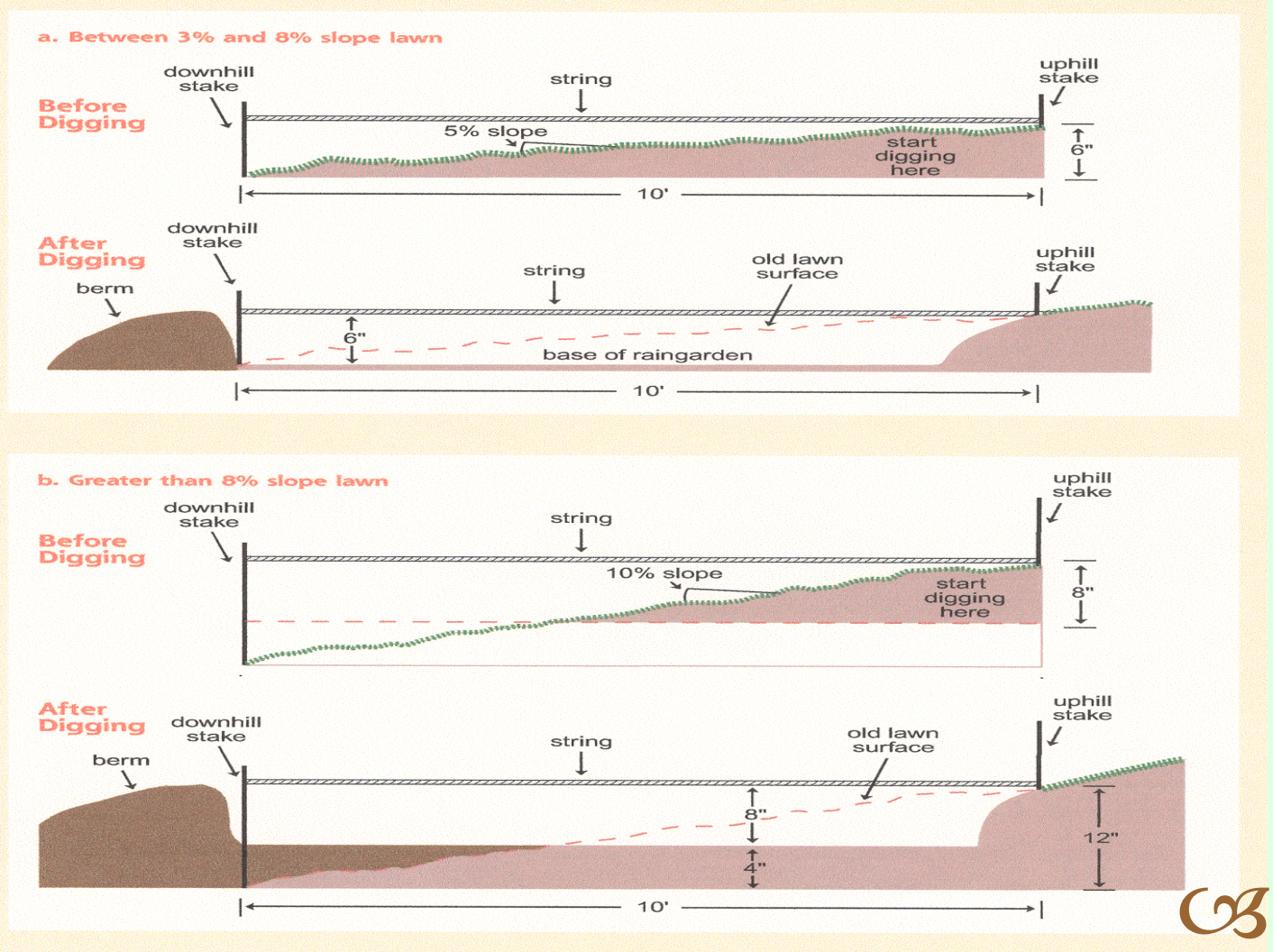
- Rain gardens are usually not square or a perfect circle
- The long length should be perpendicular to the major slope
- The shorter length should go down the major slope



Layout of a Rain Garden

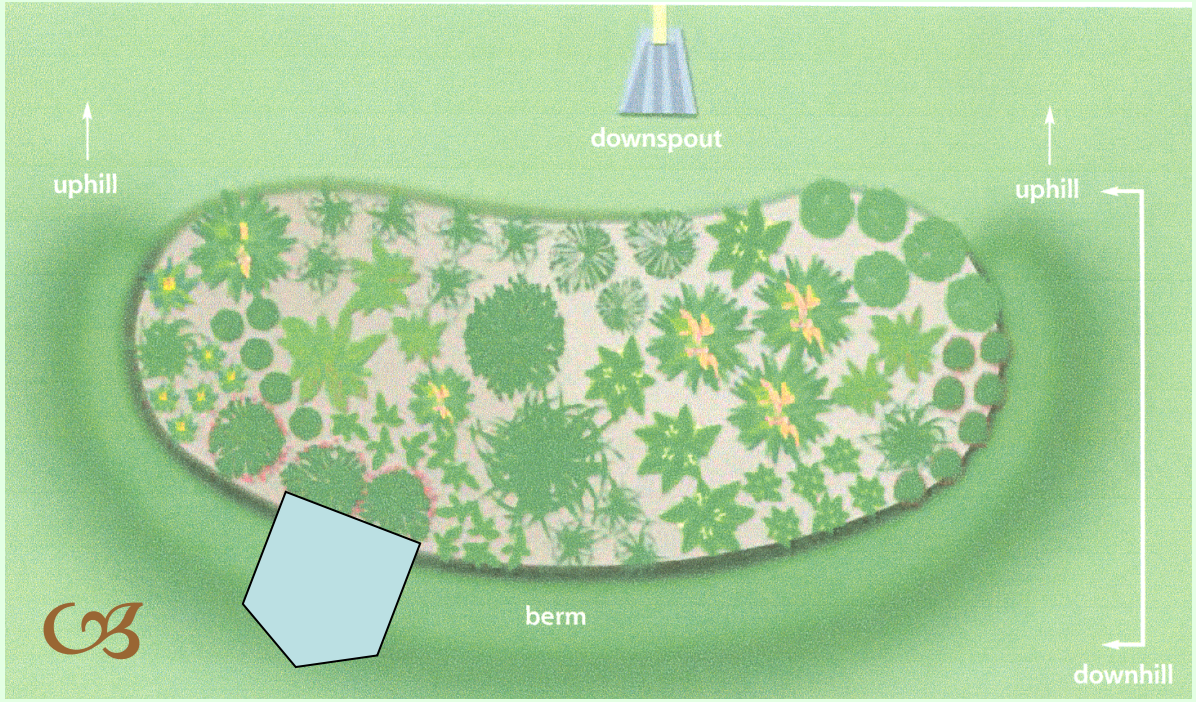
- Think about where excess storm water will go
- You cannot send your overflow onto your neighbor's property
- Local government has jurisdiction over land disturbing activities

Installing the Rain Garden



Installing a Rain Garden

- Pointers
  - Bottom of the rain garden should be level
  - Top of berm should be about the same elevation as the uphill edge of the rain garden



Overflow Area

- Always have an overflow method for larger storms
  - Lower area in the berm somewhere
  - Drain pipe within rain garden

Connecting the Rain Garden

- Create a shallow, wide swale or bury a corrugated drain pipe to carry flow from gutter into the rain garden
- Line swales with turfgrass or gravel to prevent erosion
- Flat upslope turfgrass areas can also flow into a rain garden as long as the flow stays very shallow

Installing a Rain Garden

- Lay out edge of rain garden with rope or garden hose
- Set aside the top 4 to 6 inches of soil (topsoil), excavate the hole, then use topsoil to backfill the planting area.
- Move the soil in the rain garden area down to the bottom edge of the rain garden

Installing Rain Garden

- Prepare the soil for planting
  - Add lime as recommended by soil test
  - Spread 2 to 4 inches of compost and mix or till it into the whole area of the rain garden
- Now you are ready to plant

Plants

- A wide variety of plants in both size texture and color makes for an interesting rain garden
- Rain gardens can be designed to attract butterflies and birds with the right plant choices
- Mix trees, shrubs, perennials, ornamental grasses and turfgrasses
- Plants must be wet and drought tolerant
  - Really tough plants

Trees for Rain Gardens

- Red Maple
- River Birch
- Crape Myrtle
- Black Gum
- Bald Cypress
- Green Ash
- Willow Oak
- Serviceberry
- Hornbeam
- Sweetbay Magnolia
- Dahoon Holly
- Winter King Hawthorn
- Sugar Hackberry
- Fringetree
- Gingko
- Persimmon
- Loblolly Pine

Bald Cypress

Loblolly Pine

River Birch

Red Maple

Ginkgo

Crape Myrtle

Sweetbay Magnolia

Green Ash

Black Gum

Winter King Hawthorn

Willow Oak

Shrubs for Rain Gardens

- Winterberry
- Arrowwood
- Buttonbush
- Summersweet Clethra
- Wax Myrtle
- Chokeberry
- American Beautyberry
- Bottlebrush Buckeye
- Inkberry
- Oakleaf Hydrangea
- Virginia Sweetspire
- Some native azaleas

Deciduous Shrubs

- Provide Seasonal Interest
  - Flowers
  - Berries
  - Fall Color
- More Natural Growth Form
- Majority of Wetland Plants are Deciduous

Inkberry

Arrowwood

Yaupon Holly

Southern Wax Myrtle

Bottlebrush Buckeye

Oakleaf Hydrangea

American Beautyberry

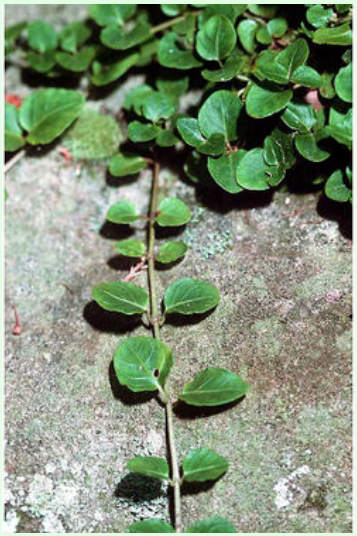
Virginia Sweetspire

Buttonbush

Spice Bush

Winterberry

Groundcovers for Rain Gardens



Partridge Berry

Ajuga

Mondograss

Strawberry Begonia

Shuttlewort Ginger

Herbaceous Perennial Plants for Rain Gardens

- Aster
- Blackeyed Susan
- Lobelia
- Northern Sea Oats
- Cardinal Flower
- Goldenrod
- Ironweed
- Joe Pye Weed
- Rose or Swamp Mallow
- Swamp Milkweed
- Royal Fern
- Cinnamon Fern
- Netted Chain Fern
- Broad Beech Fern
- Canna Lilies
- Yellow Flag Iris
- Rushes
- St. John’s Wort
- Foam Flower
- White Arrow Arum
- Jack-in-the-Pulpit

Canna Lilies

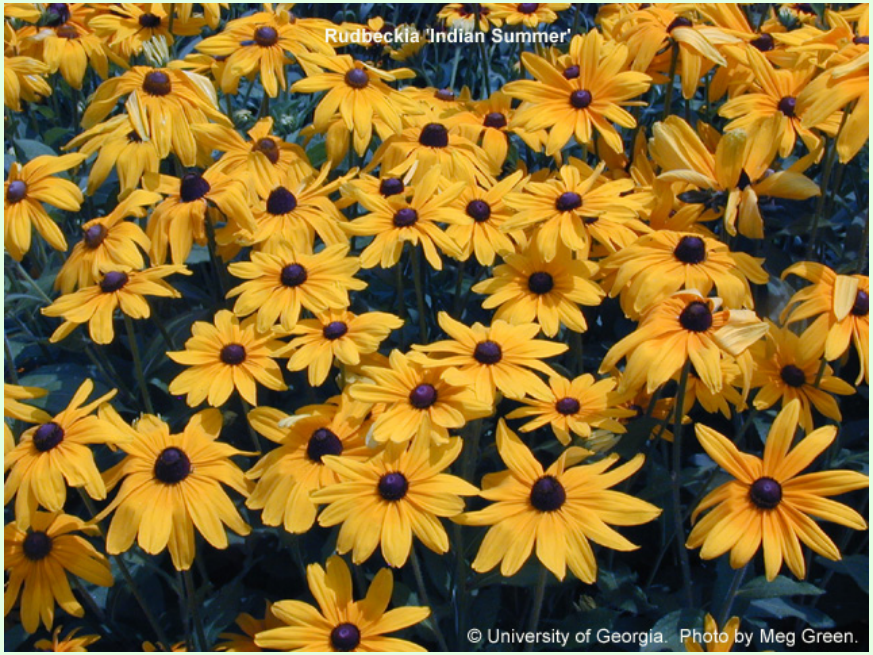
St. Johns Wort

Ironweed

Royal Fern

Cinnamon Fern

Swamp Milkweed



Blackeyed Susan

Joe Pye Weed

Asters

Ornamental Grasses

Upland Sea Oats

Plants to Avoid

- Those Susceptible to Root Rots
  - Most coniferous shrubs
  - Adapted Exotic Azaleas
  - Indian Hawthorne
  - Camellias

Maintenance

- No special maintenance required
- Routine periodic landscaping maintenance
  - Weeding
  - Pruning
  - Replacing plants
  - Plant Division
  - Replacement of mulch

Credits

"Build Your Own Rain Garden" picture from *Rain Gardens of West Michigan* www.raingardens.org

Photos with this symbol from City of Maplewood http://www.ci.maplewood.mn.us/index.asp

Pictures and diagrams with this symbol taken from *Rain Gardens A How-to Manual for Homeowners* University of Wisconsin Extension Pub #GWQ037 http://cleanwater.uwex.edu/pubs/raingarden/rgmanual.pdf

 Slides with this symbol were derived from information from the NEMO website – Nonpoint Source Education for Municipal Officials http://nemo.uconn.edu

Credits

Pictures of individual plants from:

- Todd Hurt, Horticulture Specialist, Georgia Cooperative Extension
- Gary Wade, Horticulture Specialist, Georgia Cooperative Extension
- Allen Caldwell, County Extension Director, North Carolina Cooperative Extension
- Erv Evans, Horticulture Specialist, North Carolina Cooperative Extension
- Henriette Kress, www.henriettesherbal.com

Questions

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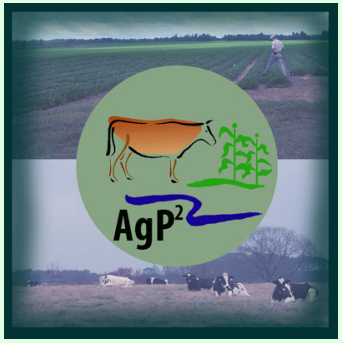

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