



~ WELCOME ~

Rain Garden Certification Workshop

Hosted by the Choccolocco Creek Watershed
Alliance, Auburn University and Cooperative
Extension

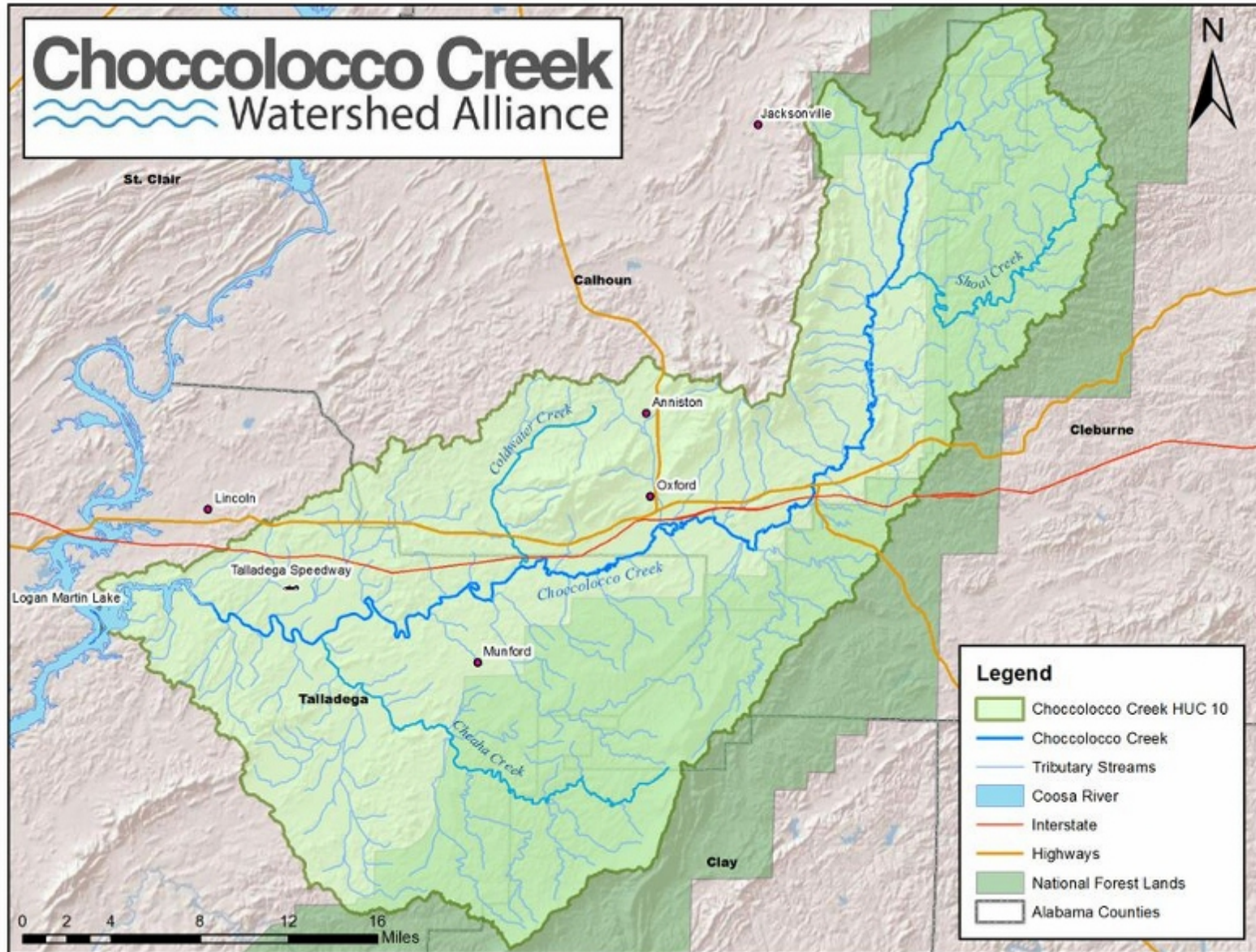
The logo for the Choccolocco Creek Watershed Alliance features the organization's name in a bold, dark grey sans-serif font. The words "Choccolocco Creek" are on the top line, and "Watershed Alliance" is on the bottom line. To the left of the second line, there are three blue wavy lines representing water.


Choccolocco Creek Watershed Alliance

Mission:

“Developing a stewardship effort comprised of informed stakeholders of Choccolocco Creek with a common interest in implementing strategies to improve, protect and promote the watershed.”

The Watershed:




A scenic view of a river flowing through a forested area. The water is a deep blue, and the banks are lined with trees in various stages of green. Large, dark rocks are scattered in the foreground, partially submerged in the water. The sky is a clear, bright blue.

A few ways to help protect the watershed....

- Prevent erosion by keeping vegetation intact
- Keep stormwater clean
- Capture run-off

.... Rain Gardens are a great start!

A scenic view of a river flowing through a forested area. The water is a deep blue, and there are several large, dark rocks protruding from the riverbed. The background is filled with trees, some with green leaves and others bare, suggesting a late autumn or early spring setting. The sky is clear and blue.

A few ways to help
protect the
watershed....

- **Teach others about the watershed**
~ and get involved!

CCWA Events:

March 23: CCWA Paired with Renew Our Rivers and LMLPA for Annual Creek Clean-up

April 28: Pinhoti Hike to the Headwaters – guided by local ethnobotanist

May 11: Munford School Get Outdoors Day and Frog Watch

October 12: Choccolocco Heritage Festival

October 16 & 17: Watershed Academy with Eve Brantley and guest speakers

* Paddle trips * Presentations * Festivals * More!

Thanks for getting involved!



Visit our website for upcoming events and updates within the watershed:

Choccolocco Creek Watershed Alliance 
www.choccolococreekalliance.org

Rain Garden Certification

Alabama Cooperative Extension System
Auburn University
Local Watershed Projects

*Adapted from North Carolina State University
USDA Southern Regional Water Program*

Goals

- Describe conditions appropriate for rain garden installation
- Offer design guidelines and construction recommendations
- Provide attractive plant options

Schedule

Rain garden basics (need, sites, design, construction, vegetation)

Design rain garden on site, check out small demonstration site

Lessons learned, maintenance recommendations

Certification exam (open book)

Rain Gardens

Landscape amenities

Homeowner stormwater practice

Not:

- Engineered best management practices
- Regulated stormwater control measures

Who is interested?

General public – ‘green’ trends

Regulated local governments

Phase I

Phase II



Phase who?

Phase I communities

Larger communities with populations of at least 100,000

Huntsville, Birmingham, Mobile, Montgomery



Phase II

Smaller communities

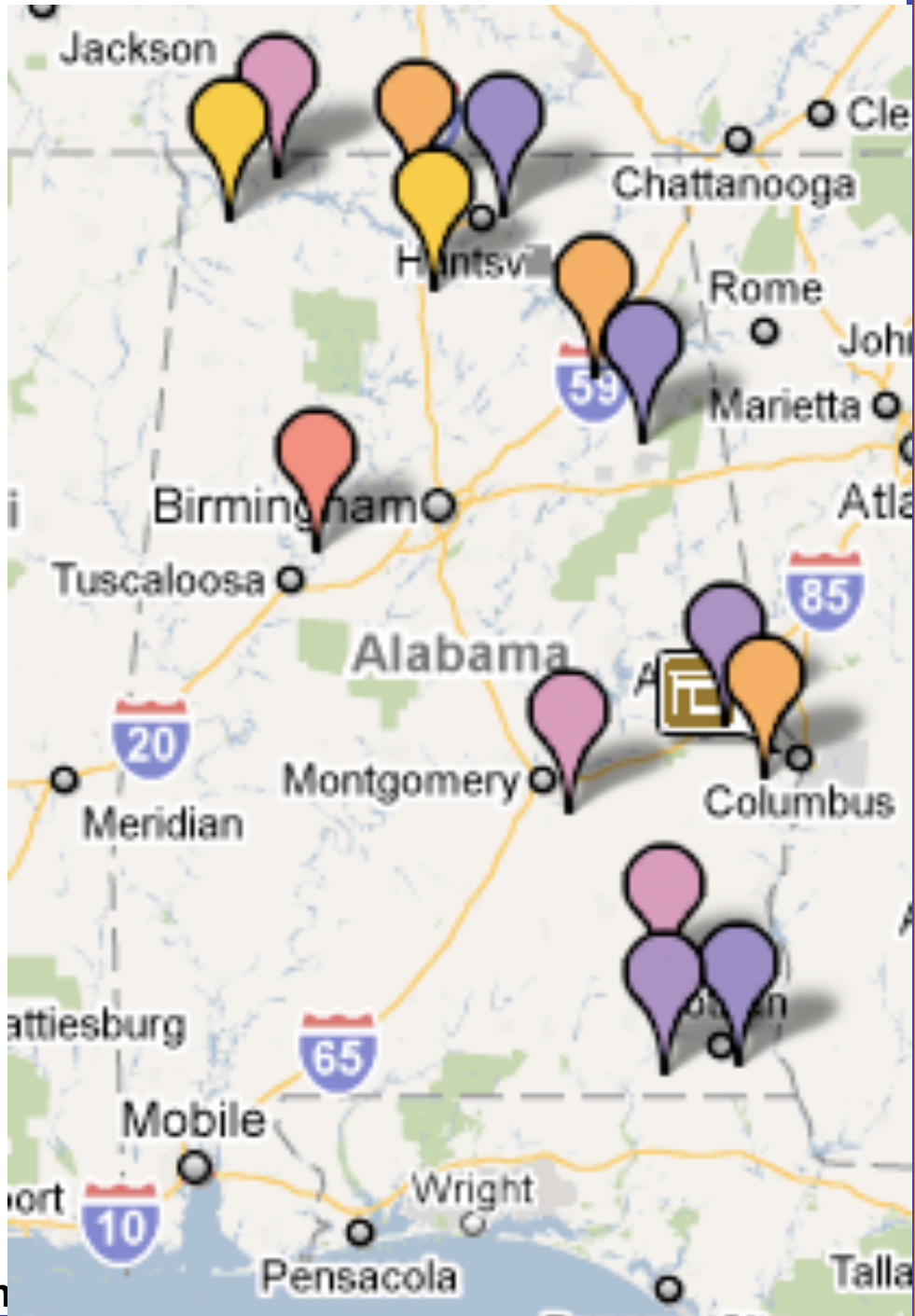
Located in urbanized areas

Population of at least 50,000

Overall population density 1,000 per mi²



Alabama Phase II Communities



Calhoun County: Alexandria, Anniston, Blue Mountain, Bynum, Hobson City, Jacksonville, Oxford, Saks, Weaver, West End-Cobb Town

Colbert County: Muscle Shoals, Tuscumbia, Sheffield

Dale County: Dothan, Grimes, Midland City, Napier, Fields

Etowah County: Attalla, Gadsden, Glencoe, Hokes Bluff, Rainbow City, Reece City, Southside

Geneva County: Malvern

Houston County: Kinsey, Rehobeth, Taylor

Lauderdale County: Florence, Killen, Underwood-Petersville, St. Florian

Limestone County

Lee County: Auburn, Phenix City, Smith Station, Opelika, Auburn University

Madison County: Meridianville, Moores Mill, Redstone Arsenal

Morgan County: Decatur, Trinity

Montgomery County

Russell County: Ladonia

Tuscaloosa County: Tuscaloosa, Coker, Holt, Northport, University of Alabama

Stormwater Regulations

Six minimum control measures:

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Stormwater Runoff Control
5. Post-Construction Stormwater Management
6. Pollution Prevention and Good Housekeeping for Municipal Operations

Opportunity to Provide Unique Service

Stormwater problems (homeowner, neighborhood, river basin) will continue to increase

Rain gardens offer relatively easy opportunity to address concerns at the lot level

Can make a difference at the community level

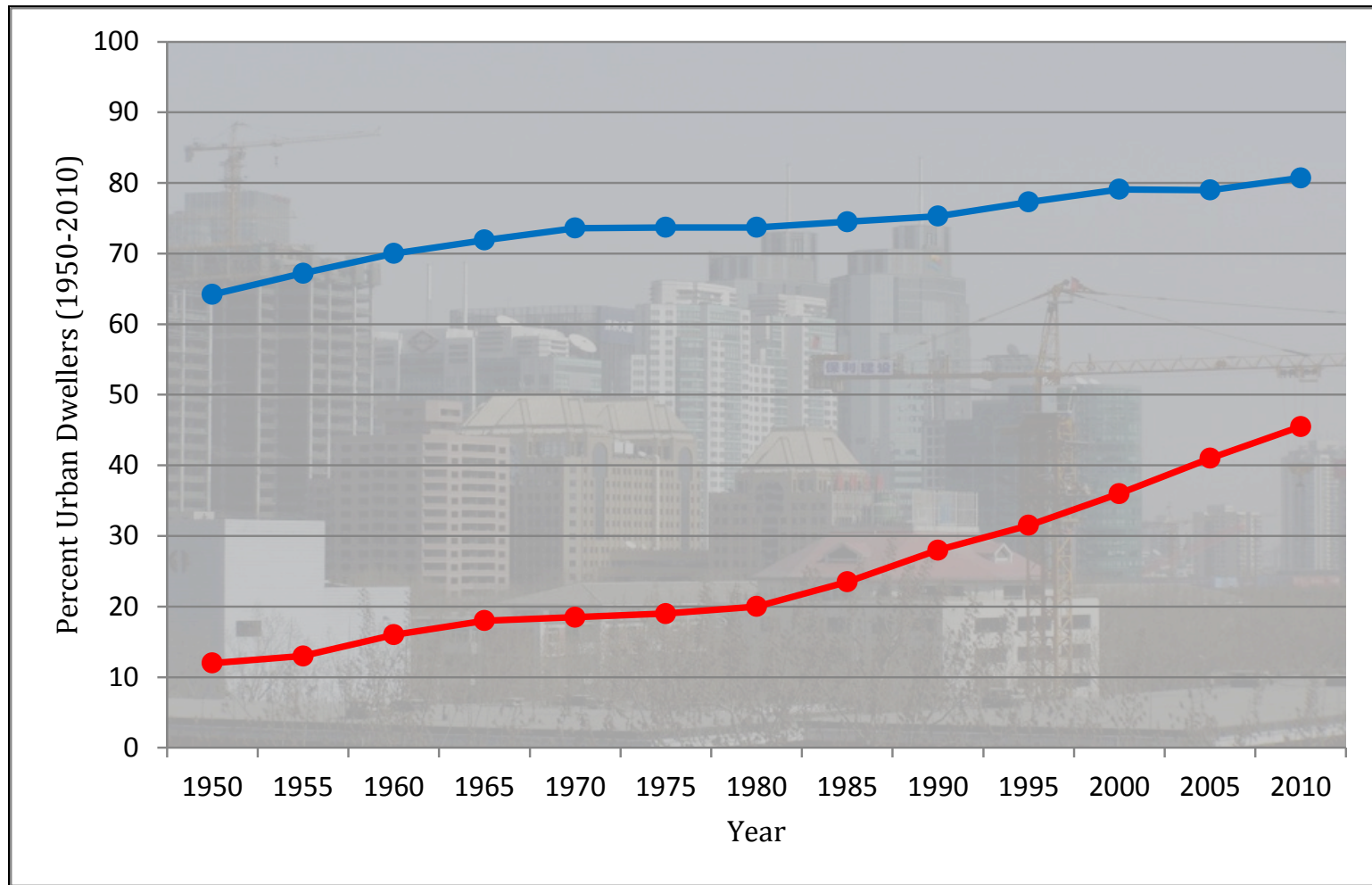
'Certified' rain garden list provided online

Stormwater Overview

Rain Garden Certification
Alabama Cooperative Extension System

*Adapted from North Carolina State University
and USDA Southern Regional Water Program*

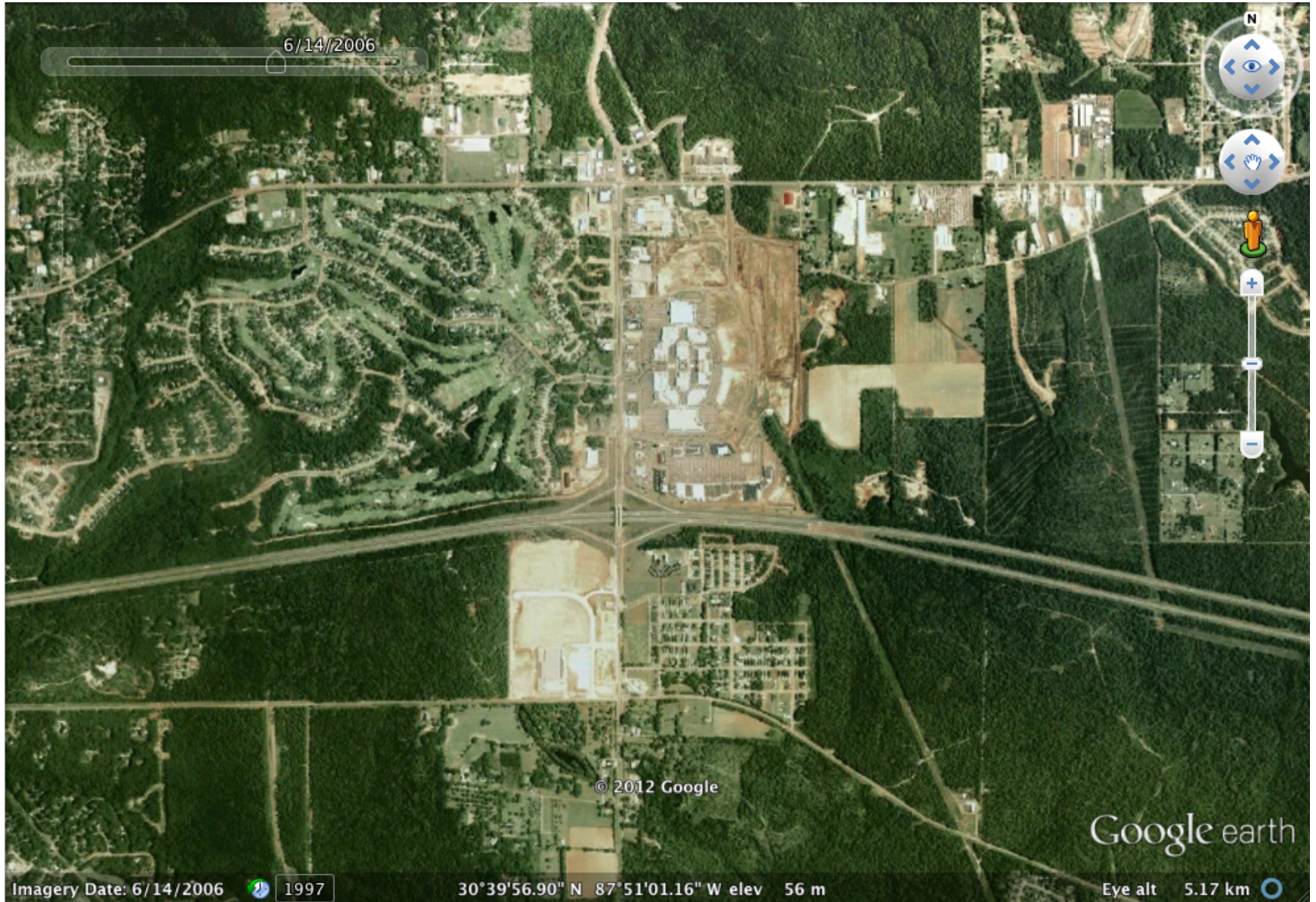
Urban Population Since 1950



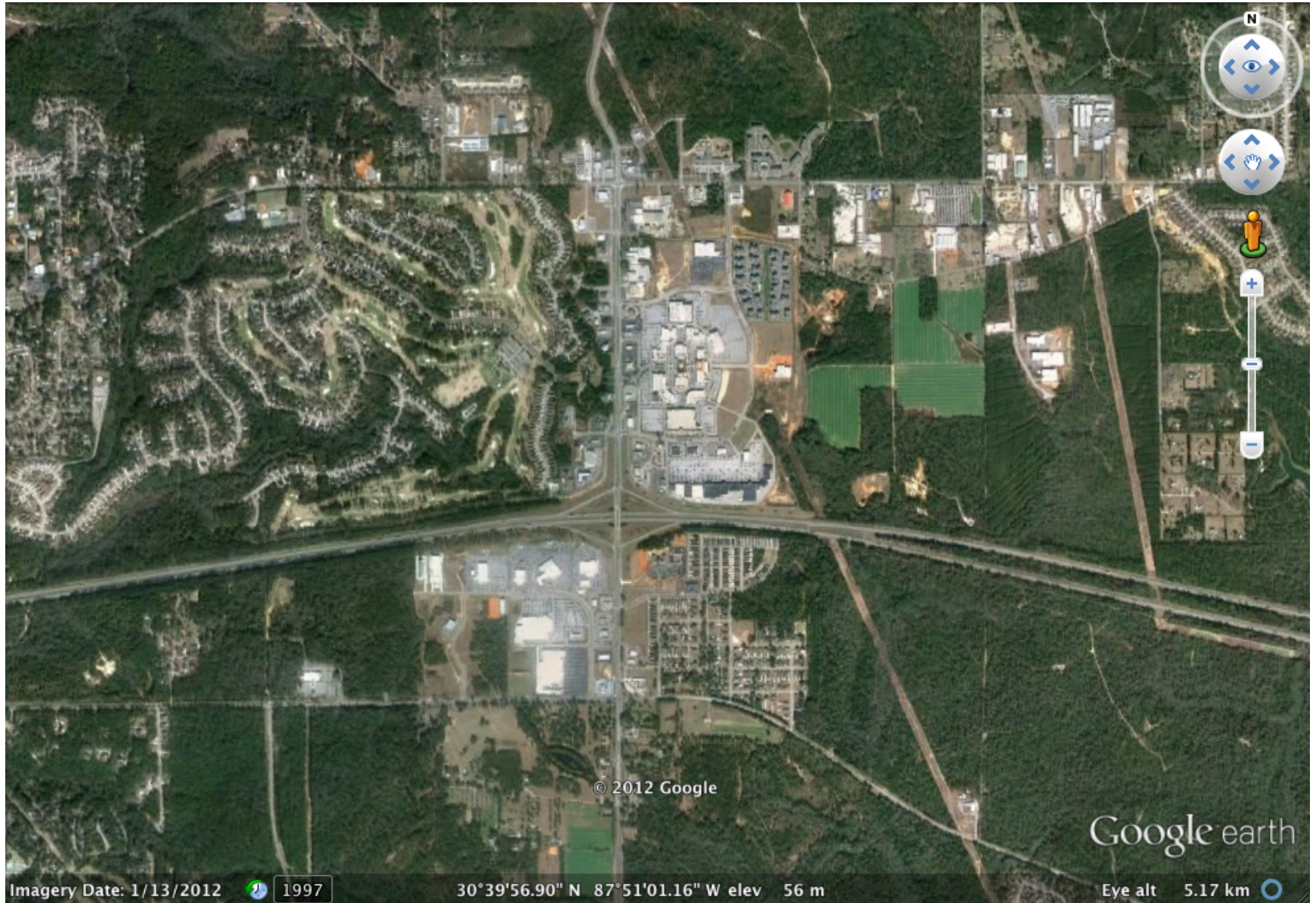
Land Conversion



Land Conversion



Land Conversion



More to the story ...

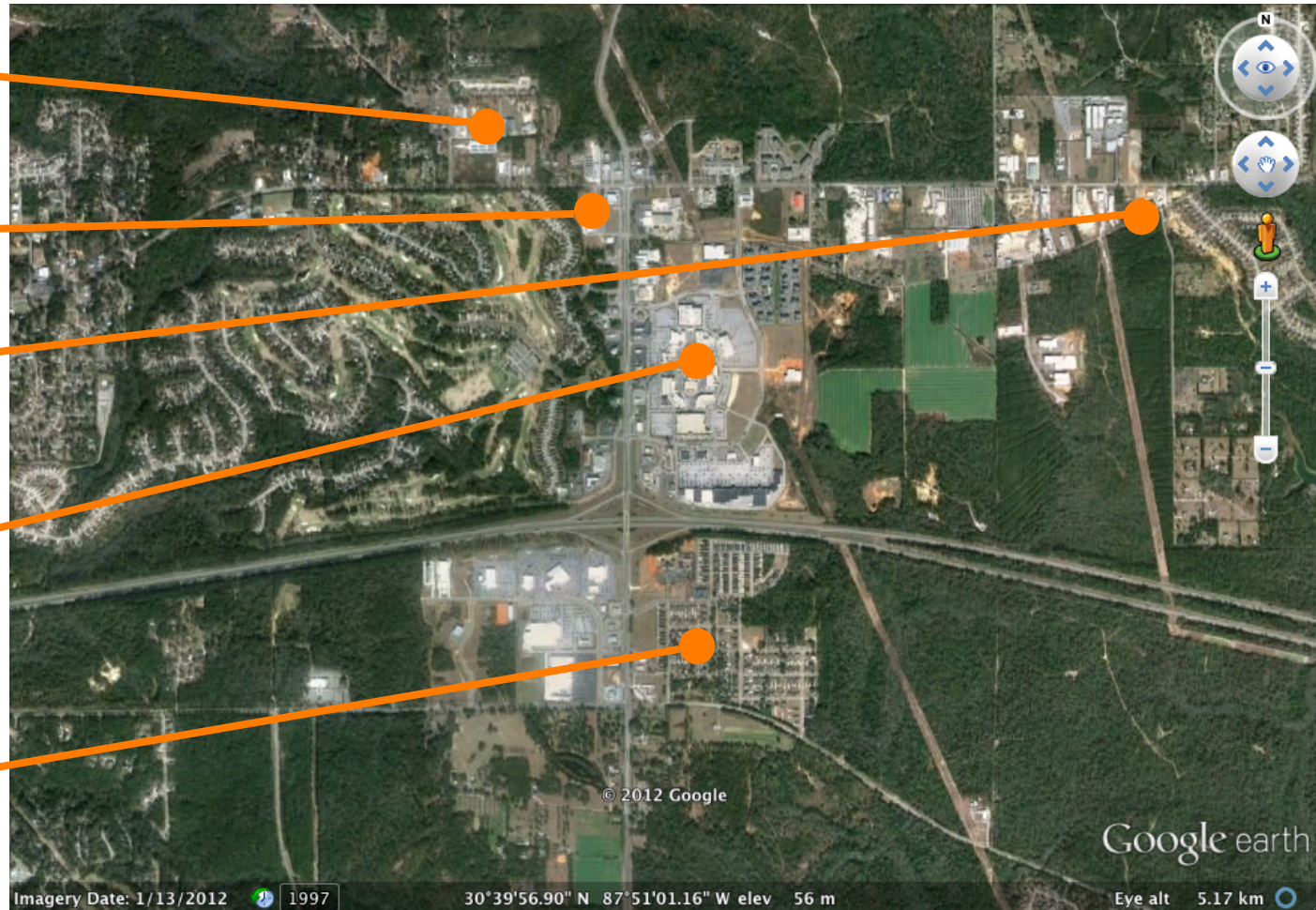
Removal of
vegetation

Land compaction

Erosion &
sedimentation

Increase in
impervious
surfaces

Conventional
stormwater
management

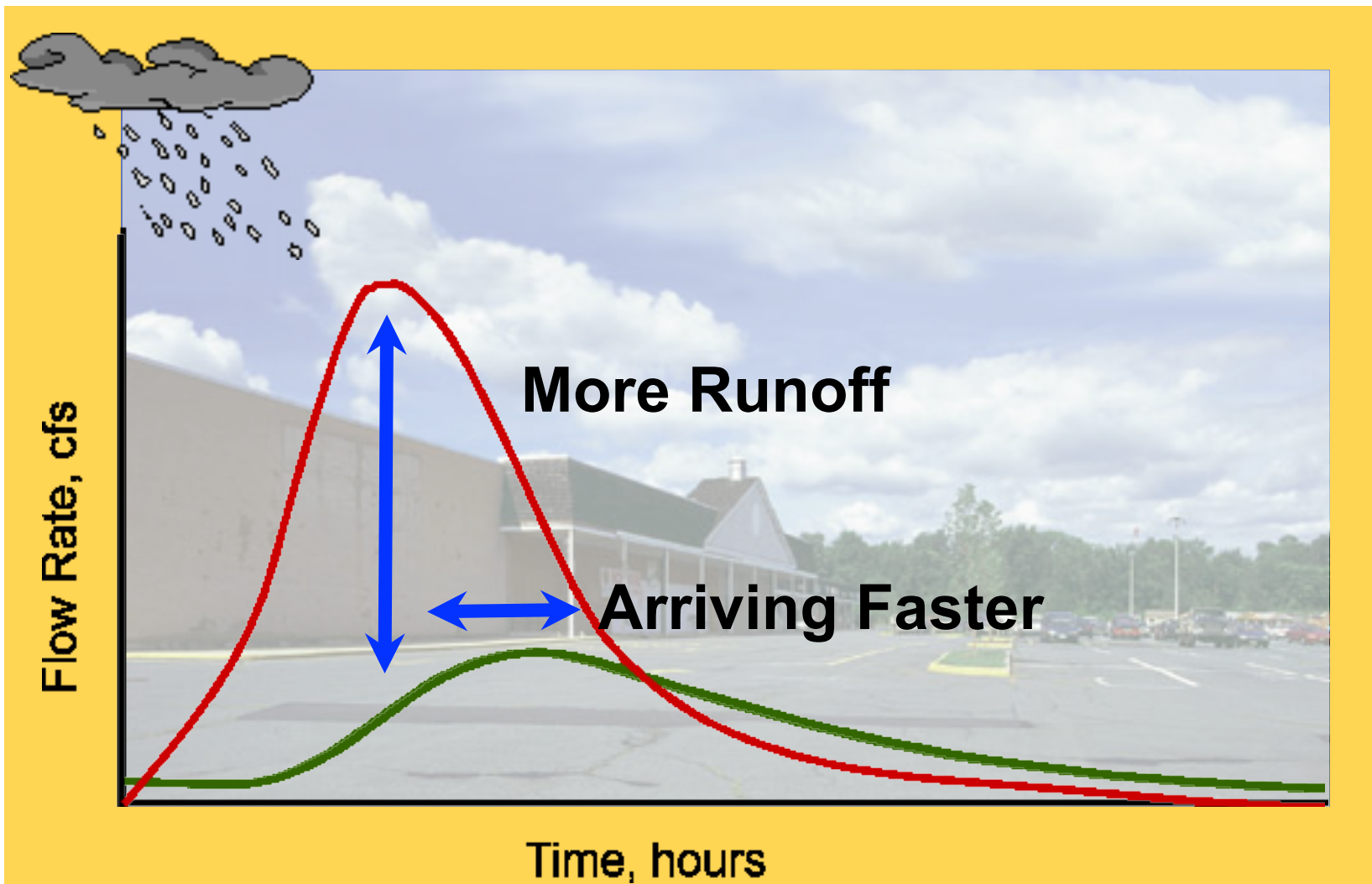
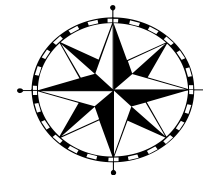


What is Stormwater?

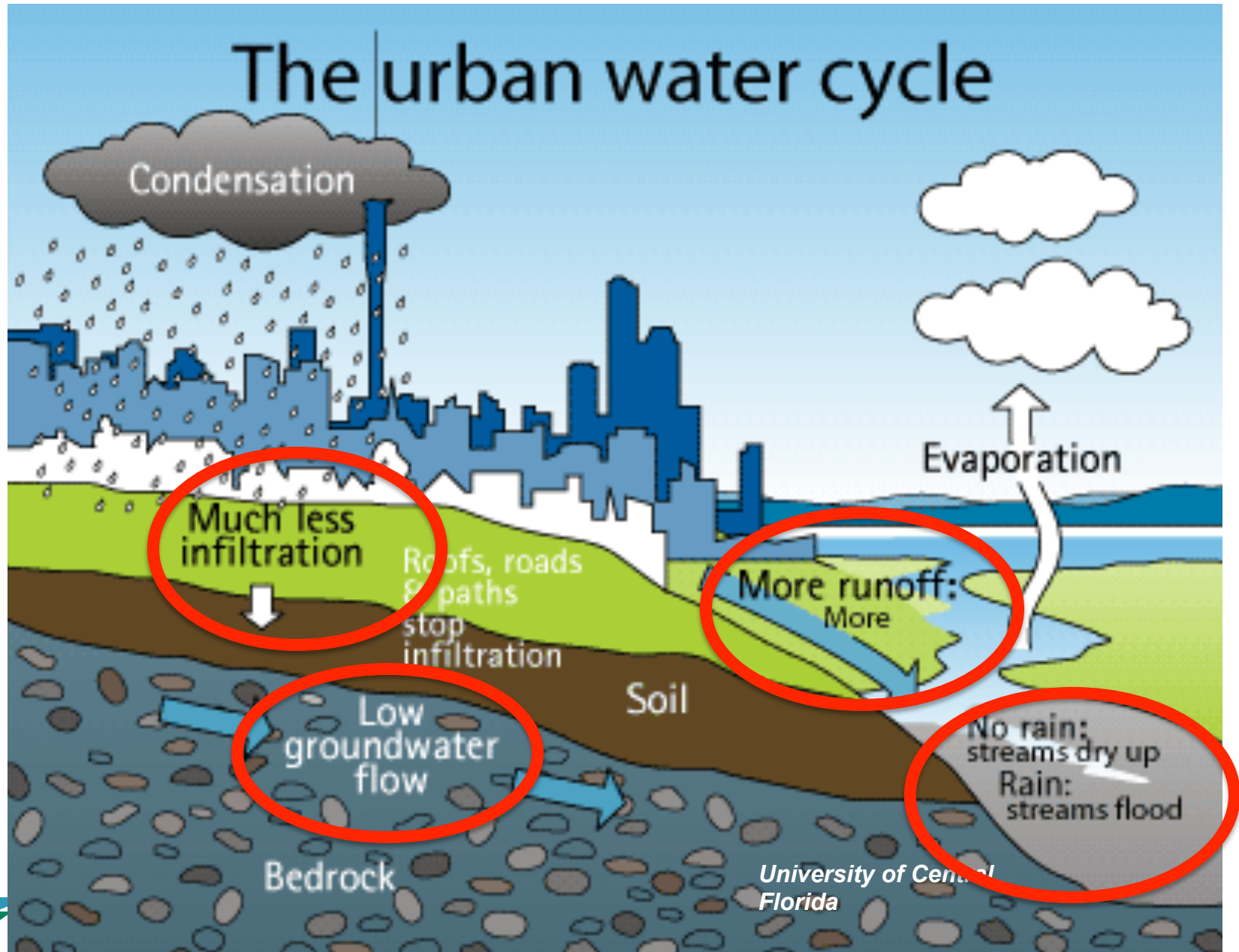
Rainwater that washes across yards, roads and parking lots, and flows into streams, creeks and other waterbodies



The Science of Stormwater...



Urban Disturbances to Hydrologic Cycle



Runoff: *more*

Infiltration: *less*

Flooding: *more*

Baseflow: *less*



Catching the worst of it

Most pollutants in stormwater are in first inch of stormwater runoff

Called 'first flush'



Sediment



Fertilizers, Pesticides



Dan Ballard

Bacteria



Oil, Gas, Tire / Brake Pad Dust, Toxins



SYSTEM

Rain Garden Certification

Stormwater – Temperature Pollution



What are the consequences?

Algal blooms, Nutrient Enrichment



Eroding and Degraded Streams



Flooding



Water Supply Contamination



A unique situation...

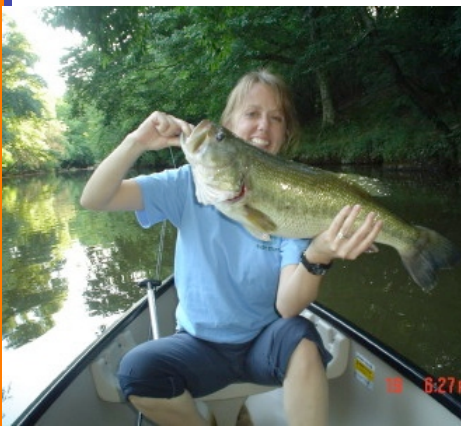
14 major river basins

~77,000 miles of rivers and streams

50 miles of Gulf Coast shoreline

390,000 acres of estuaries

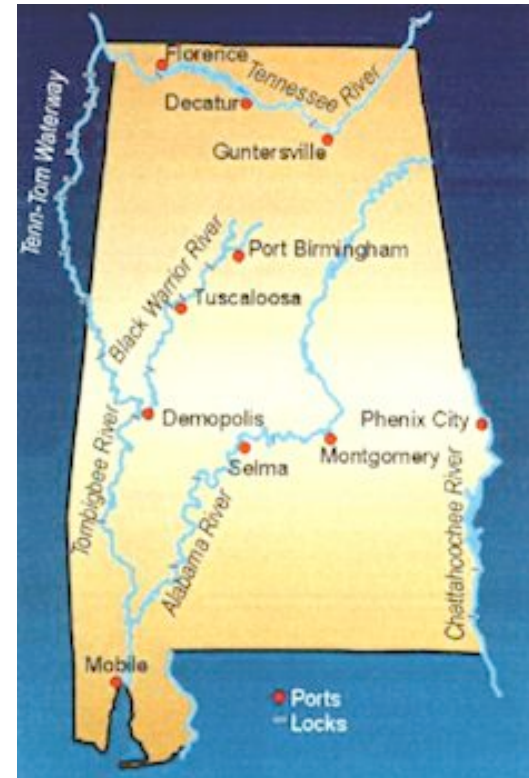
3.6 million acres freshwater wetlands



Water resources

7th in the country in perennial stream miles

1st in the country in navigable stream miles



Water rich

- ~ 10% of the freshwater resources in the continental United States flow through Alabama

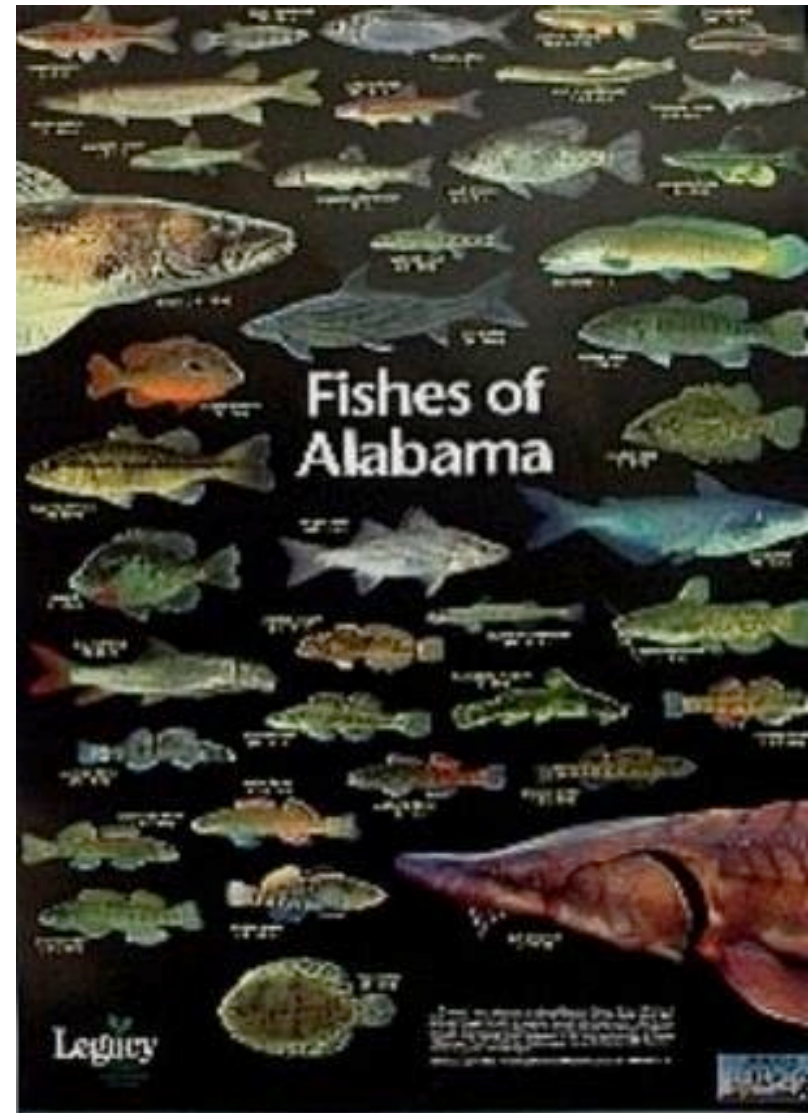
U.S. Geological Survey



<http://keithmaps.com/mrtdaerial.aspx>

Diversity of Aquatic Vertebrates

- 320 Fishes
(306 native; 883 in U.S.)
- 73 Amphibians
(30 frogs, 43 salamanders)
- 81 Reptiles
(40 snakes, 28 turtles)



Diversity of Alabama's Aquatic Invertebrates

118 Snails

(historically, the richest diversity worldwide)

180 Mussels

(2/3 of North American mussels in AL
1/3 now T/E or extinct)

342 Caddisflies

(most in U.S.; 1,369 in N. America
146 in Cahaba River)



dcnr.state.al.gov



<http://www.gbcma.vic.gov.au/>

What can we do?

Look at stormwater differently

Amenity, not problem ...



Rain Garden Overview



Rain Garden Certification Alabama Cooperative Extension System

*Adapted from North Carolina State University
USDA Southern Regional Water Program*

What is a Rain Garden?

Shallow depression in a landscape that captures stormwater runoff and holds it a short time

Allows stormwater to infiltrate into soil

An attractive addition to any landscape ~ butterflies, birds, and less lawn to mow



Rain Gardens Improve Water Quality

Handle stormwater at its source.

Keeps water on the surface aiding infiltration

Decreases velocity of water flowing from impervious surfaces

Improves water quality before it enters the stream or drain

Reduces nutrients, heavy metals, sediment, fecal coliform

Cost effective (average \$2 - \$5 per ft²)

Rain Garden

(after 3 years)



Photos <http://www.waterbalance.ca>





Rain Garden or Bioretention....?

It's a matter of scale.....



Rain Gardens

- Similar plants
- No Professional Engineer (PE) or Registered Landscape Architect (RLA) approval required
- Usually small, ‘homeowner sized’ (60-100 ft²)
- Uses in-place / native soil
- Have customers that like plants? This is for you!

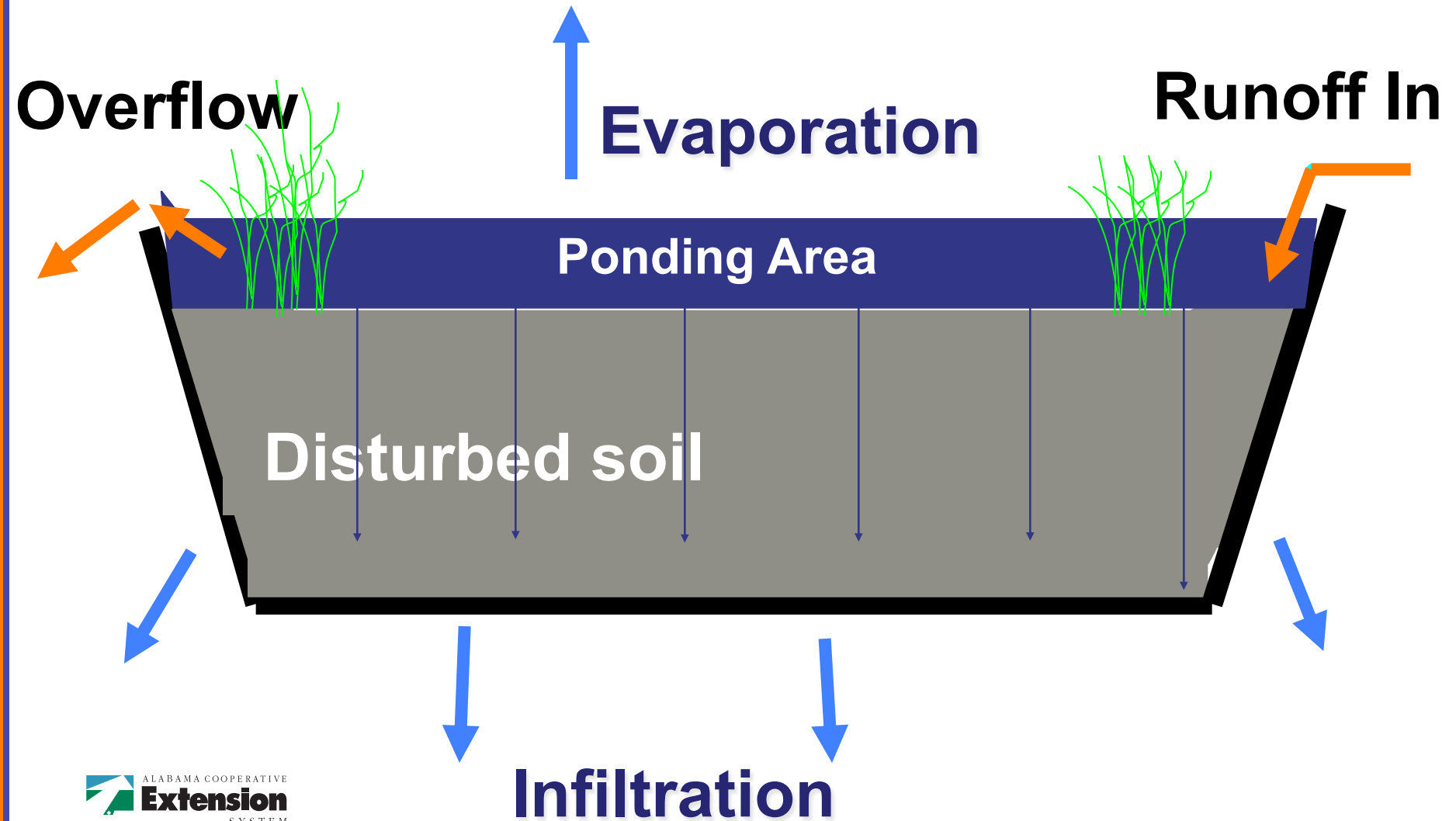
Bioretention

- Similar plants
- RLA / PE approval required
- Can be small - very large
- Use specialized engineered soils / soil media to promote pollutant removal
- Use under drains to insure that it drains
- May be installed to meet regulatory requirements
- Documented pollutant removal

Rain Gardens are like. . .



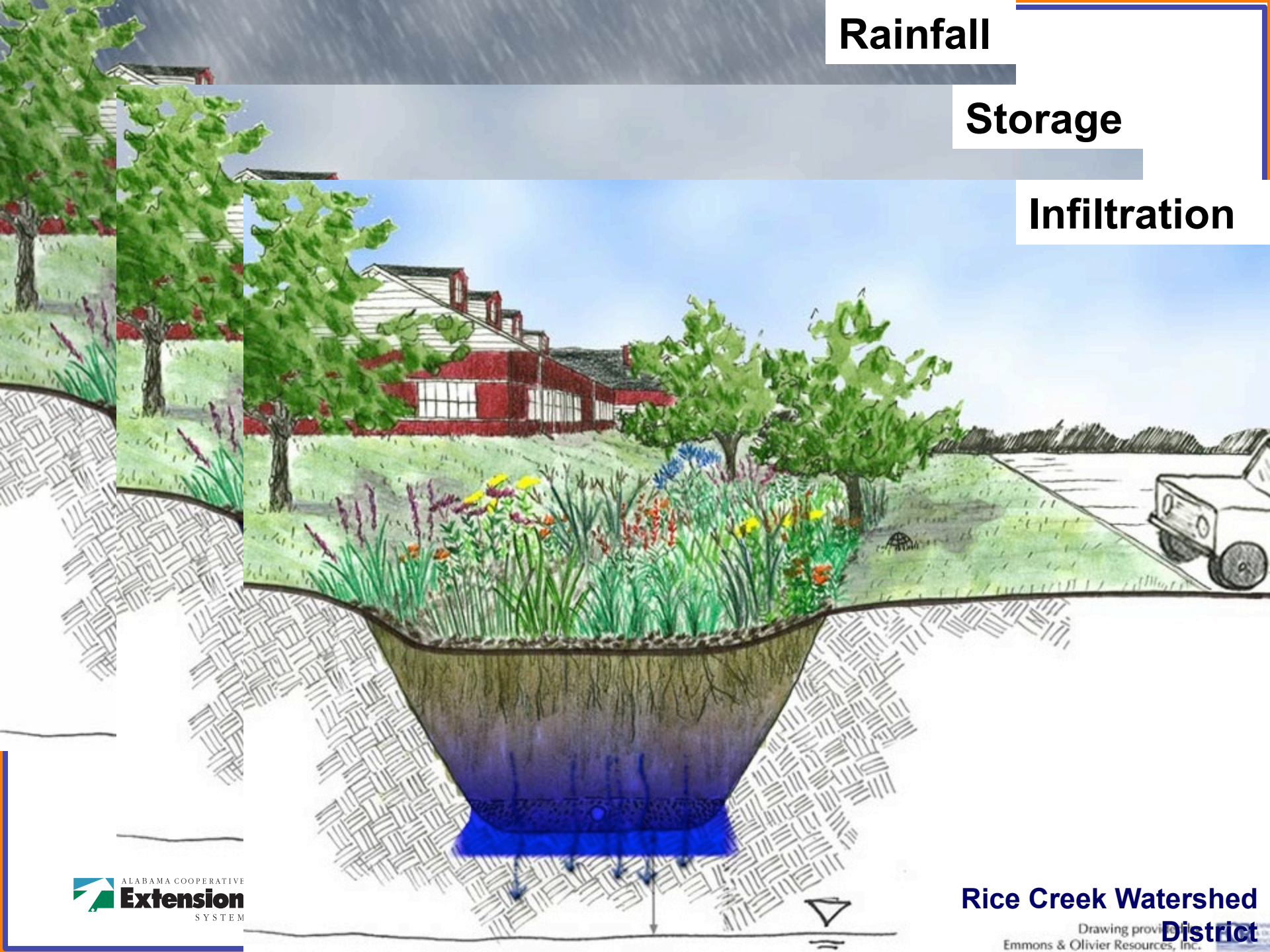
Rain Garden Components



Rainfall

Storage

Infiltration



Site Investigation and Selection

Where is the best location for a rain garden?

What are the ideal soils?

What are some constraints?

Site Selection

1. Identify potential locations
2. Perform infiltration test
3. Pick best site based on infiltration rate
4. Perform follow up 'deep' infiltration test if site may be influenced by seasonal high water table, hardpan, bedrock
 1. Look for grey mottled soils vs. orange soils
 2. Evaluate location of water table (especially at coast)

Rain Garden Location

Consider

Topography

Drainage patterns

Downspouts

Driveways

Ponding



Rain Garden Location

Place your garden between runoff source and destination

Want to intercept water before it reaches surface waters or the storm drain network

Good rule of thumb – 10' downslope of downspout



Rain Garden Location

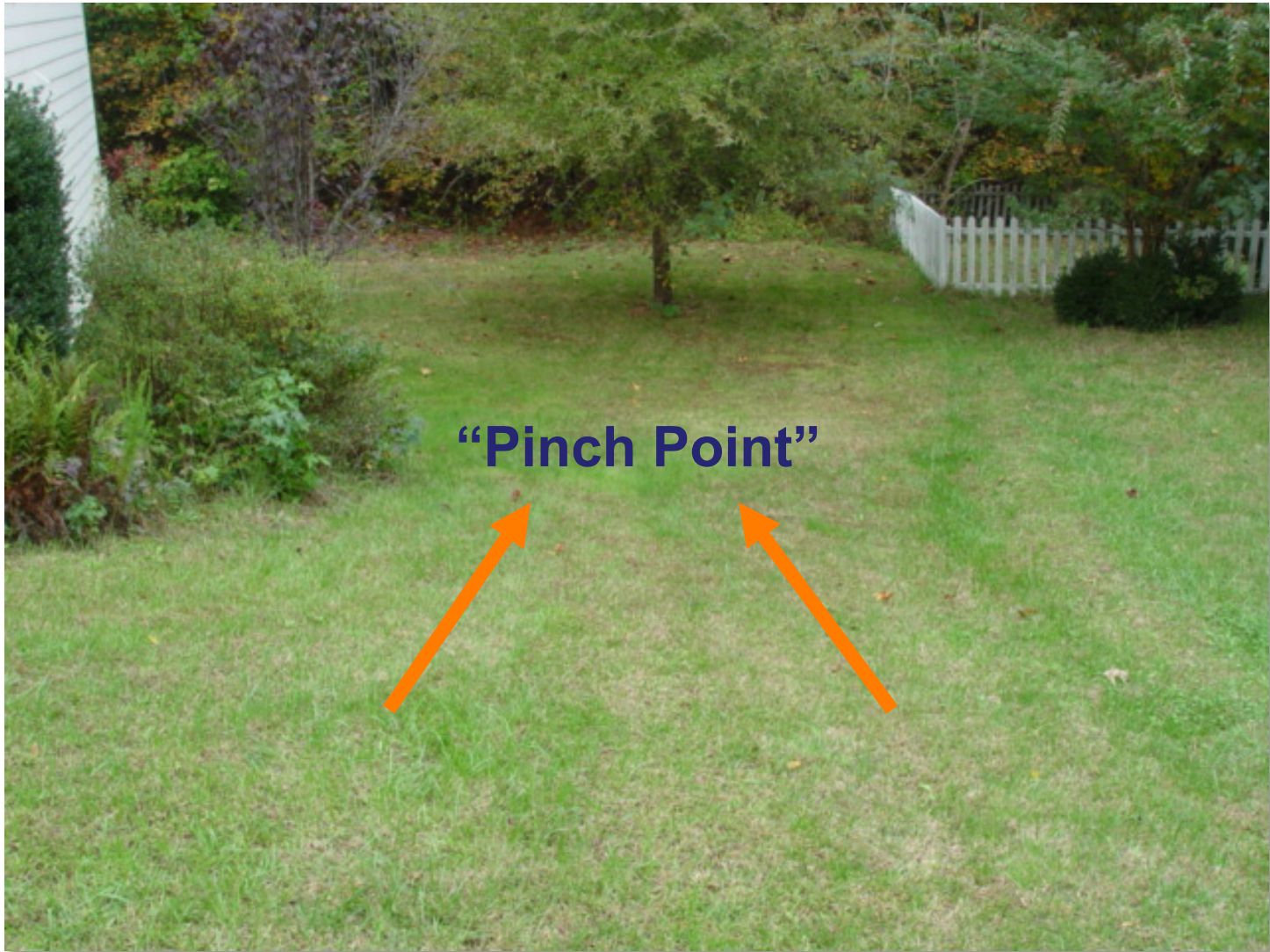


Downspouts

Rain Garden Location



Rain Garden Location



Rain Garden Location



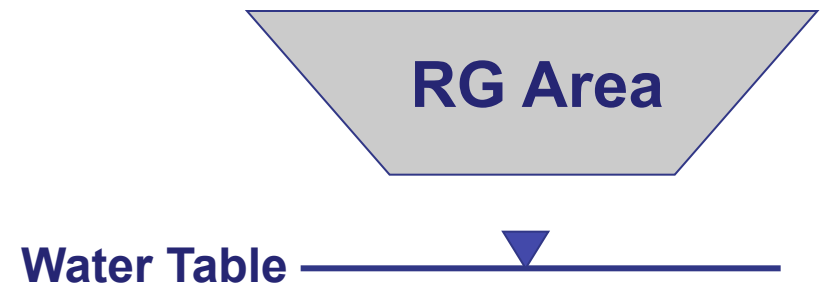
Rain Garden Location

Constraints

Seasonally high water table:
2 ft separation from bottom

Utilities: 811

Call before you dig



Evaluate Soils and Drainage

Wet, impermeable soil

Water remains in test pit 3 days after rainfall

Ponded water on surface for extended periods

Wetland soils – grey matrix mixed with areas of brown color



Rain Garden Location

Constraints

Building foundations

> 10 ft and NEVER uphill

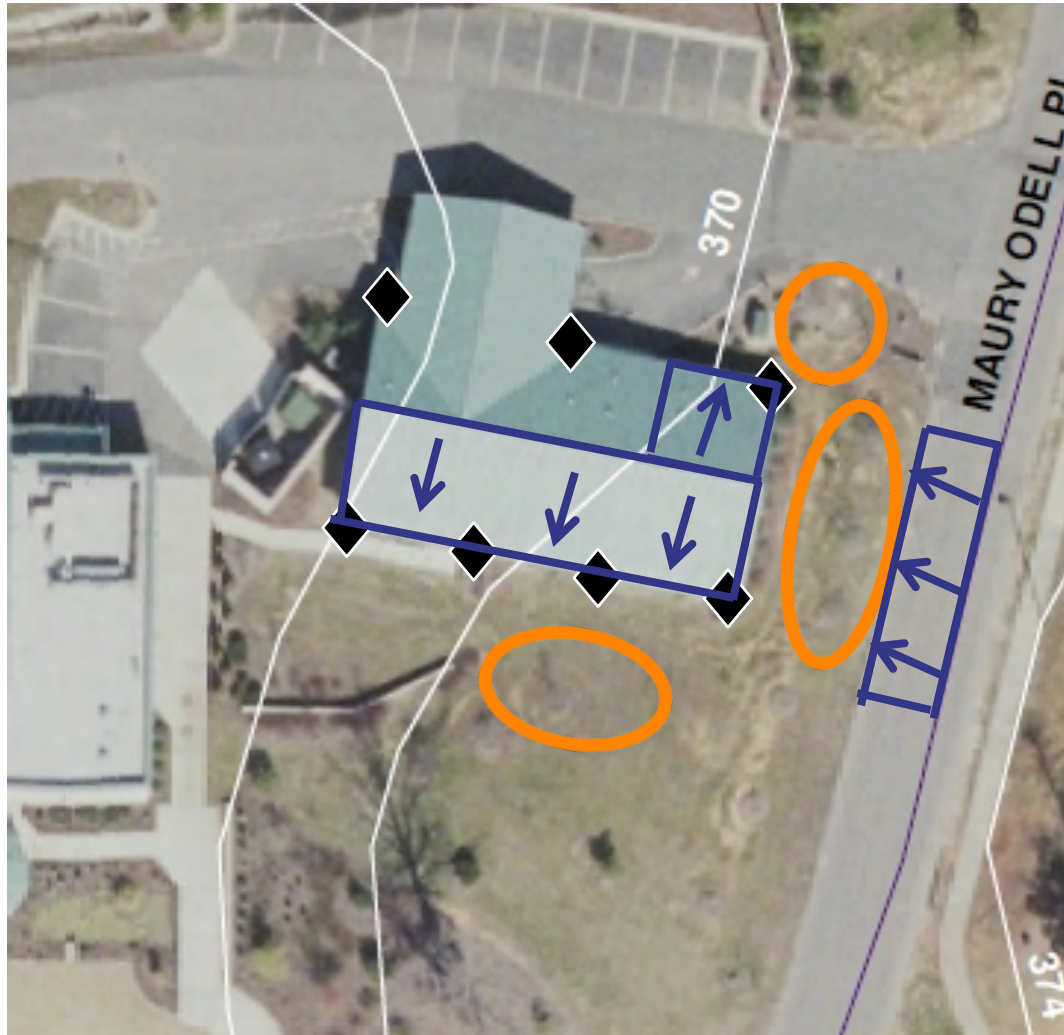
Septic system drain field

>25 ft downhill or laterally and NEVER uphill

Wellhead/
springhead



Rain Garden Location



Rain Garden Location

Integrate into existing landscaping



Rain Garden Location

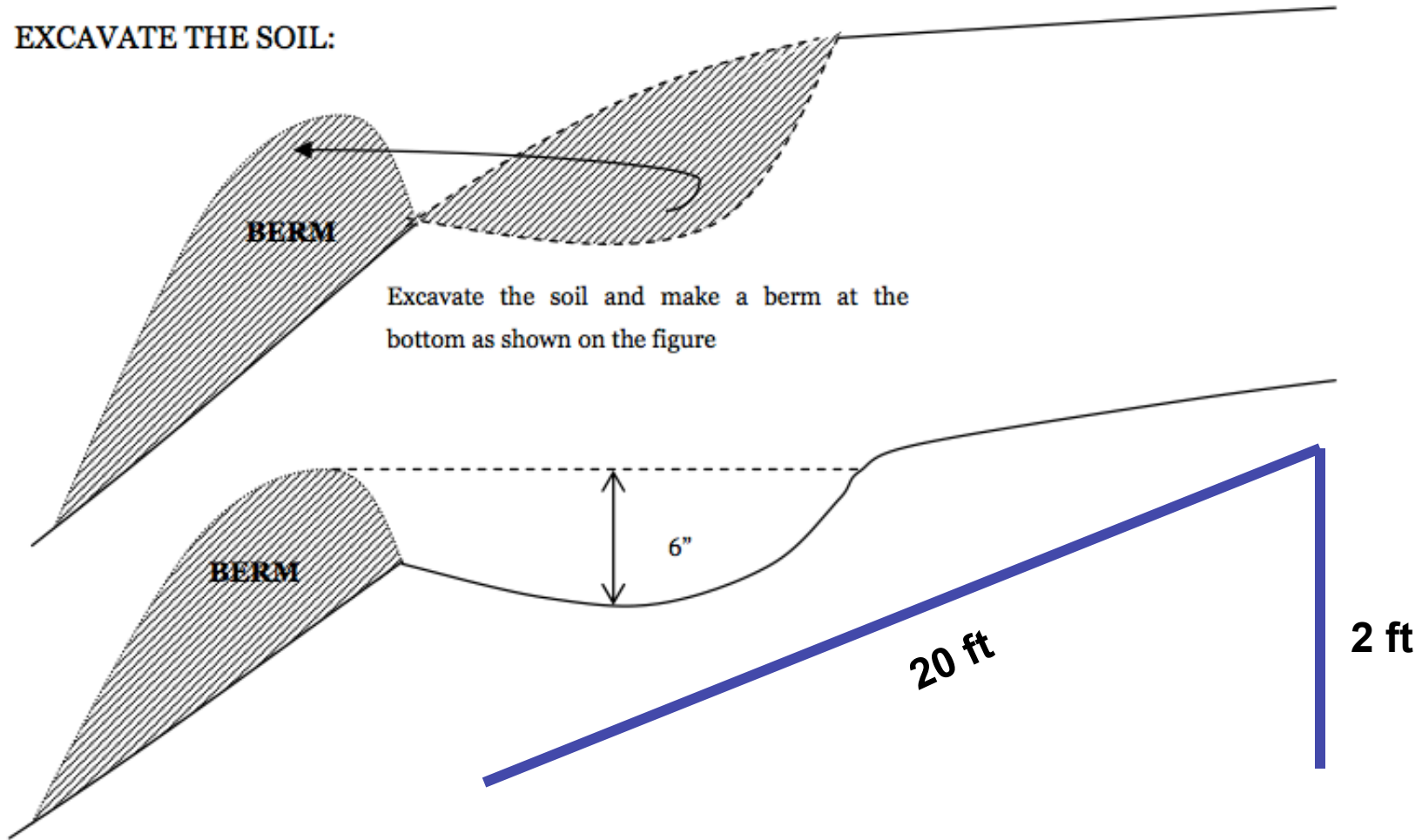
Integrate into existing landscaping



Rain Garden Location

Slopes >10% not ideal

EXCAVATE THE SOIL:



Infiltration Test



Dig 1' deep hole at potential locations (post hole digger)

Fill with water – may want to prime the hole if it's been dry

Measure drainage at each test hole

Repeat & record average drainage rate

Select rain garden location based on these initial tests

Infiltration Test

After location is selected, may do follow up infiltration test to evaluate soils and drainage of that particular area (especially if there are concerns about shallow water table, bedrock, hardpan, or other constraints that could interfere with stormwater infiltration)

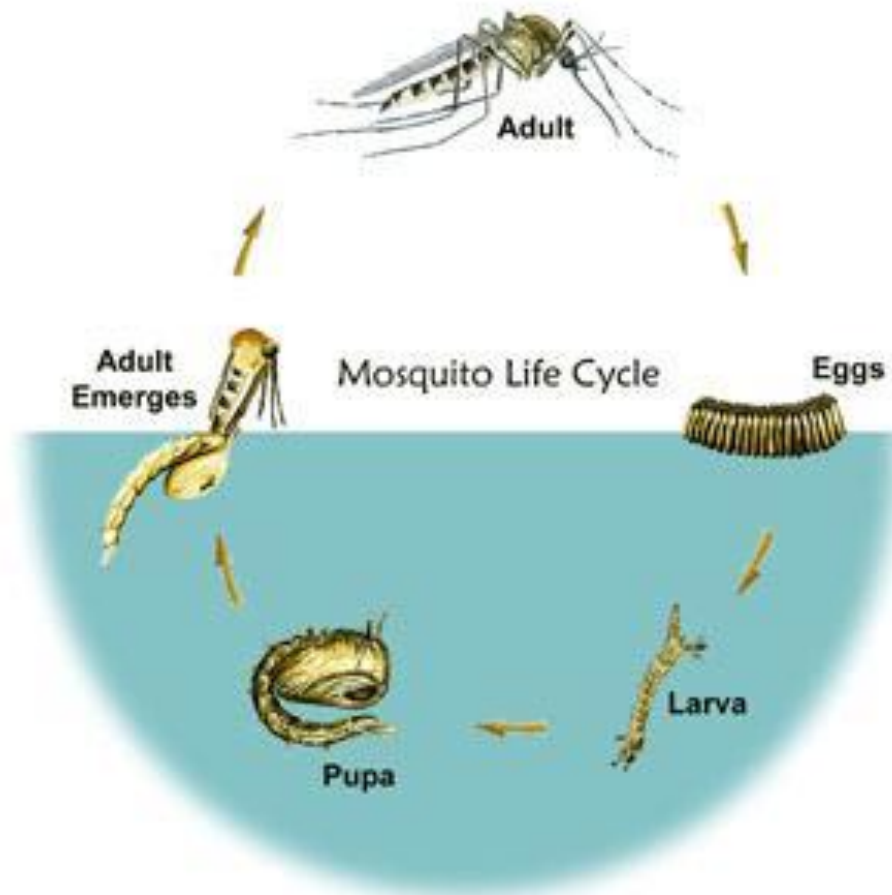
Dig 2 or 3 holes at a depth of 2'

Fill with water

Record average drainage rate



How long does it take a mosquito to go from egg to adult?



Infiltration Test: Rain Garden Type

Drain Time (Drainage Rate)	Appropriate Landscape Practice
< 12 hours (> 1"/hr)	Standard Rain Garden
12 – 36 hours (0.25-0.9"/hr)	Standard Rain Garden (amended soils for better infiltration)
> 3 days (< 0.5"/hr)	Wet Rain Garden

Amended Soils

Mix in coarse sand (available from local garden shop) to loamy topsoil

Estimate one cubic yard of sand and compost / organic matter for every 100 ft² of rain garden (~ 3 in layer of amendment)



Rain Garden Construction

Add garden after
other construction is
finished

Take note of potential
or active construction



Soil Test – Don't Guess

Determine lime and nutrient requirements

Important for initial plant establishment

Results available in 48 hours

Best \$7 you'll spend!



Interpreting a Soil Test



Dr Eve Brantley
202 Funchess Hall
Auburn, AL 36849

Report on Soil Test

Auburn University Soil Testing Laboratory

Auburn University, AL 36849-5411



County: Lee
District: 2
Test Date: 11/19/12

LAB No.	Sample Designation	Crop	Soil Group*	pH**	SOIL TEST RESULTS				RECOMMENDATIONS			
					Phosphorus P***	Potassium K***	Magnesium Mg***	Calcium Ca***	LIME-STONE	N	P ₂ O ₅	K ₂ O
					Pounds/Acre				Tons/Acre	Pounds/Acre		
03422	Ridgewood See Comments 1,2,3	Annuals	2	6.0	VL 10	H 198	H 201	H 1429	0.0	120	100	0
	Ridgewood See Comments 2,4,5	Perennials/Shrubs/Tree	2	6.0	VL 10	H 198	H 201	H 1429	0.0	120	120	0

- Comment No.1: Per 100 sq. ft. apply 1 pint triple superphosphate (0-45-0) or equivalent and 1/2 cup 34-0-0 or equivalent when spring growth begins. Repeat the 34-0-0 application monthly until about August 1.
- Comment No.2: Final remark - For small areas, comments give examples of ways to meet the fertilizer recommendations. Other fertilizer grades or materials that supply equivalent amounts of plant nutrients may be used with equal results. If you need assistance in calculating amounts of other materials to use, contact your county agent or fertilizer supplier. A pint of dry fertilizer is approximately 1 pound.
- Comment No.3: 1.0 Ton limestone per acre is approximately equivalent to 50 pounds per 1,000 sq. ft.
- Comment No.4: Per 100 sq. ft. apply 1 pint triple superphosphate (0-45-0) or equivalent and 1 cup 34-0-0 or equivalent in early spring and then apply 1 cup 34-0-0 in early summer.
- Comment No.5: Shrubs - Final remark on liming. For shrubs such as azaleas, gardenias, and rhododendron, which require acid soil do not apply lime. If the pH is below 5.0 you may wish to check with your county agent concerning the advisability of using a reduced rate of lime for these shrubs.

Closing Thoughts

Ask PE or RLA for help with larger rain gardens, bioretention, or for steep slopes

Avoid concentrating runoff towards neighbors

Designed to capture first 1" of runoff

Won't necessarily solve standing water or poor drainage

Not a solution for curing increased stormwater runoff from additional developments uphill

Sediment will clog a rain garden



Photo: NCSU

Questions?



Photo: NCSU