

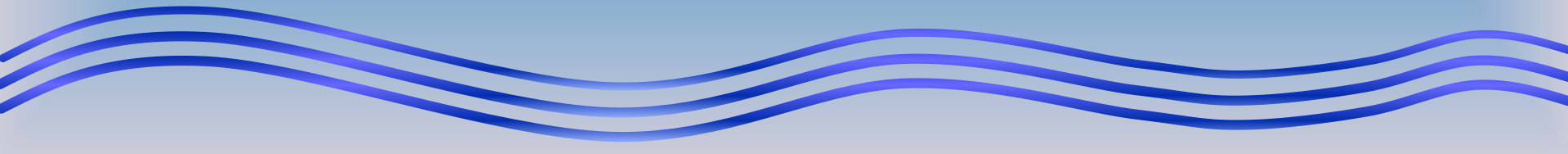
Non-Point Source Pollution Assessment and Management

**NPS Pollution Stakeholder
Meeting**

September 27, 2017

GBM^c & Associates
Strategic Environmental Services

GBM^c Experience in Watershed Assessment, Management and NPS Reductions

- ◆ Written five Watershed Management Plans (WMP) in Arkansas
 - ◆ Written one Wetland Management Plan in Arkansas (using watershed approach)
 - ◆ Been principle investigator in seven additional watershed studies in Arkansas, Oklahoma and Missouri.
 - ◆ Designed and oversaw construction of multiple NPS treatment features
- 

Primary Non-Point Source (NPS) Classifications

- ◆ Agricultural
 - ◆ Pasture/hay
 - ◆ Animal feed lots
 - ◆ Row crops
- ◆ Urban/developed areas
 - ◆ Residential
 - ◆ Commercial
 - ◆ Industrial

All
transported
in storm
water run-off

Common Agricultural NPS's

- ◆ Manure
- ◆ Agrochemicals
- ◆ Land erosion
 - ◆ Over grazing
 - ◆ Lack of soil BMPs on row crop land
- ◆ Riparian destruction and stream bank erosion

*Nutrients,
sediment,
pesticides,
herbicides, heavy
metals, bacteria,
pharmaceuticals*

Major Gully Erosion

Creek



Over 100
tons of soil



Stream Bank Erosion (riparian buffer?)



04/21/2016 11:49

10/19/2015 17:20





Image Courtesy of: By PI77 - Own work, CC BY-SA 3.0,
<https://commons.wikimedia.org/w/index.php?curid=5935821>

Common Urban NPS's

- ◆ Impervious surfaces
 - ◆ Pavement (roads, parking lots)
 - ◆ Roof tops
- ◆ Typical city storm water systems
 - ◆ Curb and gutter
- ◆ Turf grass
- ◆ Construction sites

Oil residue, gasoline, exhaust residue, bird droppings, chemicals from shingles, and roof sealants, lawn chemicals and fertilizer, pet waste, soils from erosion, trash, garbage, leaves, grass clippings.....

BOD, hydrocarbons, heavy metals, sediment, nutrients, pesticides/herbicides, bacteria.....



Recycling/Waste Transfer Stations





11/19/2014

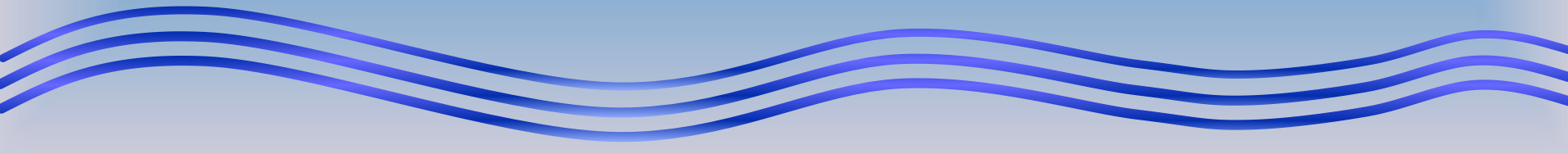


Watershed Management Planning

- ◆ Assessment
- ◆ Data Analysis and Area Ranking
- ◆ Management Plan Development
- ◆ Implementation
- ◆ Adaptive Management

All
Stakeholder
Guided

Keys to effective NPS identification and reduction

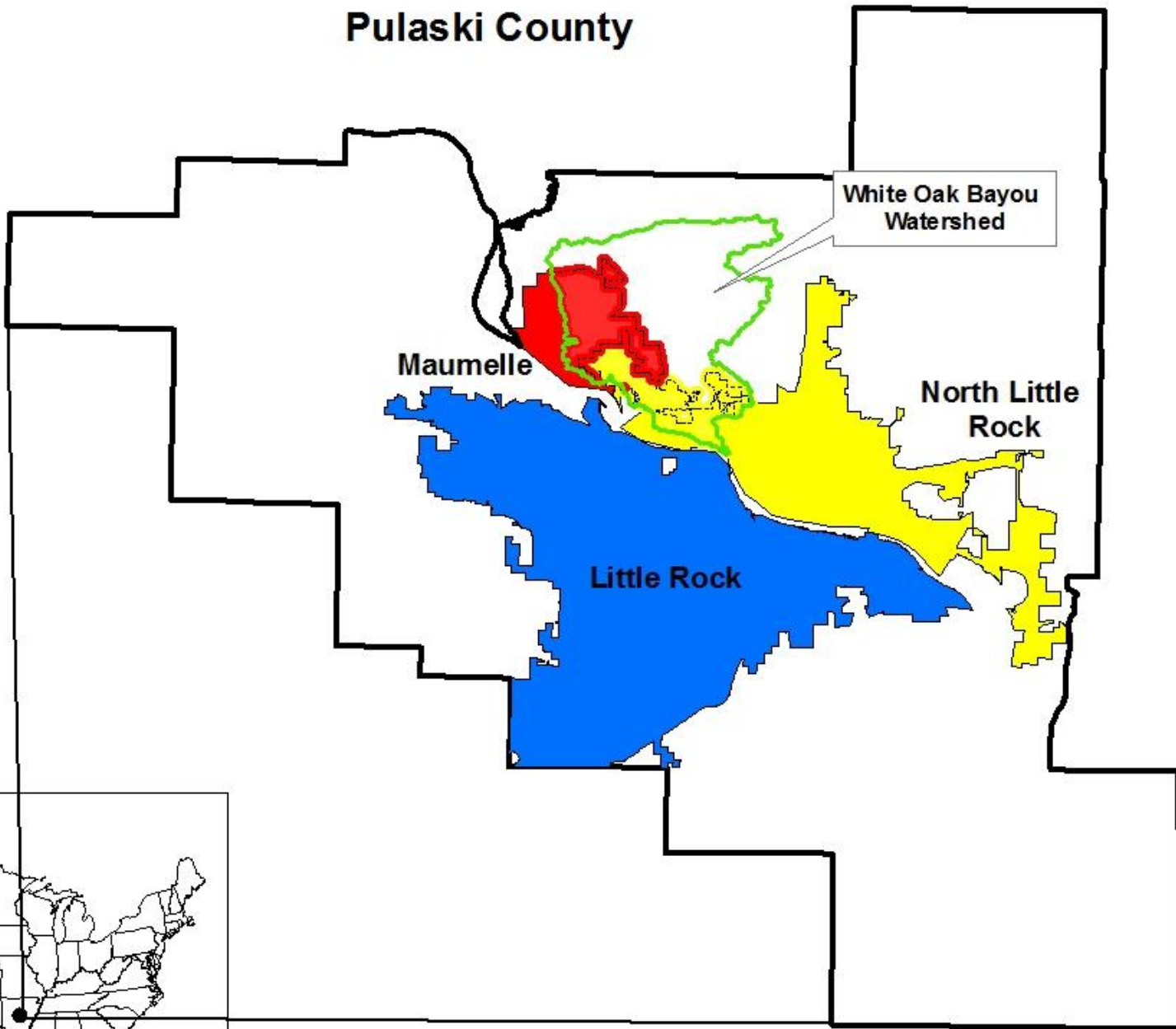
- ◆ Boots on the ground
 - ◆ Storm water run-off sampling
 - ◆ Watershed inspection during run-off events
 - ◆ Stakeholder input
 - ◆ Stakeholder buy-in
- 

White Oak Bayou Management

A watershed approach to wetlands management



Pulaski County



White Oak Bayou Watershed

Maumelle

North Little Rock

Little Rock



White Oak Bayou Stakeholders

- ◆ City of Maumelle
- ◆ Citizens of the Steering Committee
- ◆ US EPA Region 6
- ◆ USACE Little Rock District
- ◆ Arkansas Natural Resources Commission
- ◆ Arkansas Department of Environmental Quality
- ◆ University of Central Arkansas (UCA)
- ◆ Arkansas Natural Heritage Commission
- ◆ City of North Little Rock and Pulaski County

<http://www.whiteoakbayou.com/>



Management Plan Tasks

- ◆ Engage Stakeholders
 - ◆ Identify, Classify and Prioritize Wetlands
 - ◆ Protect and Manage Wetlands
 - ◆ Physical protection (easements/deed restrictions)
 - ◆ Smart growth planning
 - ◆ Storm water quality controls
 - ◆ Educate Public
 - ◆ Disseminate information
- } NPS Management!



Engage &
Educate

Technical Advisory Committee

- focused on science/technical issues

Steering Committee

- developed Mission Statement
- focused on social and economic issues
- formulated and steer goals and objectives

Stakeholders

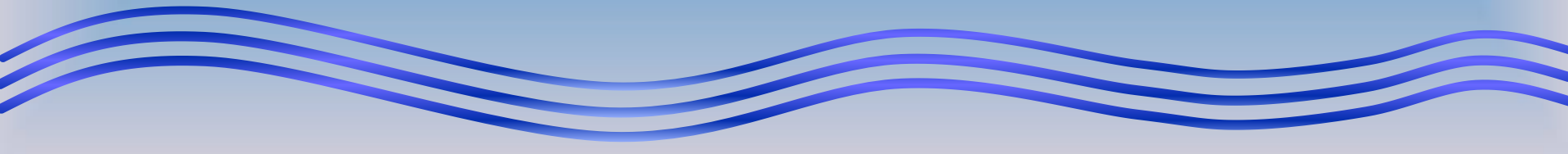


White Oak Bayou



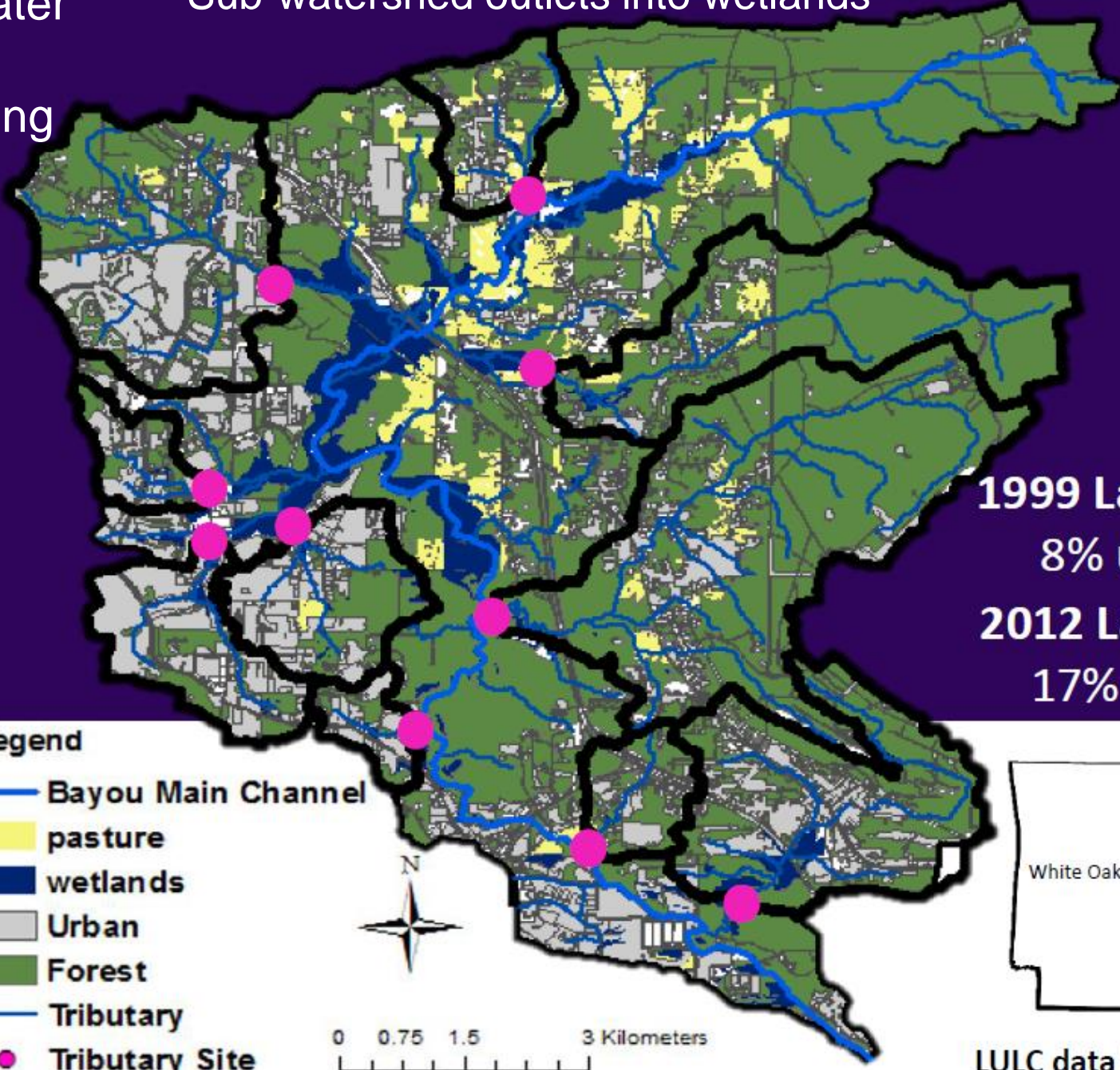
Identify, classify and prioritize

Water Quality Management

- ◆ **Monitoring water quality**
 - ◆ **Identify key sub-watersheds and NPS's**
 - ◆ **Manage storm water run-off from urban/suburban and rural areas**
 - ◆ **Ordinances**
 - ◆ **Storm water treatment features**
 - ◆ **Education**
- 

UCA Water Quality Monitoring

Sub-watershed outlets into wetlands



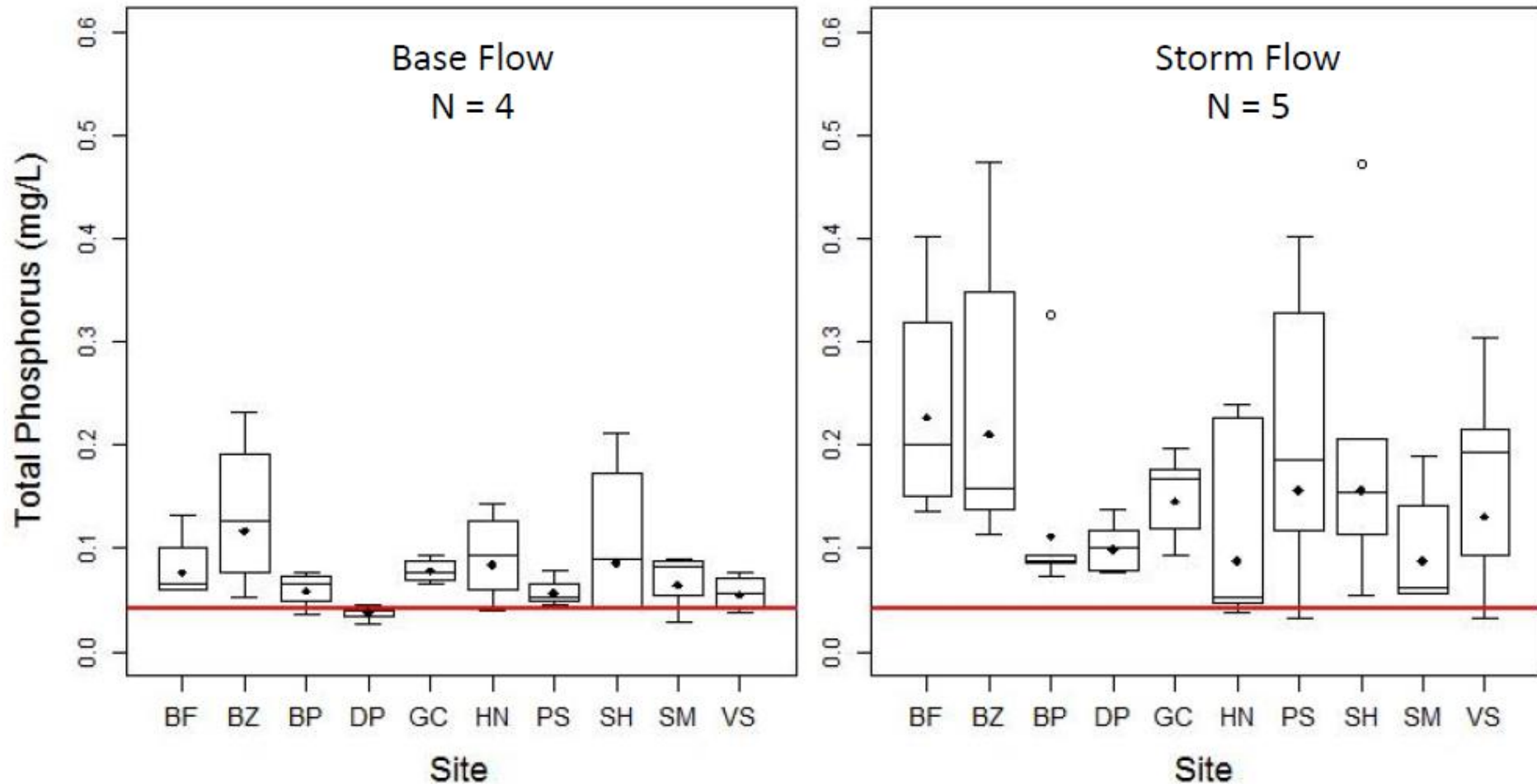
1999 Land Use:
8% urban
2012 Land Use:
17% urban



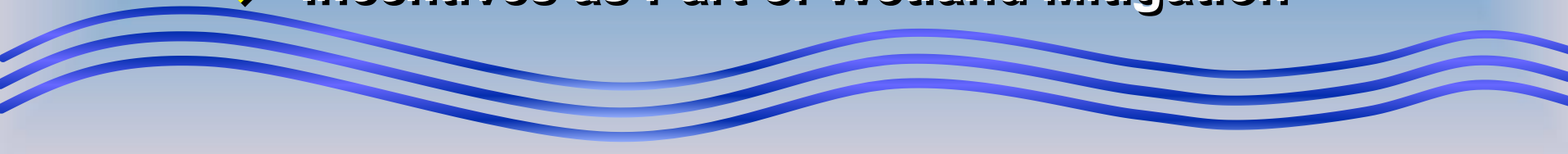
LULC data from GBMc

Total Phosphorus compared to the ARV

TP reference = 0.0425mg/L



Existing City Ordinances

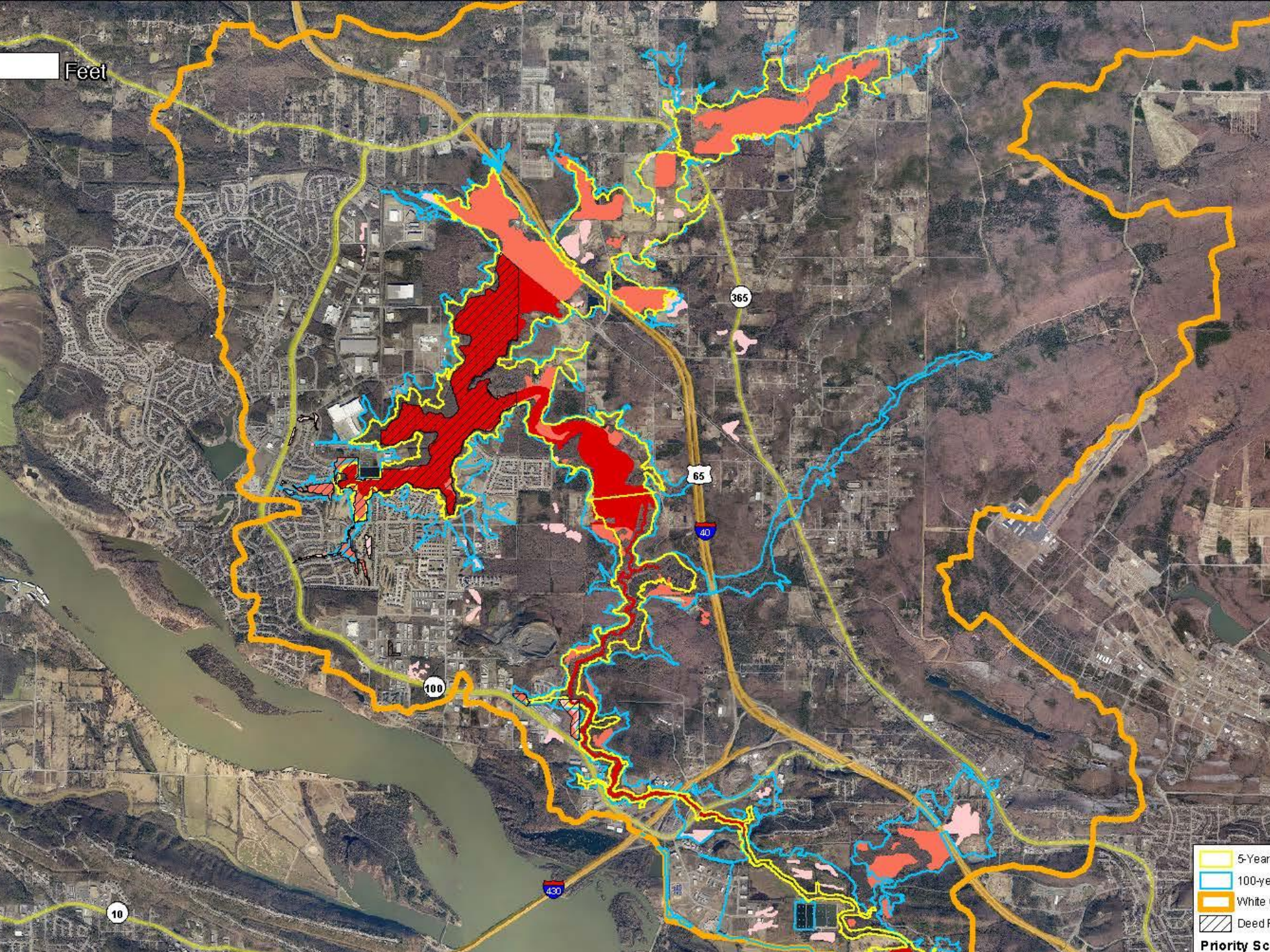
- ◆ **Storm Water Drainage**
 - ◆ **Post Development Detention**
 - ◆ **Storm Water Pollution Prevention and Erosion Control**
 - ◆ **Construction Storm Water Control**
 - ◆ **Storm Water Treatment (Post development)**
 - ◆ **Riparian Buffer??**
 - ◆ **No ordinance, but.....**
 - ◆ **Incentives as Part of Wetland Mitigation**
- 

Detention

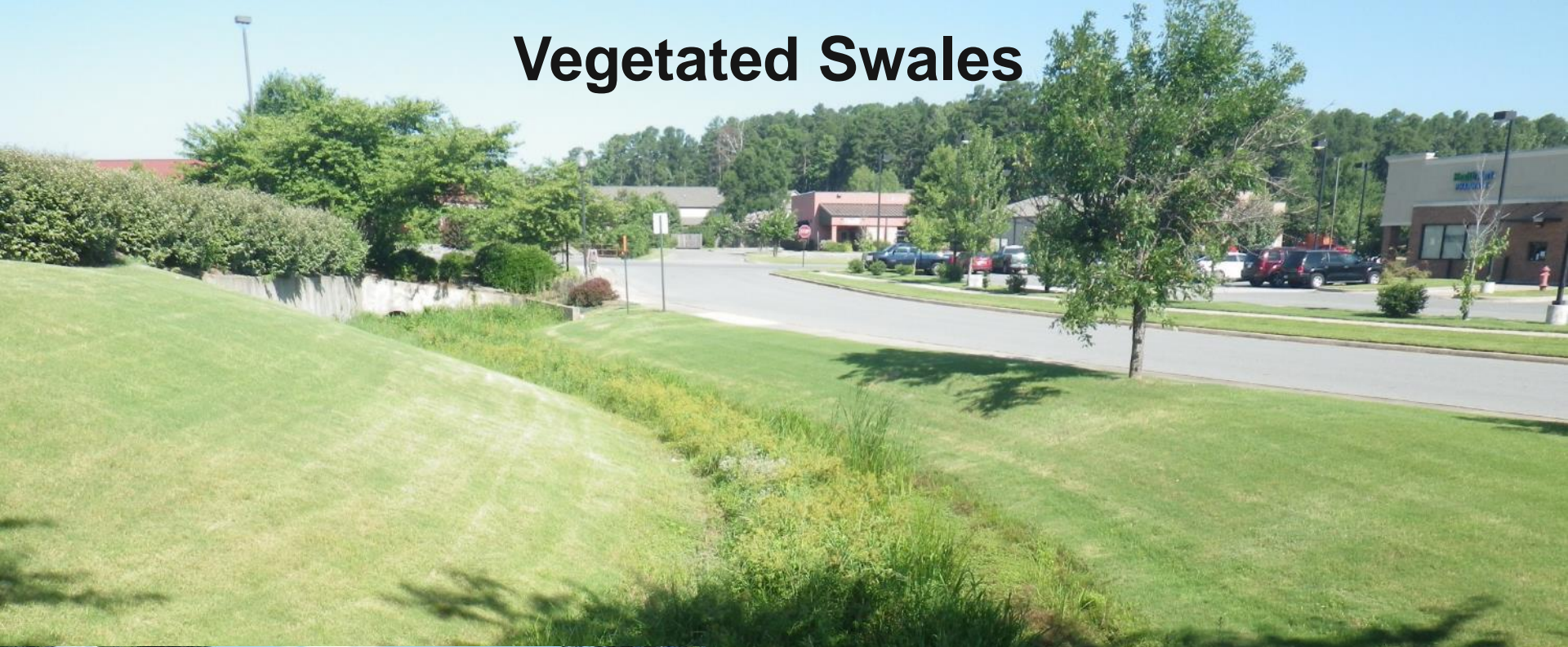


Main purpose usually to control the peak flow hydrograph.

Feet



Vegetated Swales



**Mostly WQ benefits and improved
shallow GW recharge.**

07/17/2015 09:29

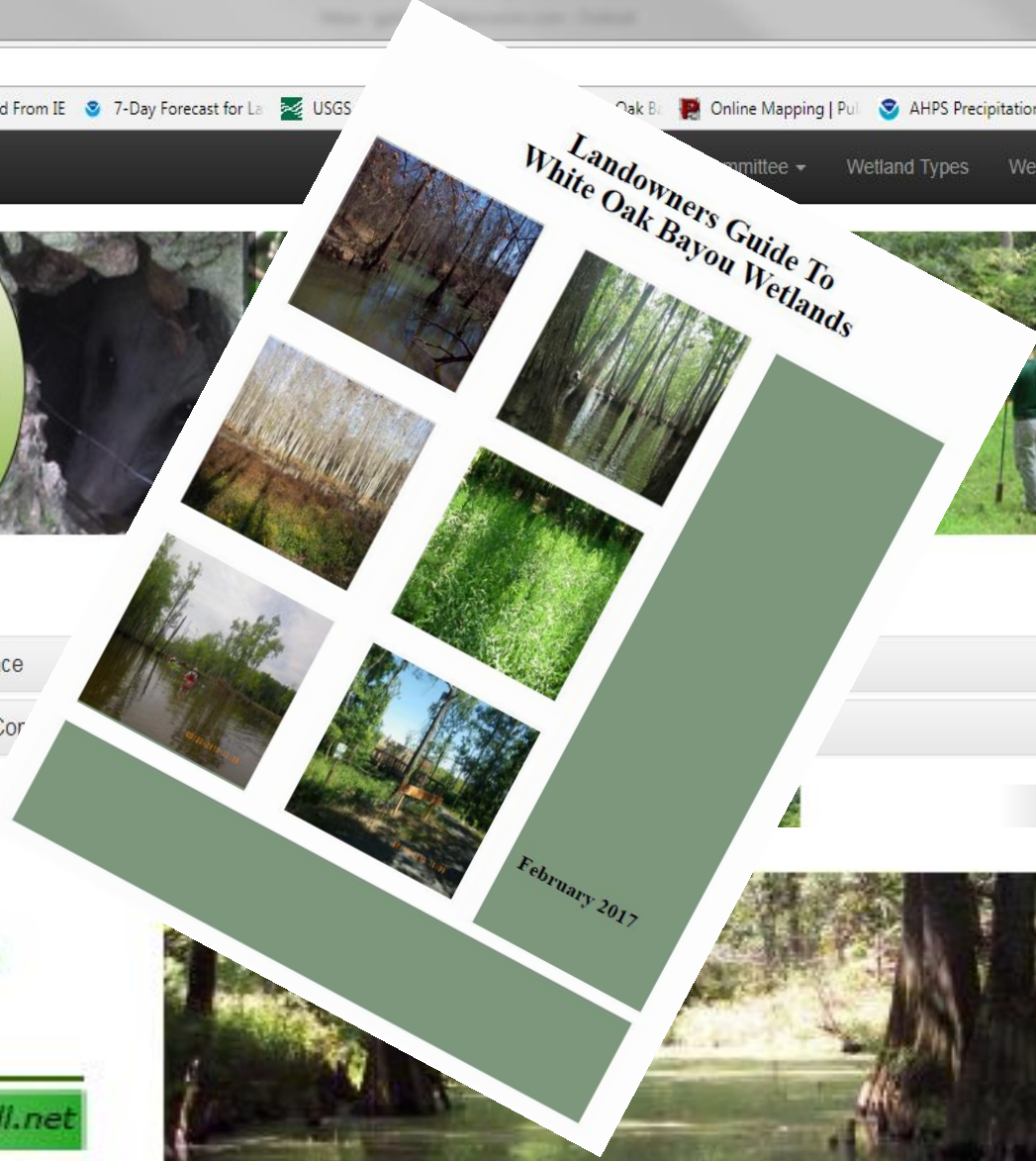
07/17/2015 10:48

Education, Education.....

- Partner with Schools
- Trails Program
- Booths at local events
- Public forums
- Wetland Hikes
- Bayou Floats
- The Cypress Knee



07/17/2015 10:06



Ongoing Website Maintenance
White Oak Bayou Steering Committee

January—May 2016
Volume 8 Issue 1

thecypressknee@swbell.net

Inside this issue:

Wetland Management Plan Update 1

Wetland Ecology: Wildlife 2



Newsletter of the White Oak Bayou Wetland Management Plan

The Public are our Stakeholders

Sponsored float in
2015

05/23/2015 13:41

Poteau River Watershed Assessment

◆ Stakeholders

◆ City of Waldron

◆ Tyson Poultry

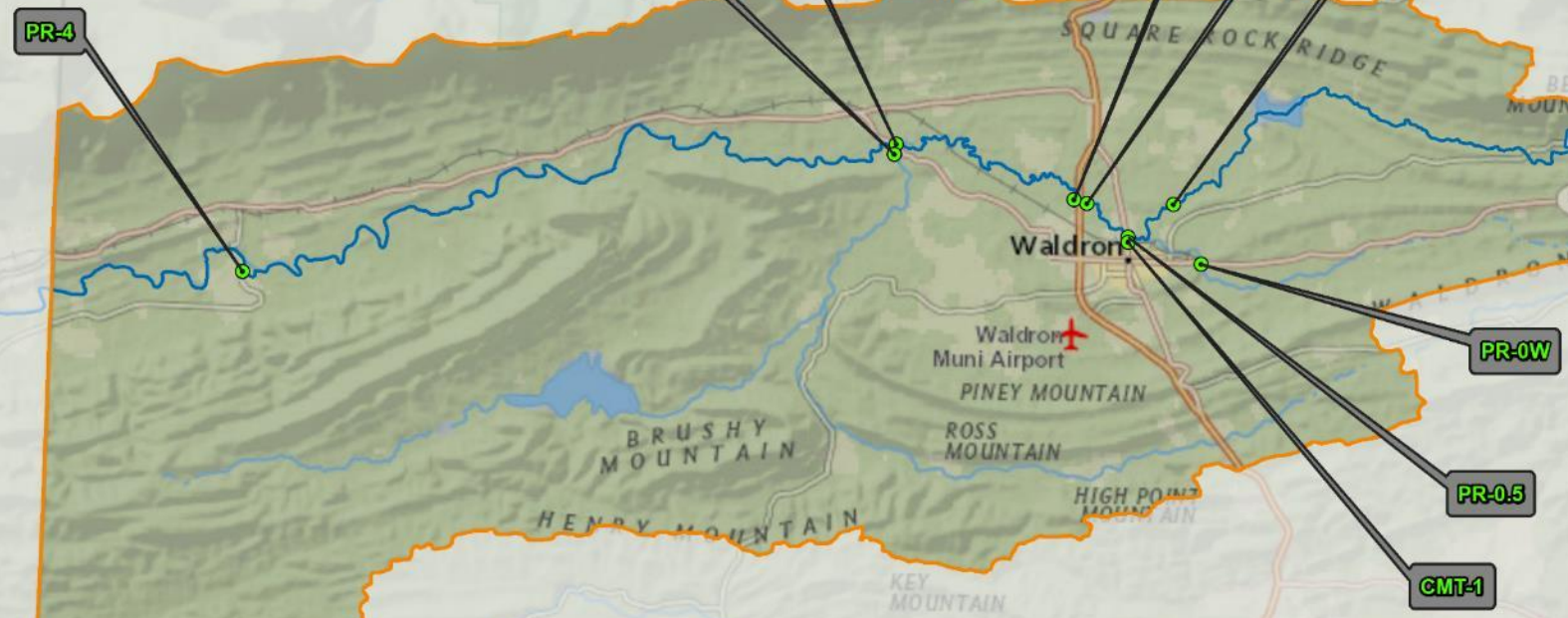
◆ ANRC




◆ EPA Region 6

◆ Local Farmers/Landowners

*Funded by a
319 Grant
from ANRC
and EPA*

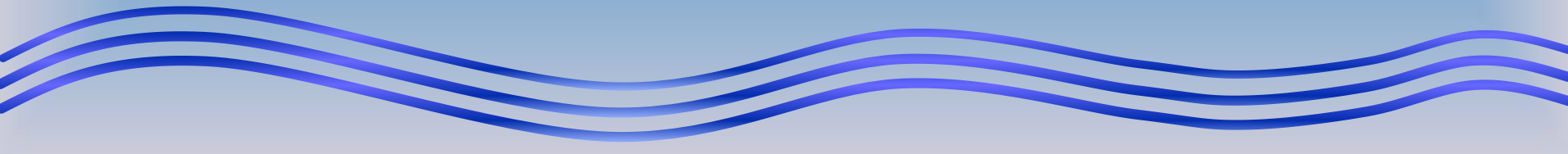
4.5
Miles



-  Sample Stations
-  Poteau River Watershed
-  Poteau River

Upper Poteau River Watershed

Main Project Tasks

- ◆ Water Quality Data Collection (baseflow and storm flow)
 - ◆ Flow Gauging (to provide load calculation)
 - ◆ Unified Stream Assessment
 - ◆ Historical Data Analysis
- 

Flow Gauging



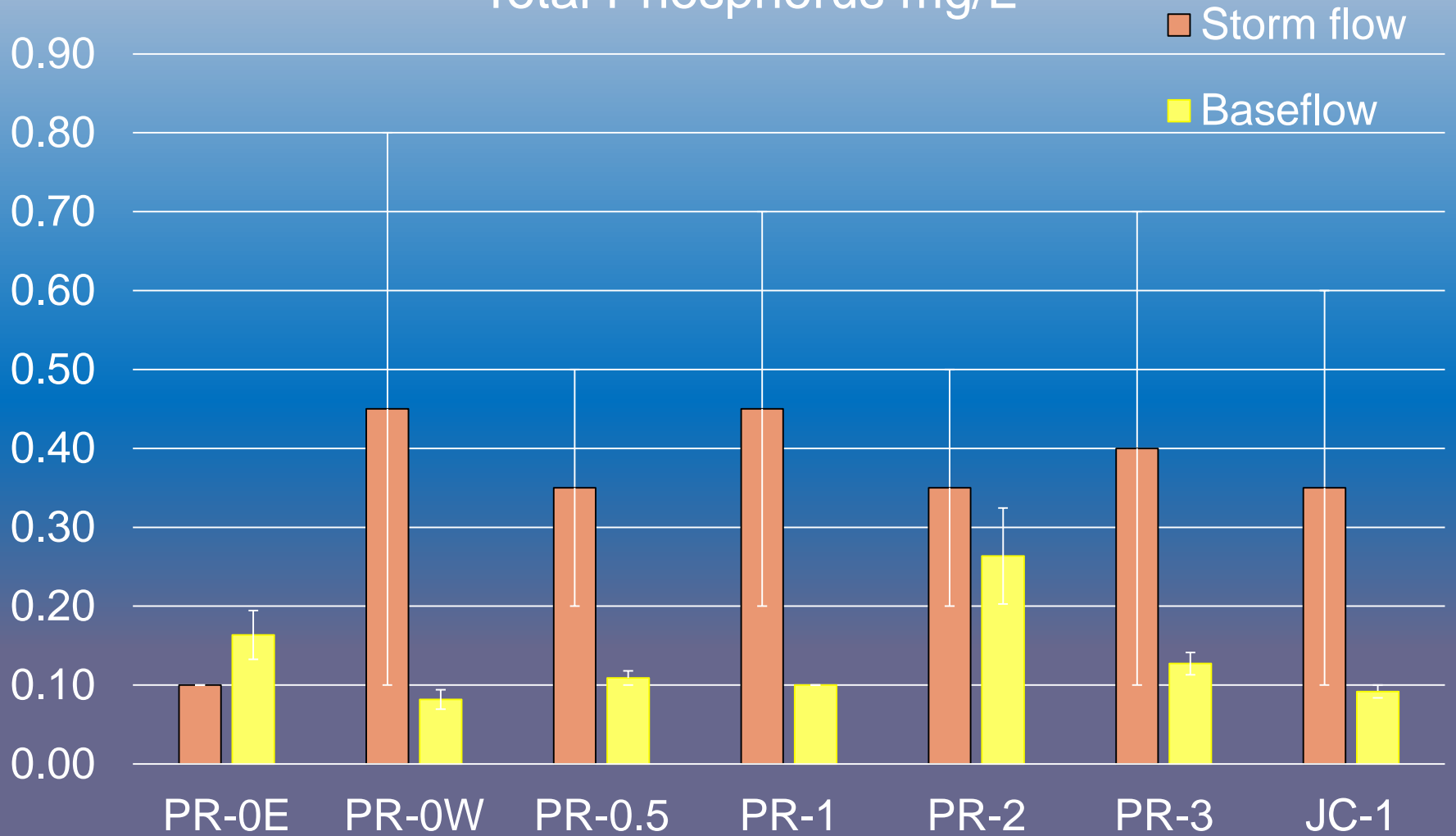
Storm Water Flow on the Poteau River



Same Day!

Storm
water in
road side
ditches in
Waldron

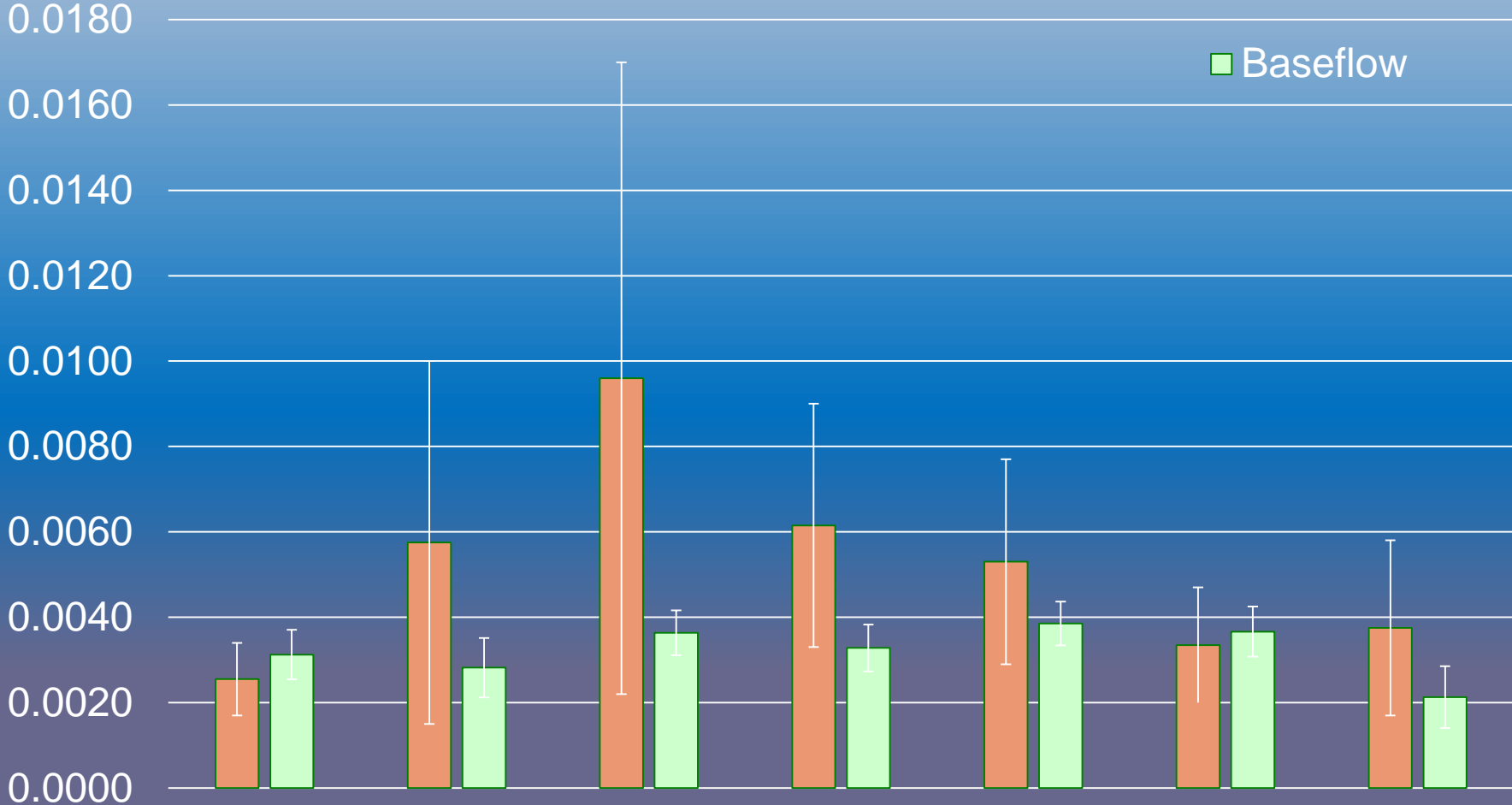
Total Phosphorus mg/L



Copper mg/L

Storm Flow

Baseflow



PR-0E

PR-0W

PR-0.5

PR-1

PR-2

PR-3

JC-1

Questions?

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