



**Sediment Pollution Control Provided by Best  
Management Practices –  
A Case Study from the North River Watershed**

**ADEM Nonpoint Source Conference**

**Mary Wallace Pitts – Coordinator, North River Watershed  
Abner F. Patton – Chairman, Patton Geologics,  
Chairman, Black Warrior Lower Sub-Basin, CWP  
January 15, 2015**



# ADEM

*This project was partially funded by the Alabama Department of Environmental Management through a Clean Water Act Section 319(h) nonpoint source grant.*

Phase I January 2011 – December 2013

Phase II January 2014-December 2016



# The Place

- The North River
- Major tributary of the Black Warrior River

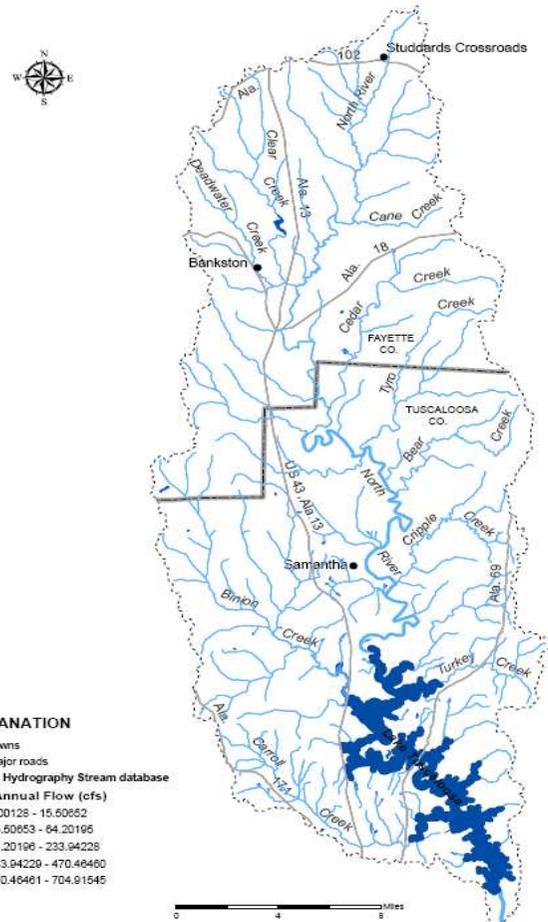
- Area 428 sq. miles

- CWA 303(d) 1998-2008 Impaired Waters

- Public Water Supply and Swimming

- Fish and Wildlife

- SHU #11



Main tributaries of the North River



## Land Use / Land Cover in the North River watershed

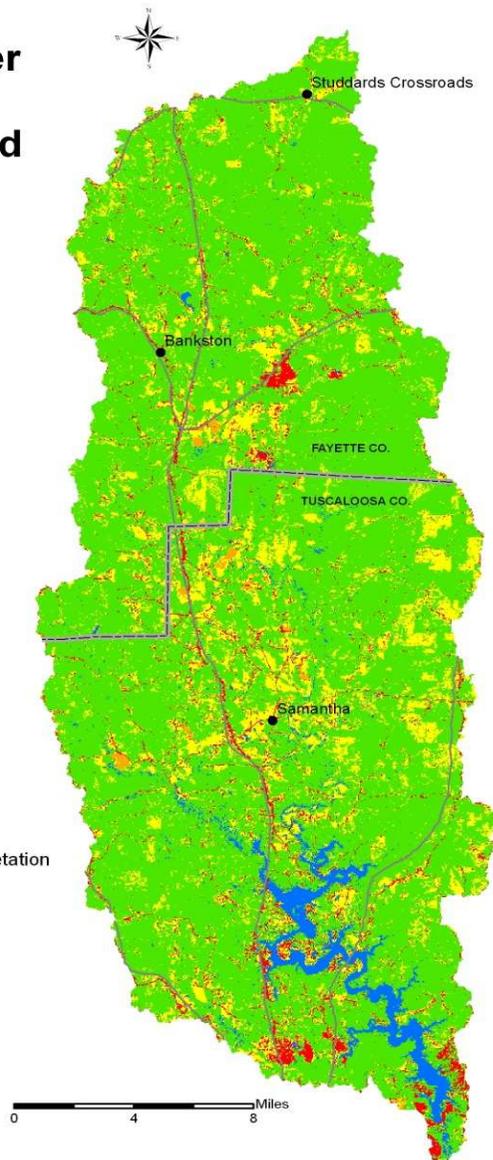
### EXPLANATION

- Towns
- Major roads

### USDA-NASS Land Cover Data

#### Class

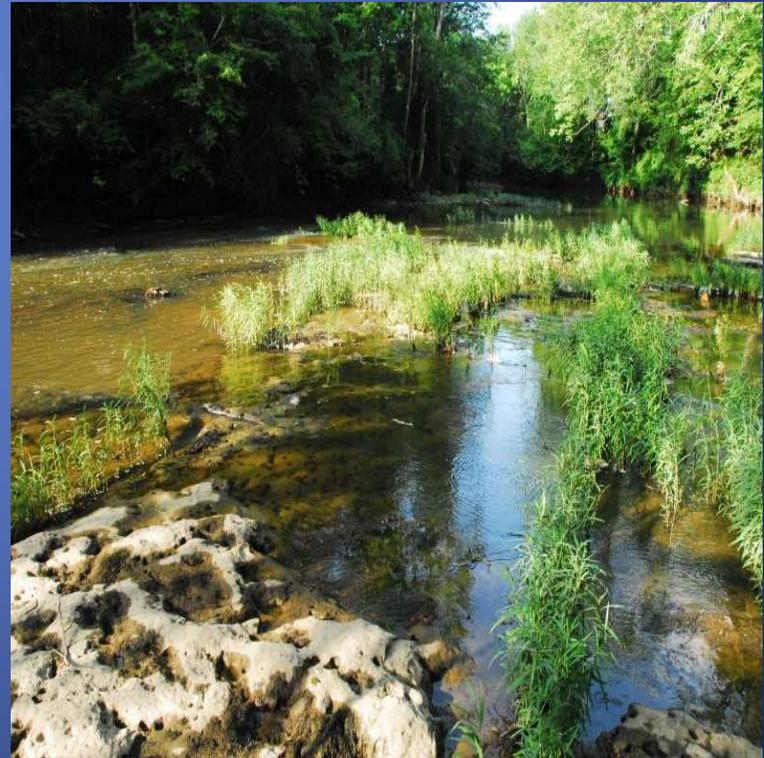
- Open water and wetlands
- Cropland
- Forest
- Developed and barren lands
- Pasture, shrub/scrublands, and transitional vegetation



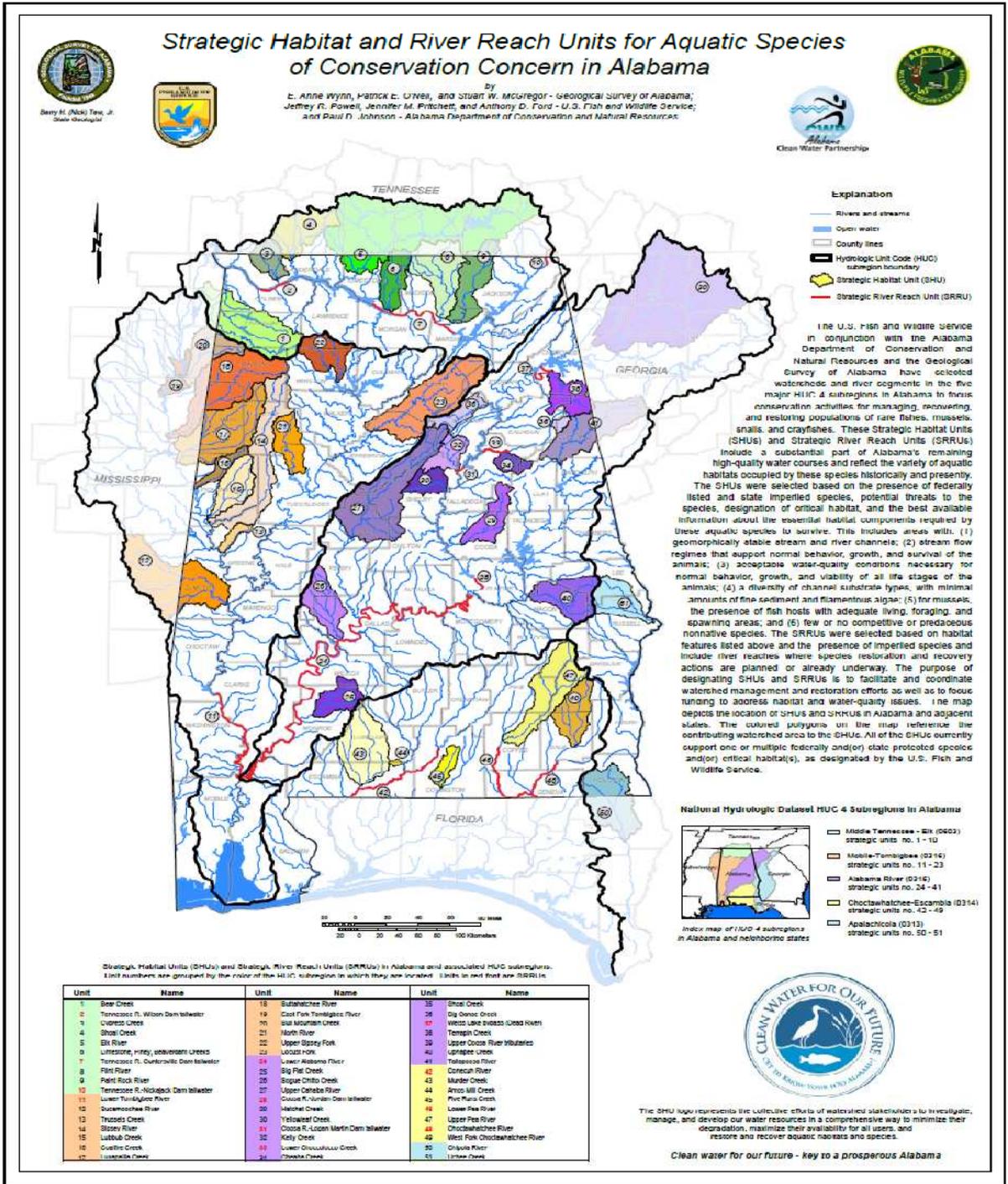
- 77%  
Forested
- 10%  
Transitional
- 5%  
Agricultural
- 4%  
Urbanized

# Water Use Classification

- Fish & Wildlife
- Public Water Supply and Swimming



Alabama's "Strategic Habitat Unit" (SHU) project-  
 "specific locations of individual fish habitats or systems of fish habitats that have been identified to provide exceptional habitat functions or that are particularly at risk due to imminent threats, vulnerability, or rarity."



The SHU map represents the collective efforts of watershed stakeholders to investigate, manage, and develop our water resources in a comprehensive way to minimize their degradation, maximize their availability for all users, and restore and recover aquatic habitats and species.

**Clean water for our future - key to a prosperous Alabama**

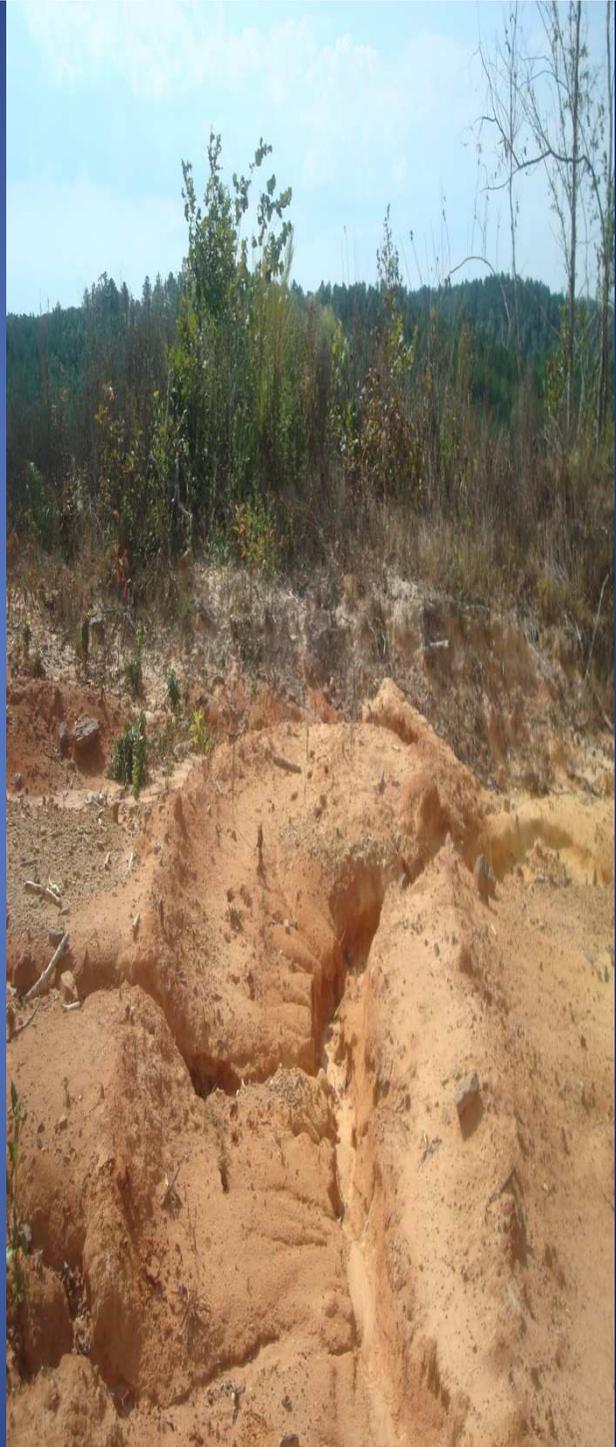
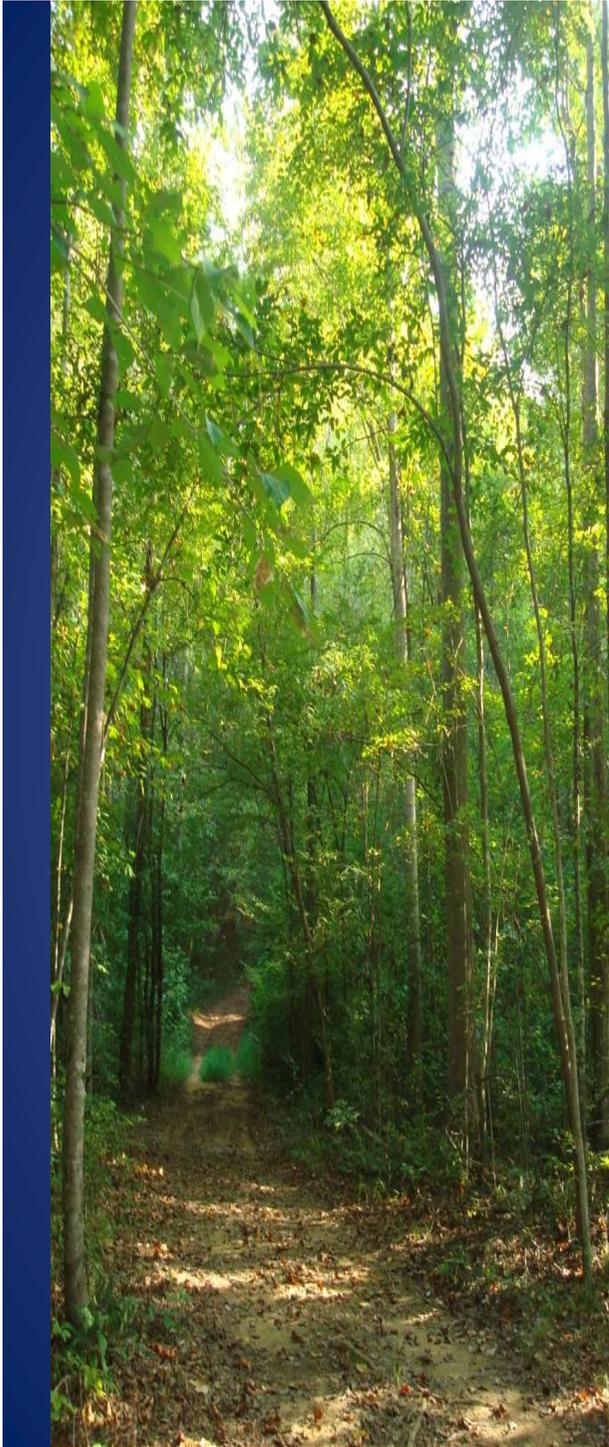
# Public Drinking Water Supplies Lake Tuscaloosa



# Public Drinking Water Supply City of Berry - Bays Lake







# The Problem

## North River 303(d) Listing

- Listed on the 1998 - 2008 CWA Section 303(d) Lists of Impaired Waters
- Listed Impairments
  - Nutrients
  - Siltation
  - Other Habitat Alterations

# The People

## Plan Development

- Black Warrior Clean Water Partnership
- Geological Survey of Alabama
- U.S. Fish & Wildlife Service
- Alabama Department of Environmental Management
- City of Berry
- City of Tuscaloosa
- Fayette County Soil & Water Conservation District
- Alabama Forestry Commission
- Tuscaloosa Health Department
- University of Alabama Natural History Museum
- Alabama Clean Water Partnership
- Cawaco Resource Conservation & Development Council, Inc.
- USDA/NRCS

## Plan Partners

- Black Warrior Clean Water Partnership
- Geological Survey of Alabama
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- USDA/NRCS
- **US Fish and Wildlife**
- **US COE**
- **USGS**
- **Westervelt**
- **Weyerhaeuser**
- **Mercedes**
- **University of Alabama**
- **University of North Alabama**
- **University of West Alabama**
- **Sassafras**
- **Green Drinks**
- **Civitans**
- **Tuscaloosa Neighborhoods Together**
- **Sierra Club**
- **Tuscaloosa Natural Resource Committee**
- **Every school**
- **Every home**
- **EVERY PERSON IN THE WATERSHED**







# North River Watershed















## Beyond Source Water Protection; A Case Study from North River

**Evolution of Current Source Water Protection Planning**

- Accounts for less than 10% of inputs within the watershed
- Only a portion of the 11 miles of head network
- Does not account for any land use such as agriculture, petroleum extraction, or forestry
- Lack of implementation of the plan in 2007, water quality has declined
- Limited effectiveness of water quality management

**A Shift in Vision**

**Beyond Source Water Protection: Wherever the Polls Are Included**

- Land management
- Essential characteristics affecting ecosystem health
- Comprehensive watershed protection plan
- Comprehensively managed freshwater resources within the watershed
- Long-term sustainability of water supplies for every Alabama

**Current Plan** (ESAP): 21 miles of paved head network, 100% paved and 40% head network

**Current Plan** (ESAP): 21 miles of paved head network, 100% paved and 40% head network

The presentation board features a title at the top, two columns of bullet points, a central diagram with an arrow, and a line graph at the bottom. The graph shows two data series over time, with one series showing a significant decline after 2007.



# The Plan

An aerial photograph of a large, forested island in a deep blue lake. The island is covered in dense green trees and is surrounded by water. The sky is a clear, light blue. The text 'The Plan' is overlaid in green at the top, and two bullet points are overlaid in white on the left side.

- **Load Reduction Strategies**

- **Education and Outreach Programs**

# Load Reduction and Education

## Lake Clean-Ups

- Annual Events
- Hundreds of Volunteers
- Thousands of lbs of trash
- Community wide
- University only

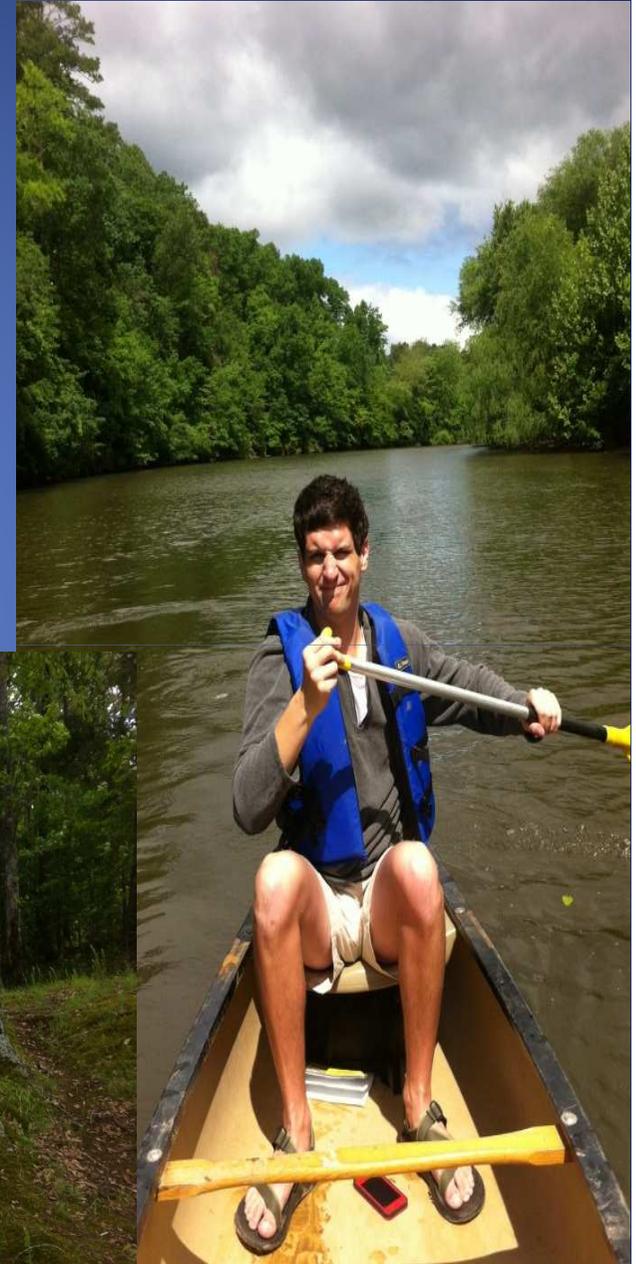








# Education















# Education WaterFest





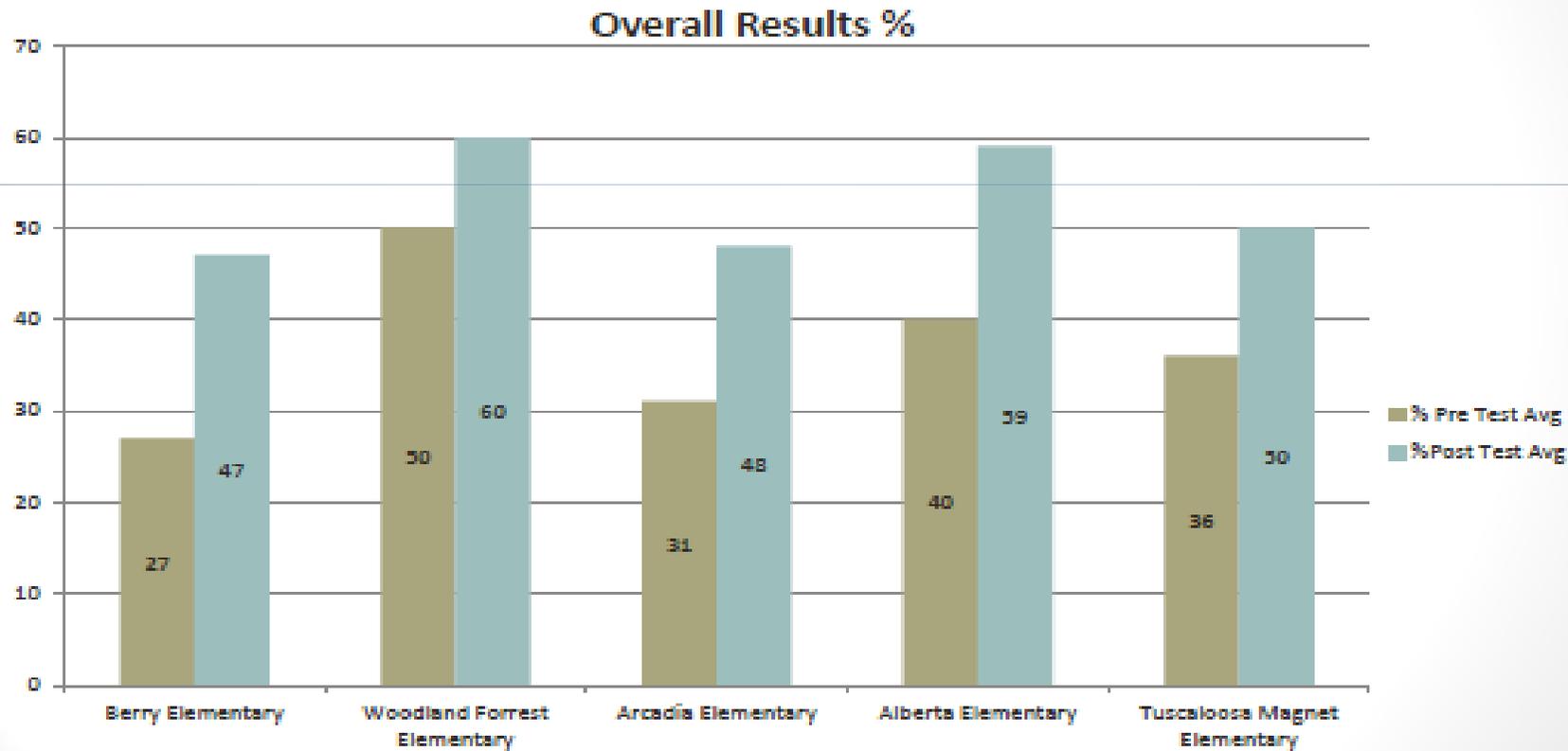


# Northside High Volunteers



# Quantify.....

## Overall Evaluation Results from 2014:



# Watershed Festivals Growth 2012, 2013, 2014

## WaterFest 2012

- 200 Students
- 2 Schools
- 15 Exhibits
- 6 Stations in the Educational Hands-On component
- 15 UA Volunteers
- 8 Northside High School Volunteers

## WaterFest 2014

- 350 Participants
- 8 Schools
- 20 Exhibits
- 7 Stations in the Educational Hands-On component
- 40 UA Volunteers
- 25 Northside High School Volunteers

# EDUCATION

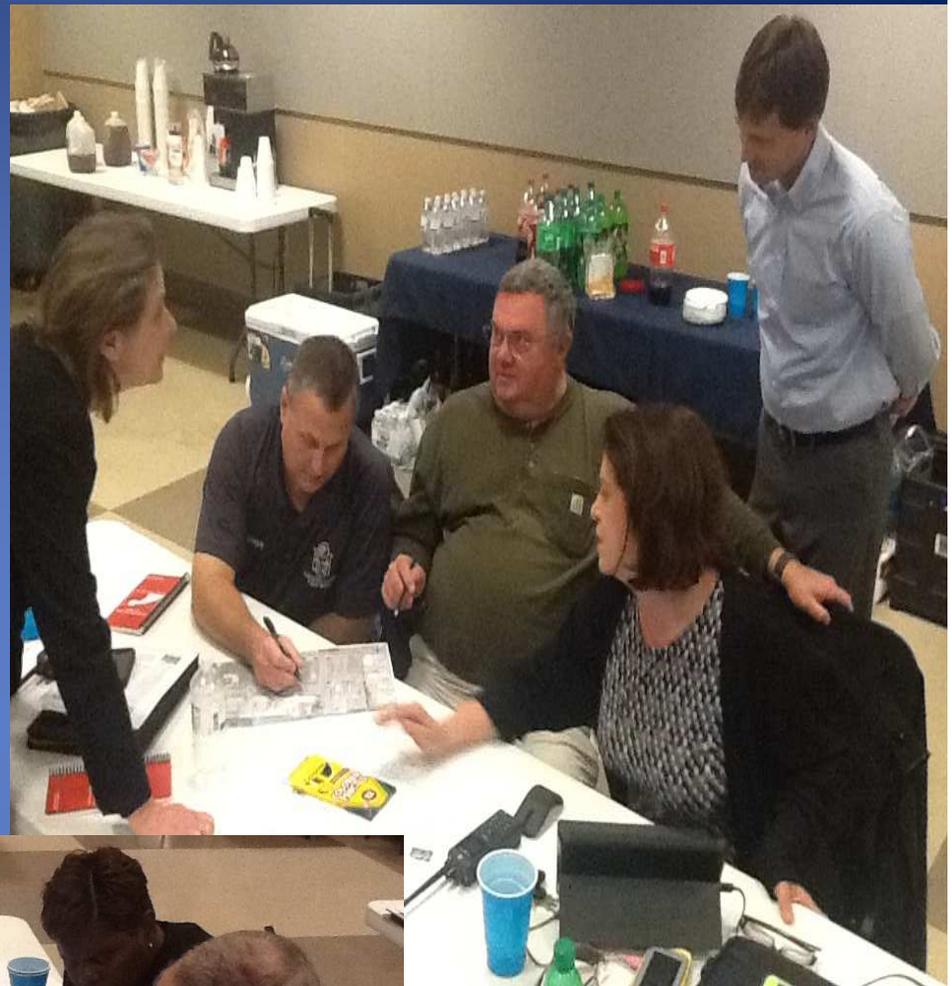
## Educating Professionals - Forestry



# Unpaved Road Workshop



# Low Impact Development Workshop



# Field Trips Local, State and Federal Agencies, Universities



# Alabama Water Resource Conferences

## 2012

## 2013

### Session 5 “North River Watershed Management Plan Implementation

Session Chair: Allison Jenkins, Alabama Clean Water Partnership

- Exhibit
- Student Poster Competition
- “Beyond Source Water Protection – A Case Study from the North River”

## 2014

### Session: “North River Watershed Management - Partnerships

Session Chair: Mary Wallace Pitts, North River Watershed



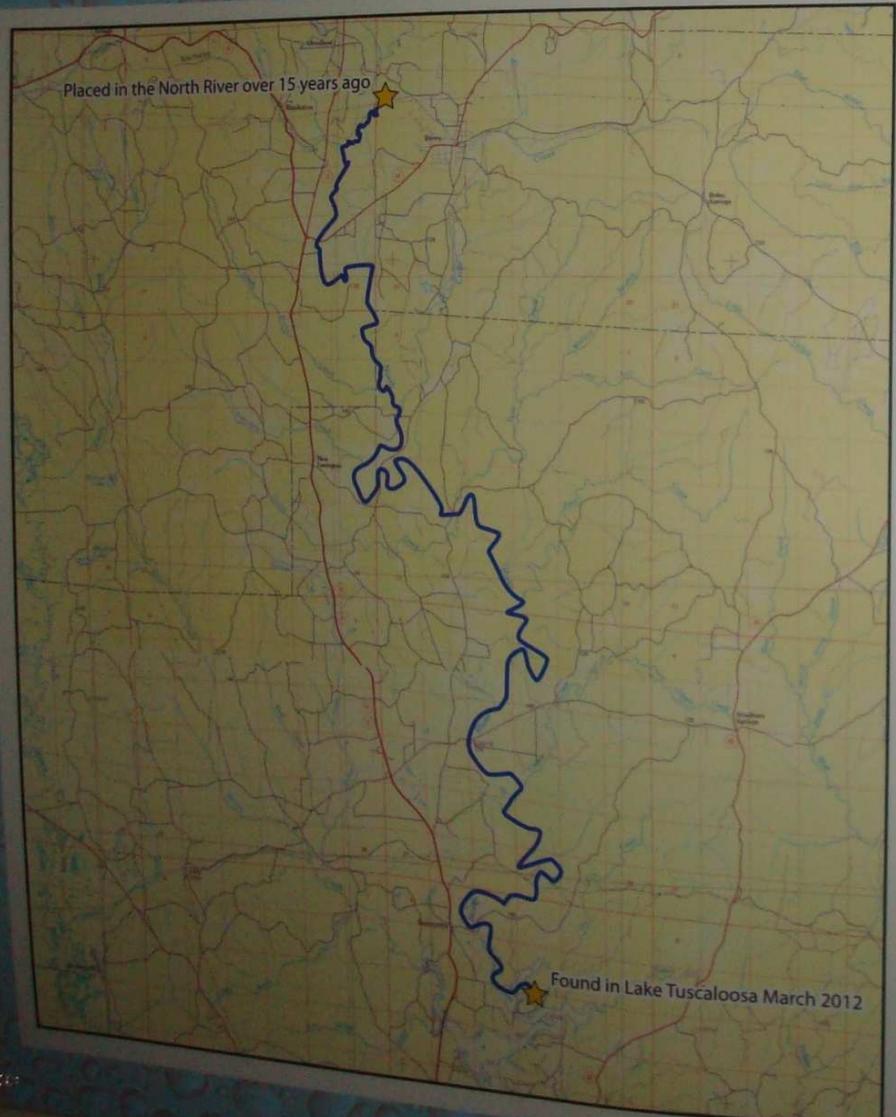
# What we've learned.....







# A Bottle's Journey Through the Watershed



## Message in a bottle leads to students' chance to

**Jessica Ruffin**  
Contributing Writer

A message in a bottle became more than just a plot for a romantic movie for UA graduate geography students one day in March.

Students were participating in a winter cleanup of a lake with professor Mary Wallace Pitts, and one of them found a bottle with a note inside it from a third grade class. The letter asked the person who found it to visit Mrs. Scott's third grade class in Berry.

However, Pitts said there was a slight problem with that request — Scott was retired and the student who wrote the letter has now graduated from college.

"It was really neat because part of what we're trying to do is educate the kids that every thing we do affects water quality," Pitts said. "The bottle was a perfect step to show them that because the bottle came from their school, in order to educate schools in Alabama and the rest of the community about water resources, Pitts will assist with the Lake Tuscaloosa-North River Watershed event this weekend. The Watershed will consist of two events: the Watershed Festival on Friday, May 4, and the Lake Nicol cleanup on Saturday, May 5.

Pitts, who serves as the coordinator for the North River Watershed Management Plan, is excited to be able to spread awareness and knowledge about drinking water in the area with the festival on Friday.

"I'm excited because it's a great opportunity for our school to get out into the North River area and see the beauty of the area and who get their drinking water from Lake Tuscaloosa," Pitts said. "Having a student who lives in Berry area schools have pre-registered for this five event."

"They will be guided through a series of educational hands-on components and have an opportunity to learn directly from a number of local, state and federal agencies."

Pitts said she hoped the people in the Tuscaloosa and North River communities would learn from the event more about water quality and how to protect their own drinking water.

**S e e I t**

Saturday, who is also working to put on the event, believes this knowledge is crucial for everyone in the community to know.

"If you live, worship, shop, go to work or school, eat or play anywhere in the greater Tuscaloosa area, then there is a good chance that the quality of our water resource is affecting your quality of life," Sanderford said.

Sanderford also encouraged people from the community to help out with the cleanup on the following day.

"This is the fourth year we have had the cleanup," Sanderford said. "Previously, we have had 100 plus volunteers, and participants clean out more than 50,000 pounds of debris from Lake Tuscaloosa."

Participants will be provided with all equipment including boats, which they will have to bring themselves. They will also be fed lunch and be given a T-shirt following the cleanup.

Sanderford also said that because Alabama Outdoors has teamed up with the UA Outdoor Recreation Program, participants would be able to paddle their own kayaks and canoes or learn how to do so from on-site instructors. However, according to Sanderford, there is another incentive to participating in either of the weekend's events.

"Registered participants in the Watershed Festival and lake cleanup will have opportunity to enter a raffle for great prizes such as a framed local life print, a football signed by Coach Saban and gift cards from Atlantic's Post," Sanderford said, adding that other retailers will be offering prizes as well.

Elizabeth Smith, a junior majoring in psychology, said she was specifically interested in quality water.

"The quality of the water is important because it affects everyone. I think it's great to be doing just as much as we can to improve the water quality."

### IF YOU GO ...

- **What:** Watershed Festival
- **Where:** MaryAnn Phelps Activity Center
- **When:** Friday, May 4 from 9 a.m. to 4 p.m.
- **What:** Lake Nicol Cleanup Day
- **Where:** Back Quarry boat landing, Back Boat landing, Lake Nicol Park boat landing (motorized only)
- **When:** Saturday, May 5 from 8 a.m. to 12 p.m.

Dear Bottle Finder,

My name is Haley Bollinger.  
My address is 1541 Morris Lp. Rd.  
Berry, AL. 35546. Please write me  
back or come to my school. It's  
name is Berry Elem. Mrs. Scott's  
class and tell us about yourself.  
I am a girl I'm 8 yrs. old  
I have blonde hair and blue eyes  
My father is the basketball coach  
at Beyl State. Please write me  
back. How old are you. My mom  
is a



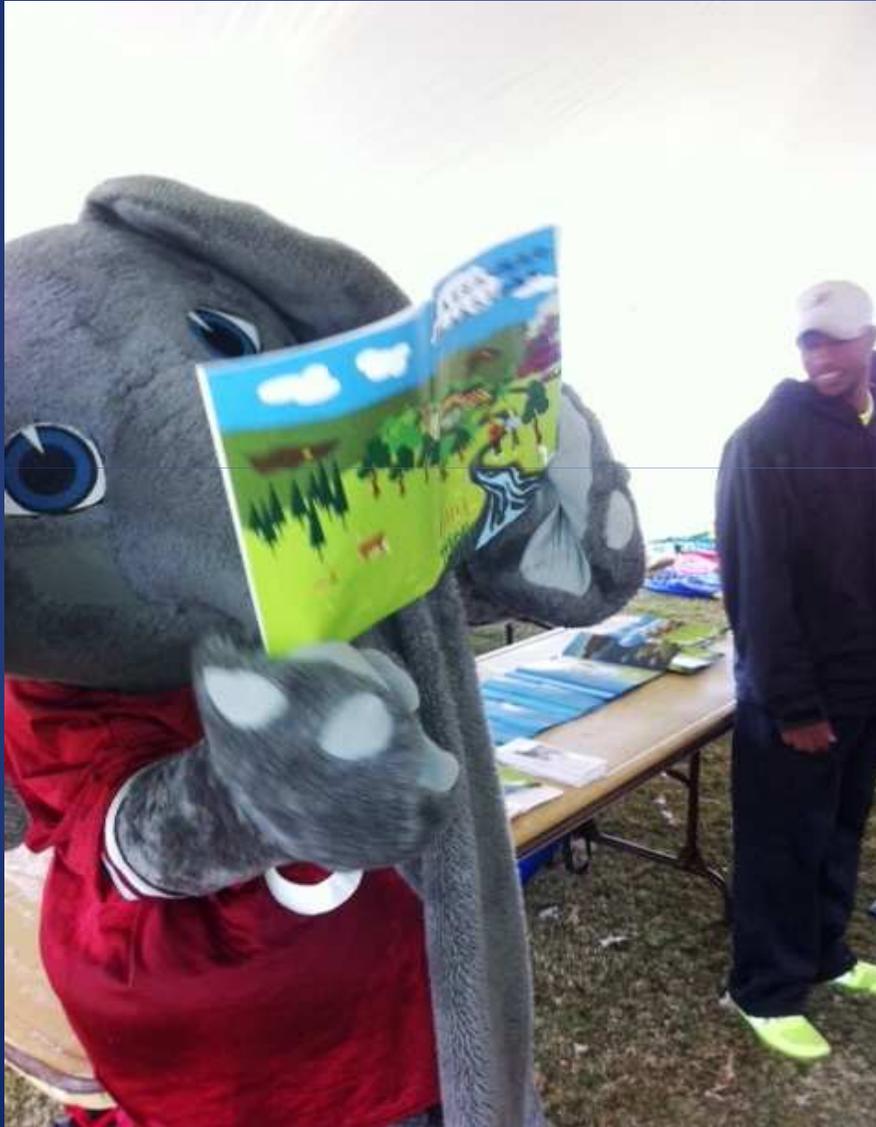
# How have we achieved goals?

- Partnerships
- Community building
- Education
- On the ground bmps

# How do we quantify success?

- Sound science
  - Data: Baseline and Post Project Measurements
- Quantifiable results
  - WQ
  - Sediment reductions
  - Education programs
  - Behavior changes
  - Increased participation

# Big AL learns about North River ...



Still working on Aubie..



# Contact

## Mary Wallace-Pitts

North River Watershed Coordinator

(205) 310-0831

Email: [northriverwatershed@hotmail.com](mailto:northriverwatershed@hotmail.com)

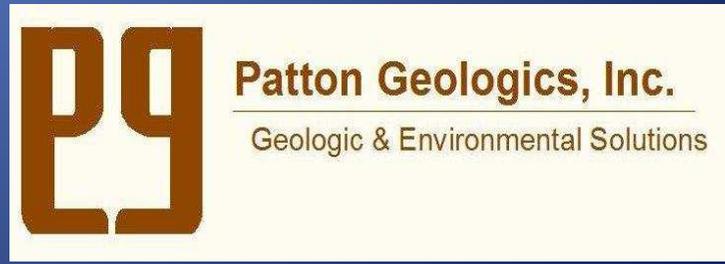
[www.northriverwatershed.org](http://www.northriverwatershed.org)

Photos: Scott Sanderford, City of Tuscaloosa ; UA Museum of Natural History, NRW  
Coordinator

Graphics: Patrick O'Neil and Anne Wynn GSA, Abner Patton, Patton Geologics

# Sediment Pollution Control Provided by Best Management Practices Installation

ADEM Nonpoint Source Conference  
January 2015



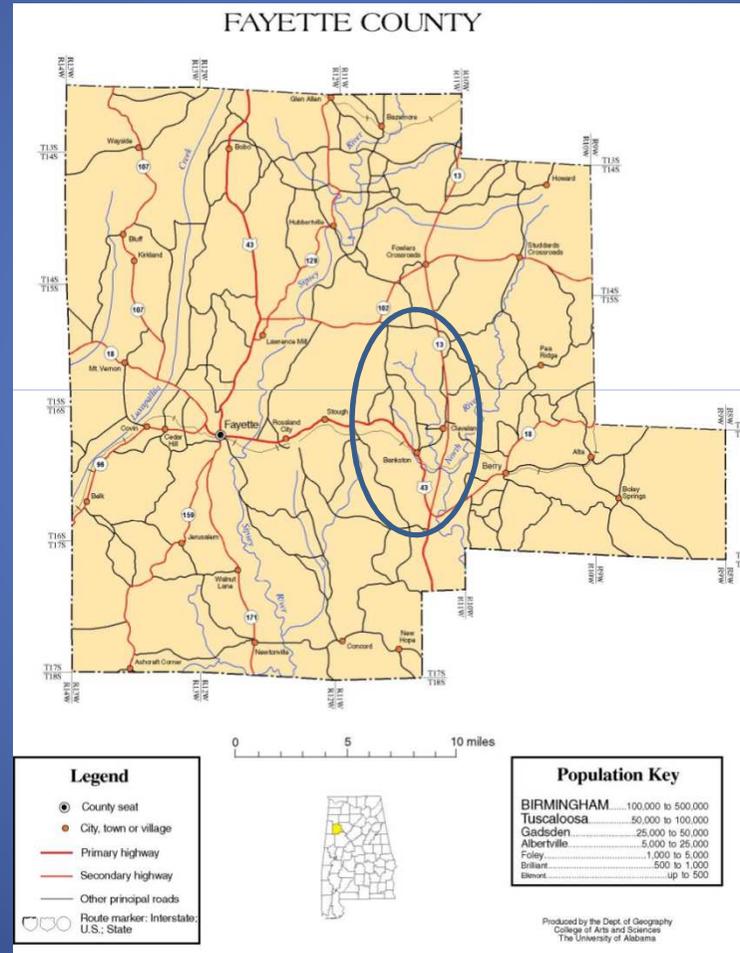
# Strategic Habit Unit (SHU)

- Developed by the U.S. Fish and Wildlife Service as a stream segment supportive of threatened, endangered or protected species
- The Geological Survey of Alabama conducted a survey identifying stream segments that met this criteria and identified potential locations for installation of BMP's

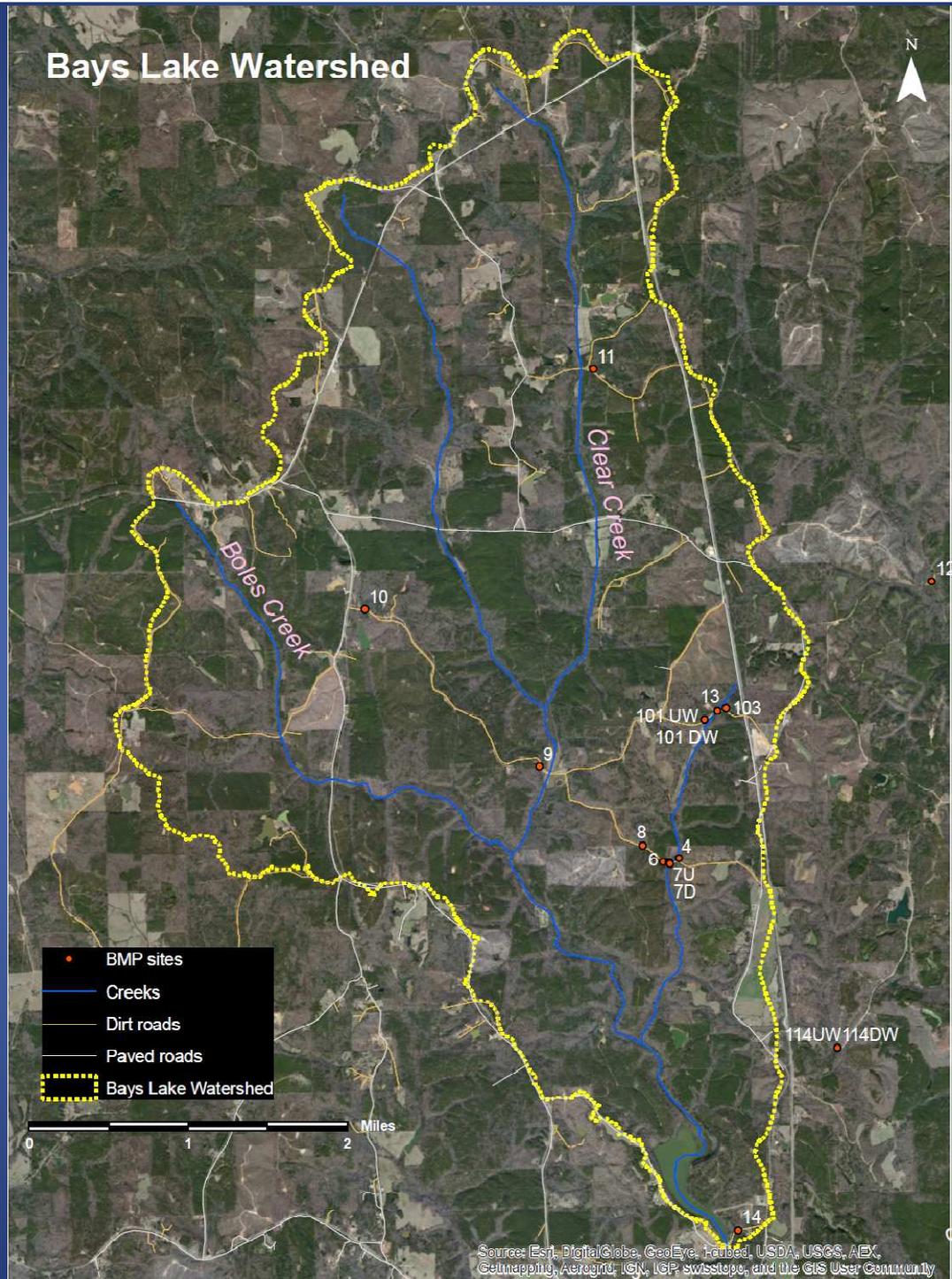
# BMP Construction

- Fayette County and Patton Geologics began installation of Best Management Practices (BMP's) along dirt roads in the Fall of 2011
- Each BMP is different in size and functionality, but all were picked for specific reasons
- Construction is site specific based on topographic conditions of the location and proximity to a stream

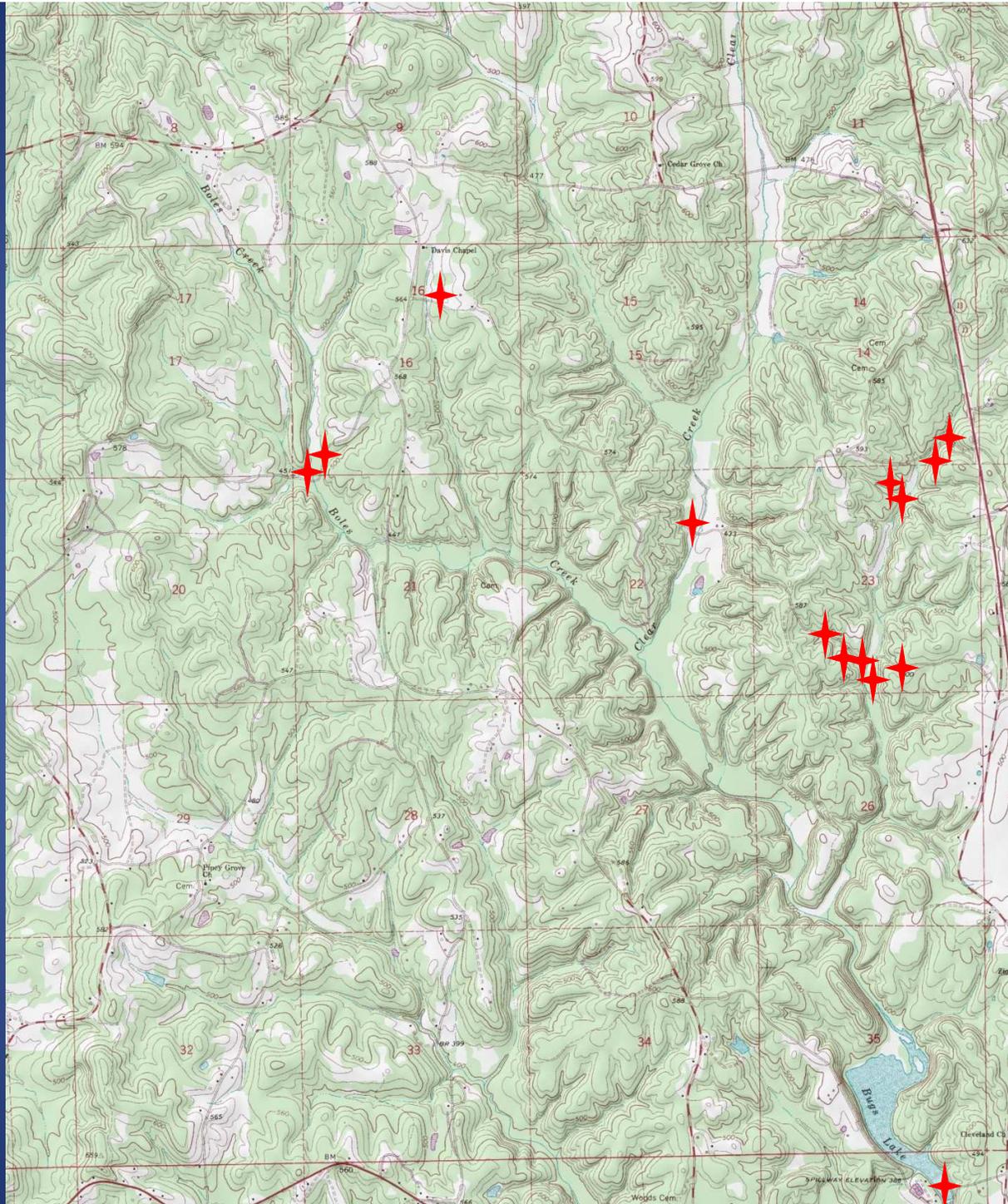
# Study Area Fayette County



# Bays Lake Watershed



Source: Esri, DigitalGlobe, GeoEye, AeroMap, USDA, USGS, AEX, Geomatics, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



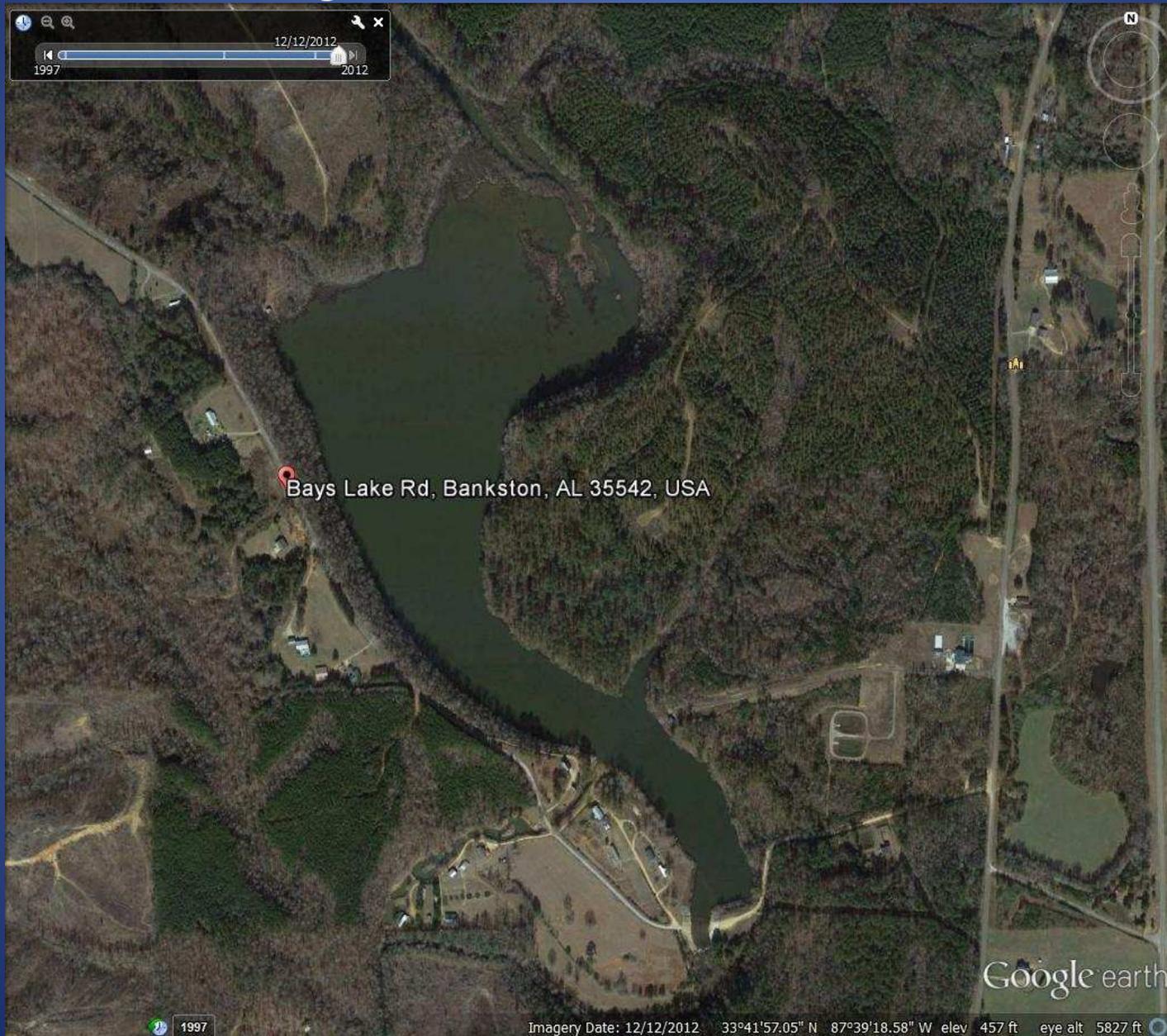
# Bays Lake Facts

- Bays Lake is eighty-one acres in size
- The lake at its deepest point is thirteen-fifteen feet deep
- Bays Lake provides water to 1520 customers, the eastern half of Fayette County
- Bays Lake currently has a normal production of 500,000 gallons of water per day
- Production capacity is 1,000,000 gallons per day

# Bays Lake - 1997



# Bays Lake - 2012



#9



#9



#9



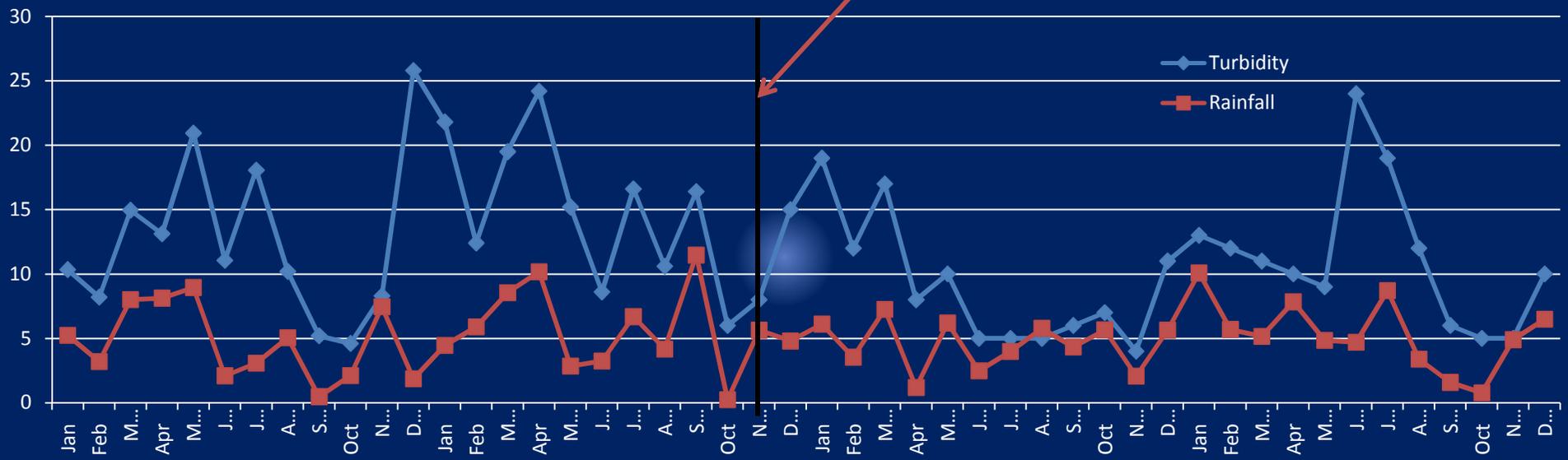
# Bays Lake BMP Facts

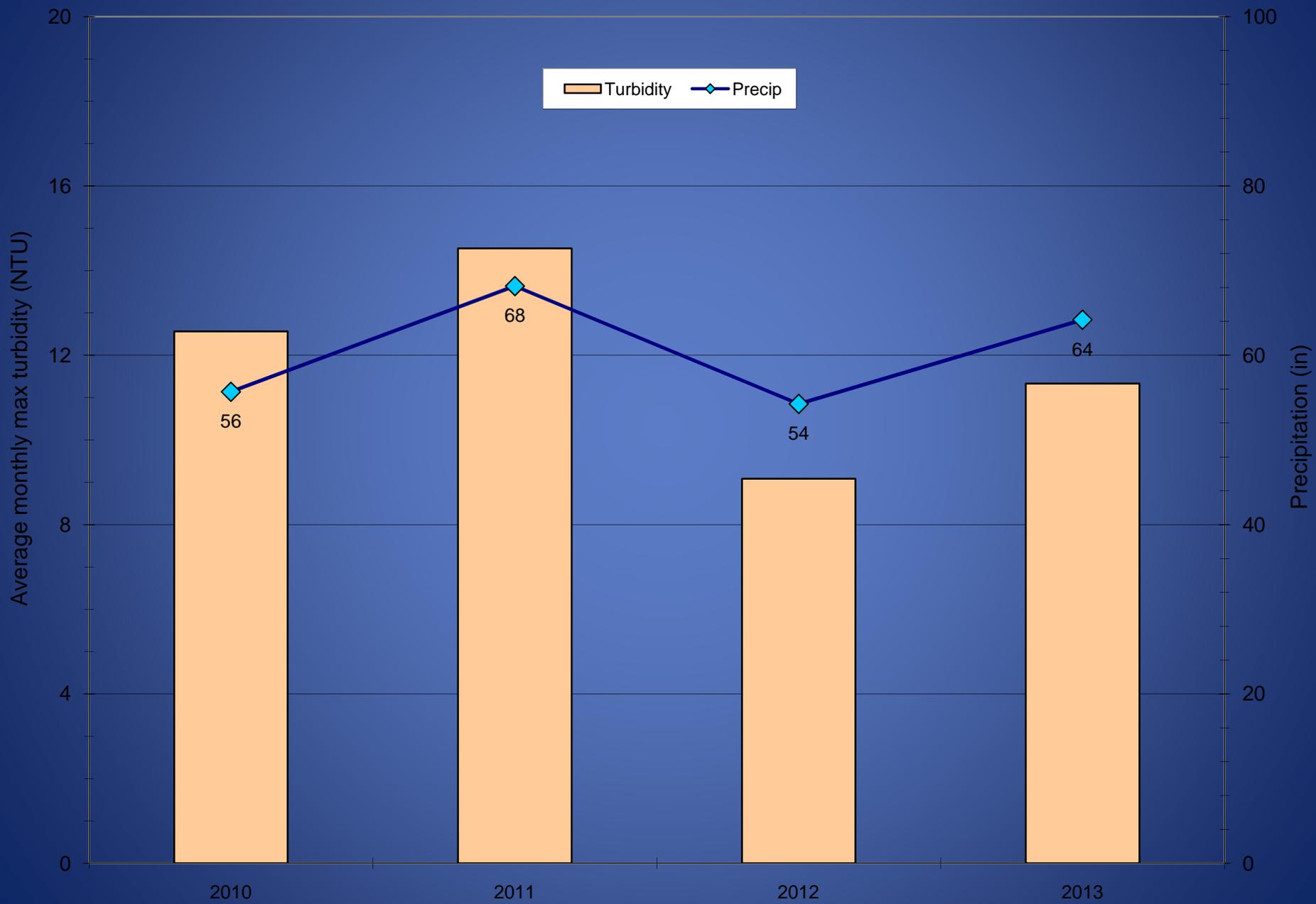
- Out of a total of 44 BMP's installed in Fayette and Northern Tuscaloosa County, thirteen are in the Bays Lake drainage basin
- The thirteen Bays Lake BMP's have captured 68.9cubic yards/92.9 tons of sediment
- Capturing this quantity of sediment has preserved 13,911.25 gallons of reservoir storage capacity in Bays Lake

# Confirmation of Sediment Reduction

- The measured levels of turbidity are higher in the two years prior to installation of BMP's than the two years post installation
- This confirms that sediment captured by the BMP's would have made it to Bays Lake and reduced its storage capacity

Initiation of BMP  
Construction

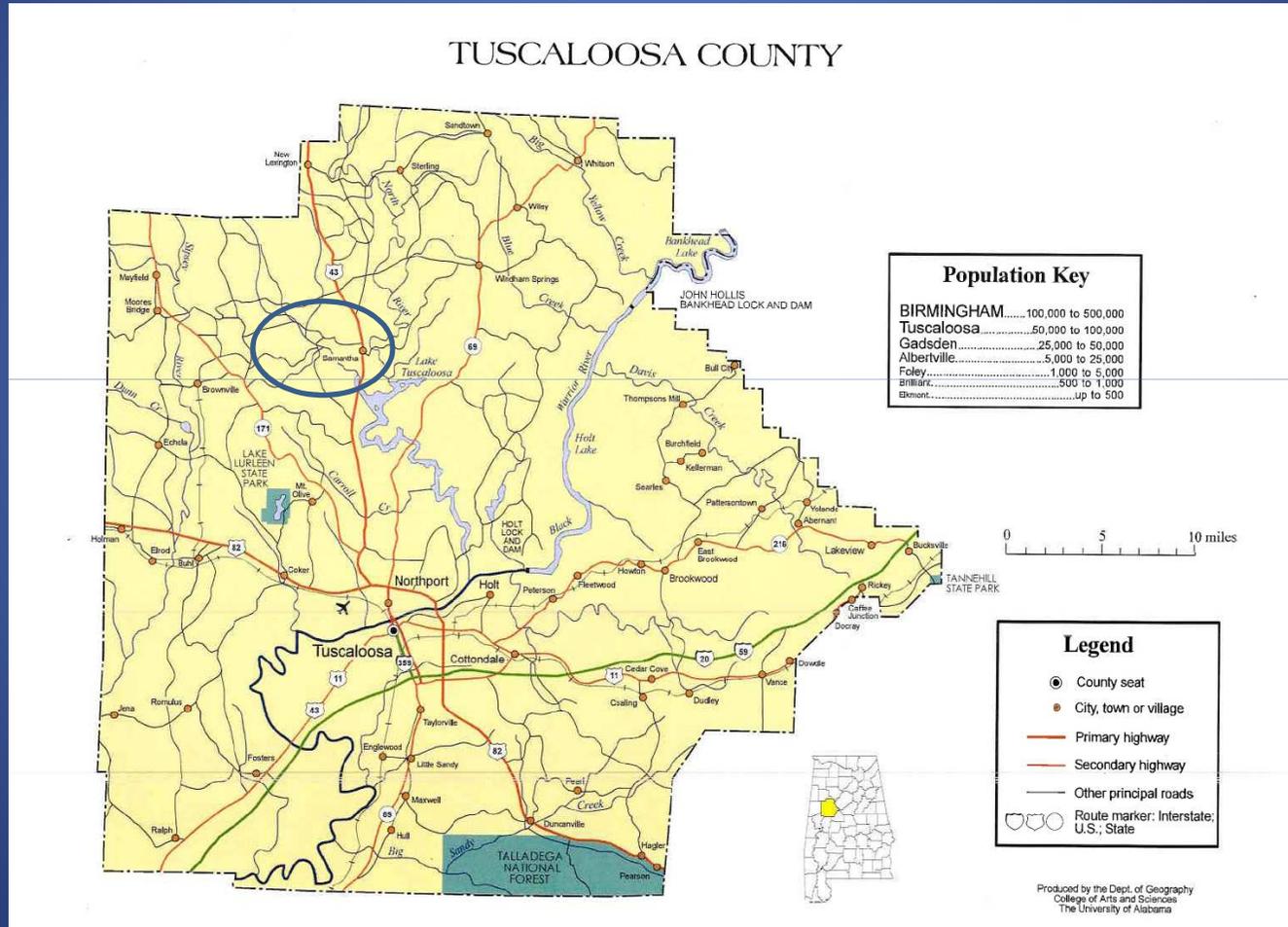




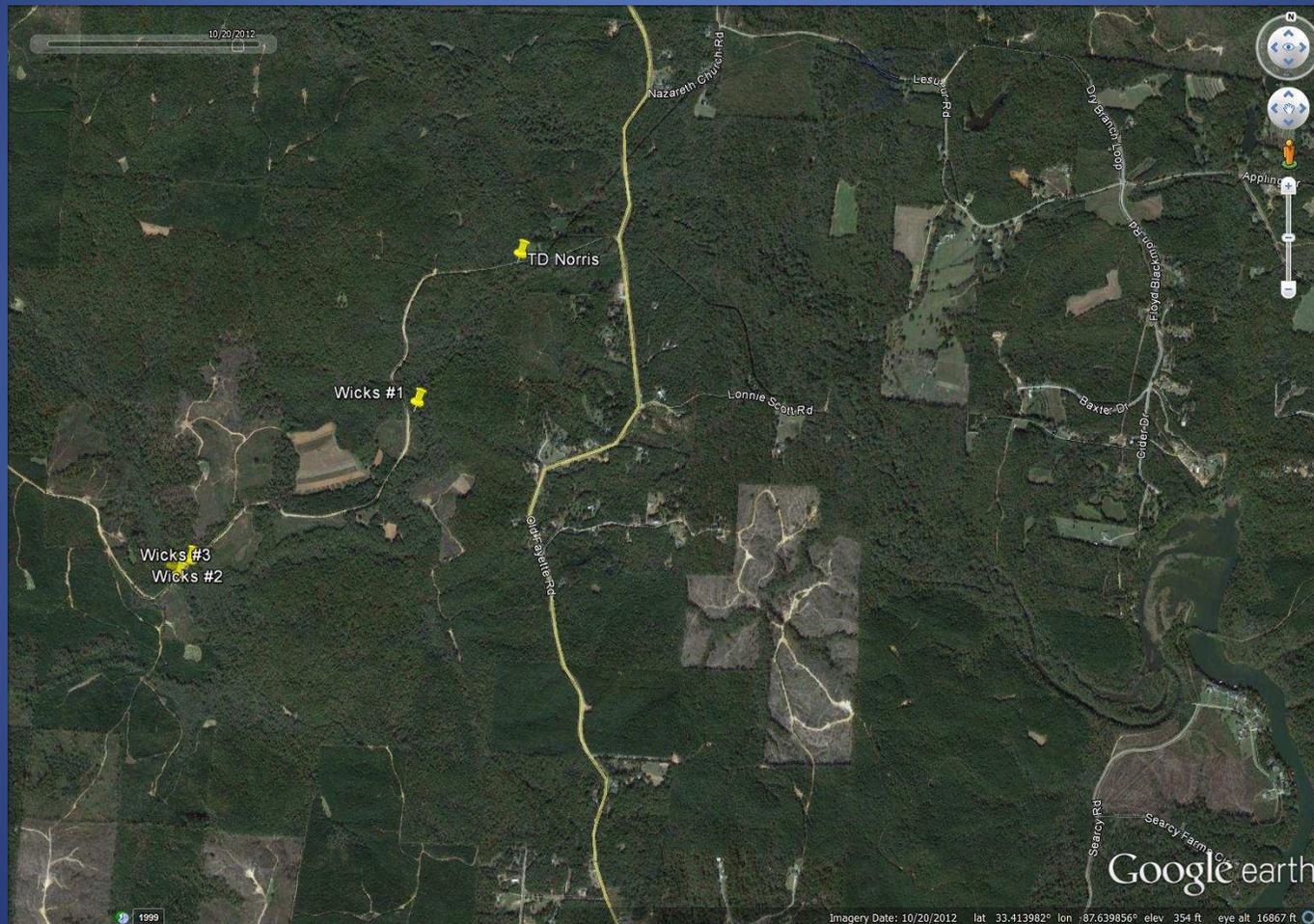
# Economic Benefit

\$\$\$\$ Over a 4 year period, 2 years prior to implementation/construction of the Sedimentation Basins and 2 years subsequent to the construction, the Berry Water treatment plant observed a 46% reduction in cost of chemicals used in treatment at the Bays Lake treatment plant.

# Study Area Tuscaloosa County



# Tuscaloosa County Study Area Aerial

















# Special Thanks

- Alabama Clean Water Partnership
- Alabama Department of Environmental Management
- Alabama Forestry Commission
- Alabama Geological Survey
- Berry Water Works
- CAWACO RC&D
- Fayette County Commission
- Fayette County Engineering Department
- U.S. Fish and Wildlife Service