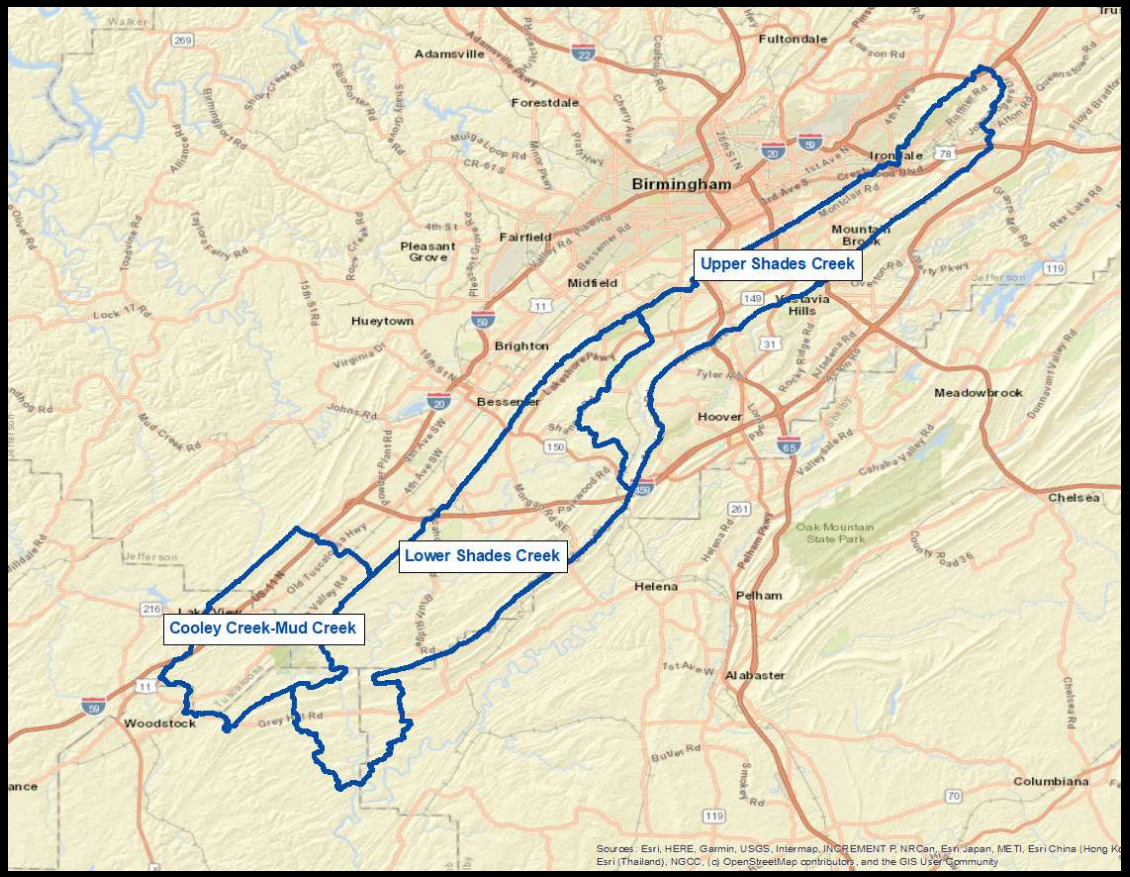
SHADES CREEK WATERSHED MANAGEMENT PLAN

Stuart Blackwell, Goodwyn Mills & Cawood



Shades Creek Watershed Management Plan Project Area

- Upper Shades Creek
  - 26,395 acres
  - HUC ID 031502020301
- Lower Shades Creek
  - 44,470 acres,
  - HUC ID 031502020303
- Cooley Creek/Mud Creek
  - 17,905 acres
  - HUC ID 031502020302

The Nature Conservancy
Alabama

GMC

Planning Team

OVERVIEW OF THE PLANNING PROCESS

EPA 9-Step Watershed Management Plan

EPA's 9 Minimum Elements of Successful Watershed Plans (WMP)

A. IDENTIFY CAUSES AND SOURCES OF POLLUTION

B. ESTIMATE LOAD REDUCTIONS EXPECTED

C. DESCRIBE MANAGEMENT MEASURES AND TARGETED CRITICAL AREAS

D. ESTIMATE TECHNICAL AND FINANCIAL ASSISTANCE NEEDED

E. DEVELOP AN INFORMATION AND EDUCATION COMPONENT

F. DEVELOPMENT OF PROJECT SCHEDULE

G. DESCRIBE INTERIM, MEASURABLE MILESTONES

H. IDENTIFY INDICATORS TO MEASURE PROGRESS

I. DEVELOP A MONITORING COMPONENT

https://www.epa.gov/sites/production/files/201512/documents/watershed_mgmnt_quick_guide.pdf

Benefits of a WMP

- Actionable plan to address water quality impairments
- Eligibility for 319 grant funding for implementation
- Engages the community in watershed protection
- NPDES MS4 Permit compliance
  - Impaired waters monitoring
  - Public education and involvement
  - Green infrastructure/Low Impact Development

Why Watershed Plans Fail

- Planning activities were conducted at too great a scale.
- The plan was a one-time study rather than a long-term management process
- Stakeholder involvement and local ownership were lacking
- The plan skirted land use/management issues in the watershed
- The document was too long or complex
- The recommendations were too general
- The plan failed to identify and address conflicts.

From Handbook for Developing Watershed Plans to Restore and Protect our Waters, EPA

Watershed Planning Process

https://www.epa.gov/sites/production/files/201512/documents/watershed_mgmnt_quick_guide.pdf

1. Identify Key Stakeholders
2. Identify Issues of Concern
3. Set Preliminary Goals
4. Develop Indicators
5. Conduct Public Outreach

Step 1: Build Partnerships

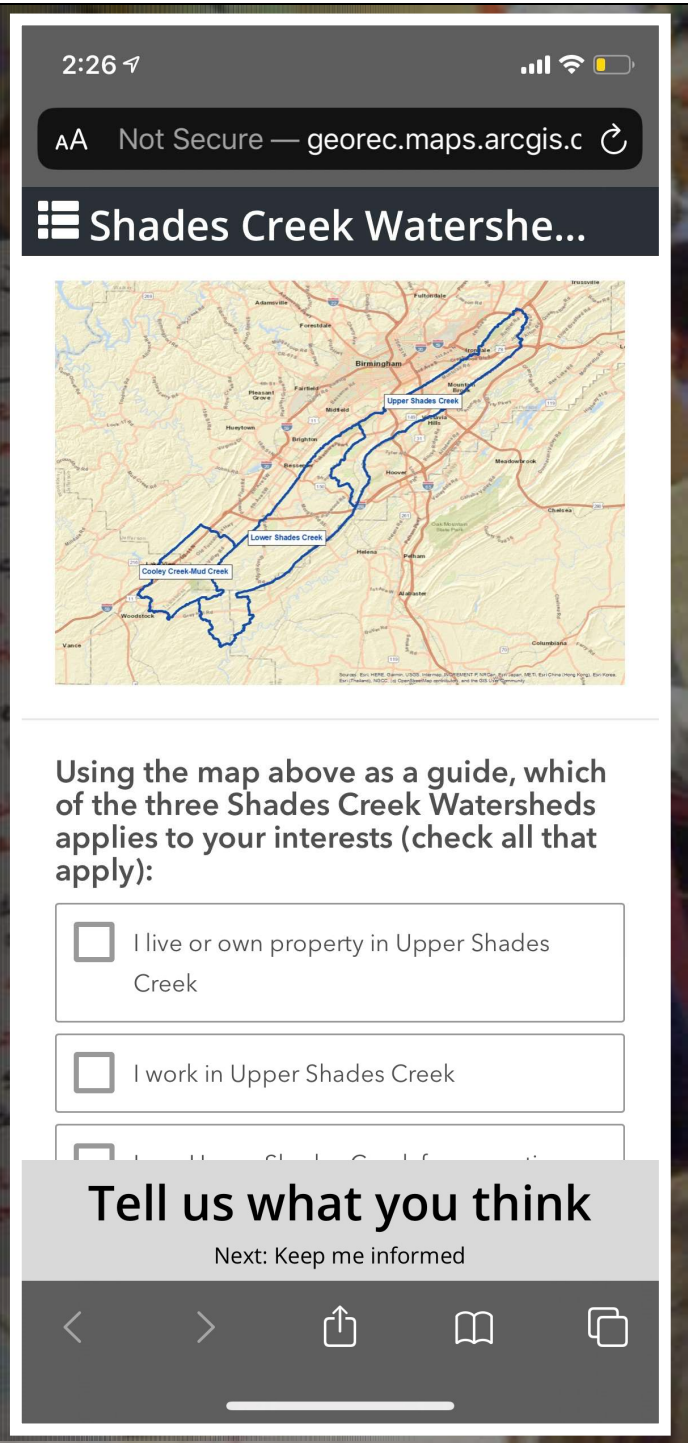
Community Engagement Process

- Build Partnerships
  - Ensure the right people are at the table
  - Prepare for future implementation
- Solicit Input
  - Listen to the community
  - Opportunities and challenges

Engagement

Online Survey

- 10 minute survey
- Geographical questions
- Identify issues & areas of concern



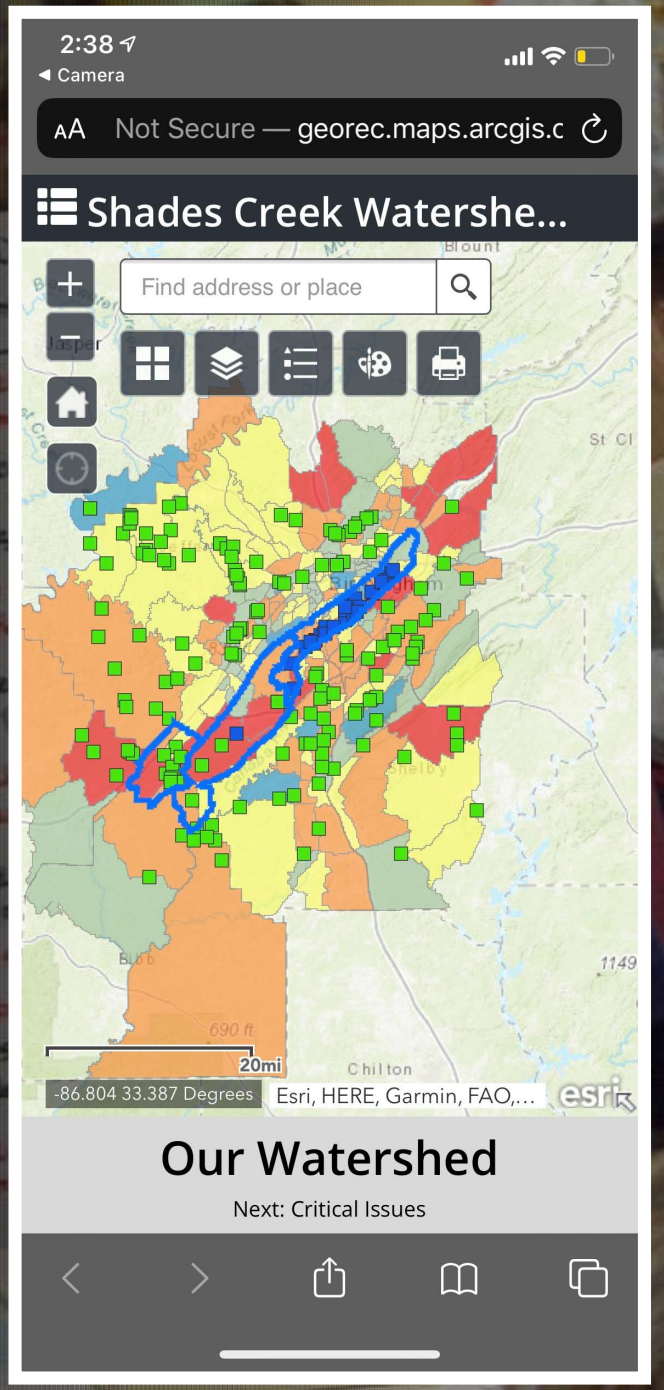
Engagement

Story Map Website

» Community Engagement

» View GIS data

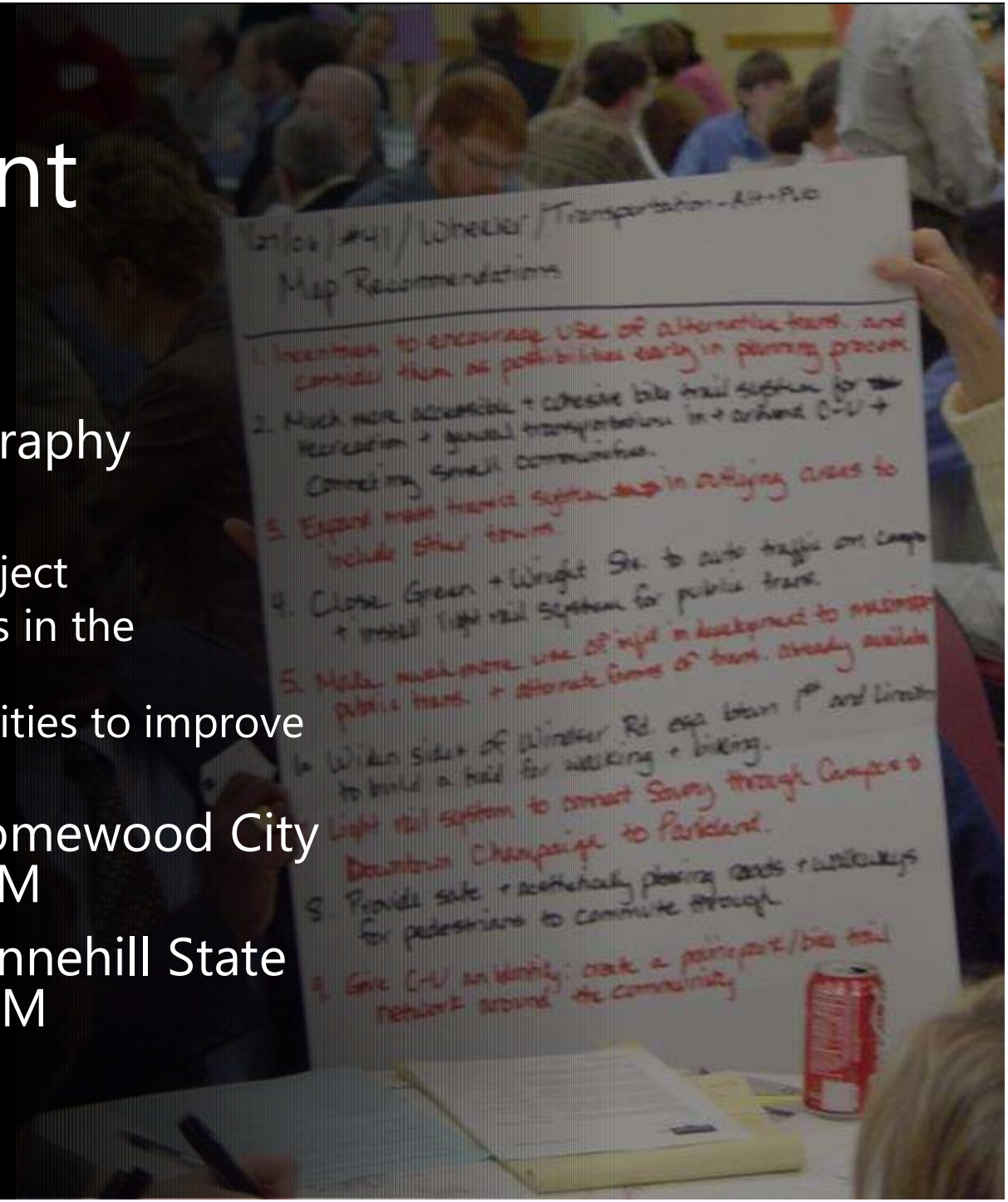
» Access survey



Engagement

Open Houses

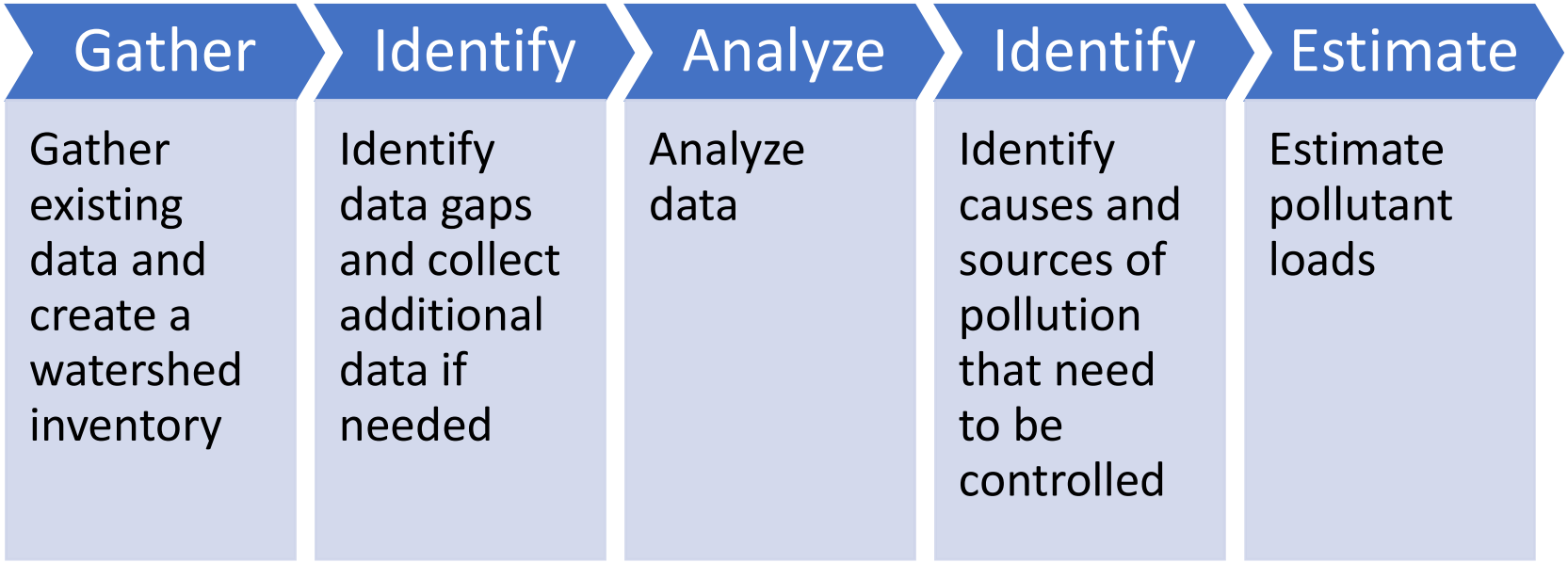
- Targeted by Geography
- Purpose:
  - Introduce the project
  - Understand issues in the watershed
  - Identify opportunities to improve the watershed
- February 11th – Homewood City Hall – 4 PM to 7 PM
- February 25th – Tannehill State Park - 4 PM to 7 PM



Engagement

Community Events

- Salamander Festival
- Alabama Rivers & Streams Network
- Others?



Step 2: Characterize the Watershed

What causes Water Quality Impairment?

GMC

Source Data

Physical and natural features—watershed boundaries, hydrology, topography, soils, climate, habitat, wildlife.

Land use and population characteristics—land use and land cover, existing management practices, demographics.

Water body and watershed conditions—water quality standards, 305 (b) report, 303(d) list, TMDL reports, source water assessments.

Pollutant sources—point sources, nonpoint sources.

Water body monitoring data—water quality and flow, biology, geomorphology

Water Body	Impairment	Regulatory Status
Cooley Creek	Pathogens (bacteria)	Approved TMDL (2003)
Mud Creek	Pathogens (bacteria)	Approved TMDL (2003)
Mill Creek	Pathogens (bacteria)	Approved TMDL (2003)
Shades Creek	Pathogens (bacteria); Siltation, Turbidity, and Habitat Alteration	Approved TMDL (2003); (2003)

ADEM Water Quality Designation

All surface waters in Shades Creek Watershed are designated [1]Fish and Wildlife, [2]Swimming and other Whole Body Water-Contact Sports, and [3]Agricultural and Industrial Water Supply

Water Quality Issues

Bacteria

- Fecal Coliform
- E. Coli

Nutrients

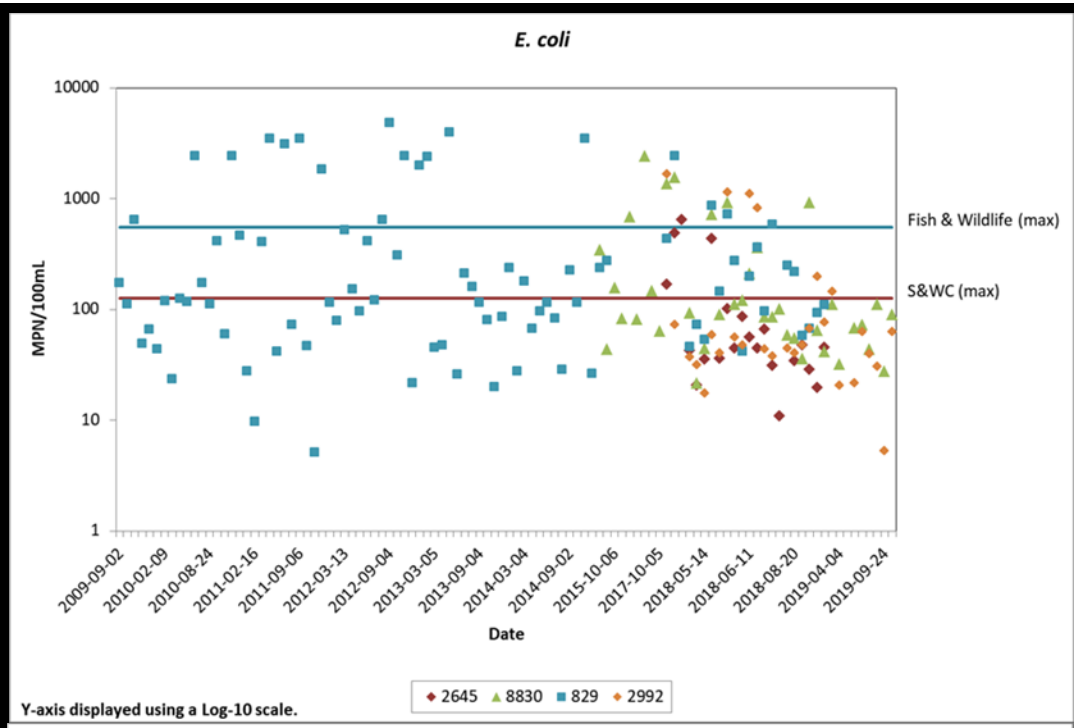
- Nitrogen
- Phosphorus

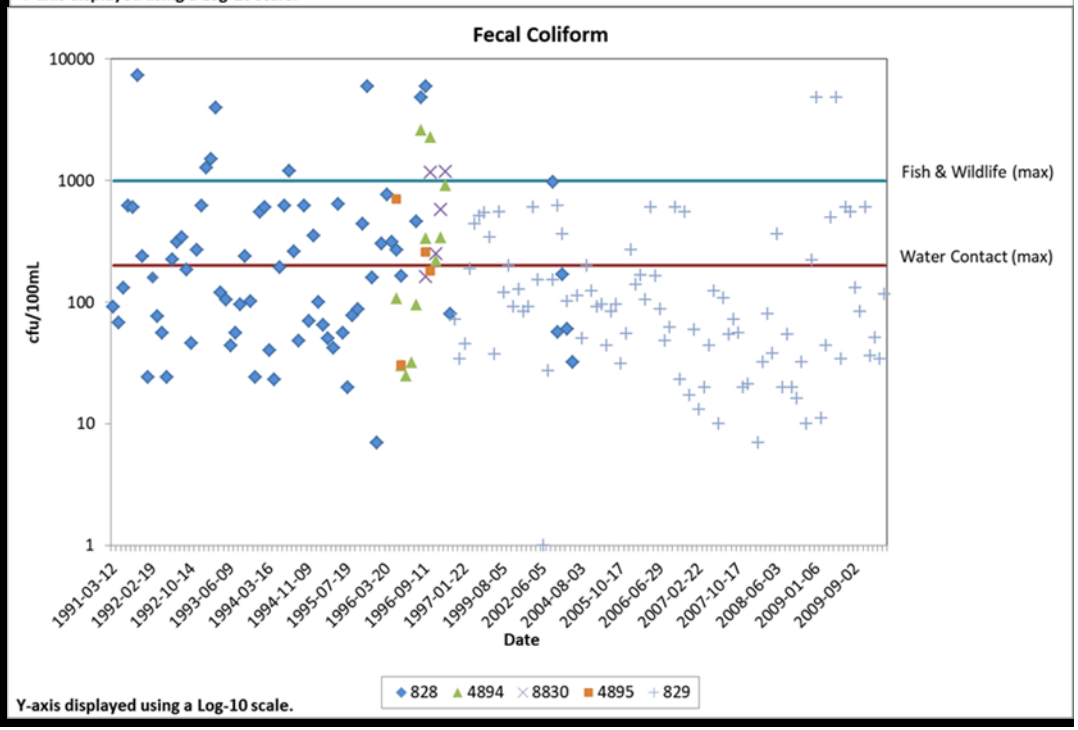
Sediment

- Turbidity
- Total Suspended Solids

Bacteria

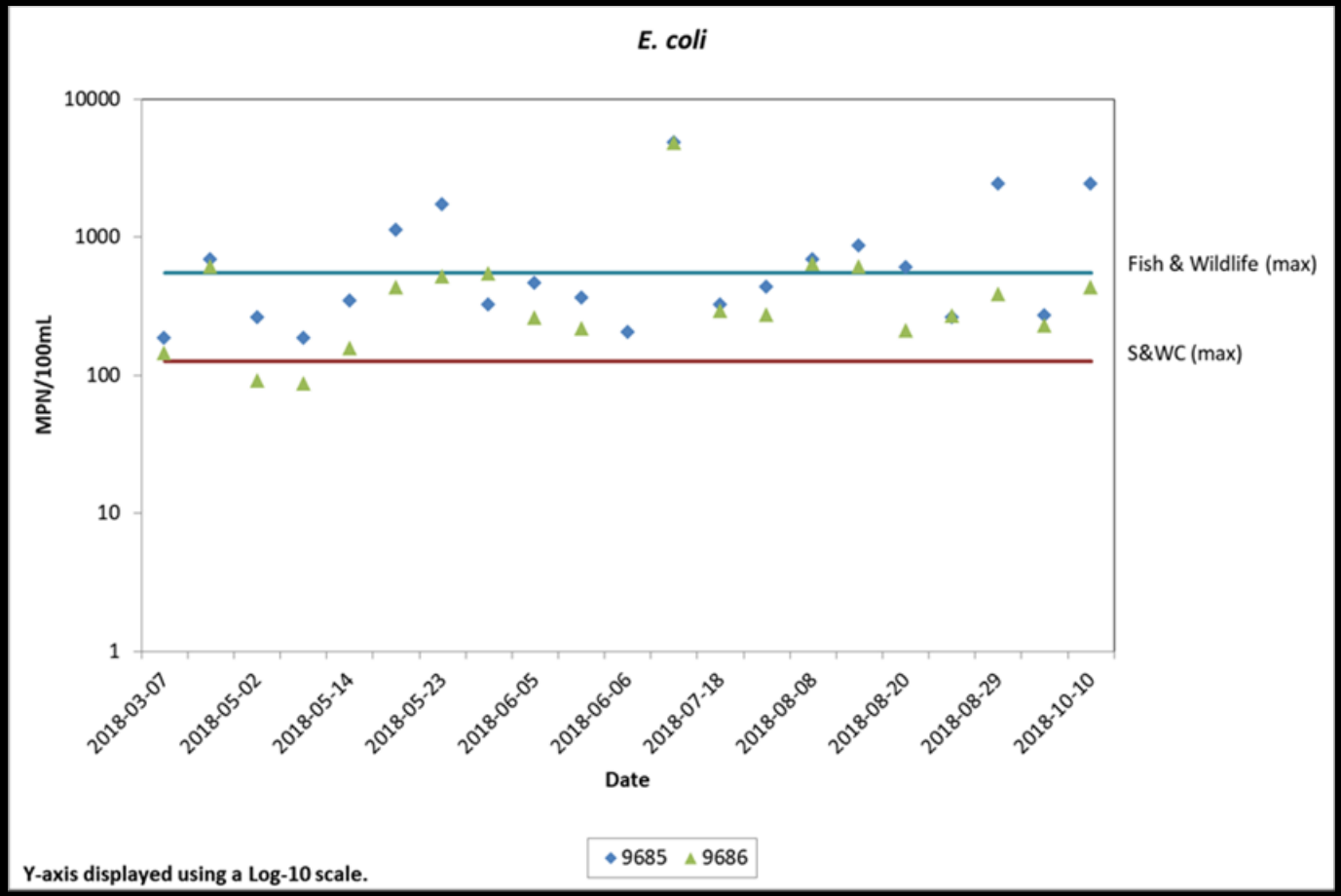
Lower Shades Creek frequently had levels of both fecal coliform and *E. coli* that surpassed standards.





Bacteria

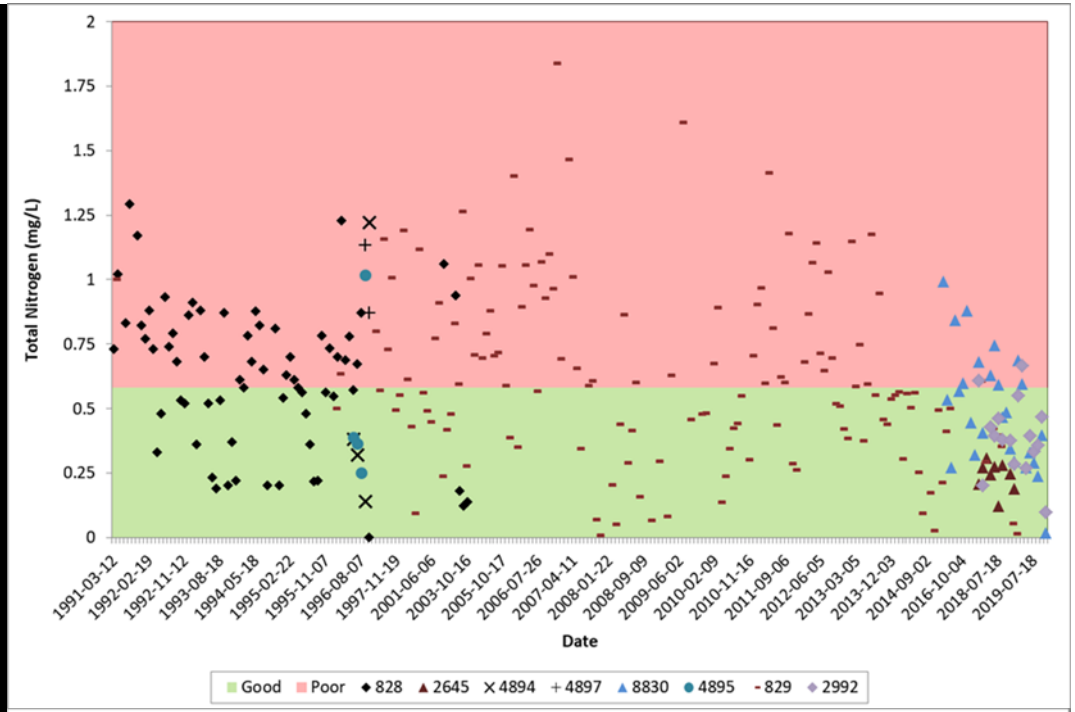
Upper Shades Creek's *E. coli* levels were above standards in almost all sampling events.

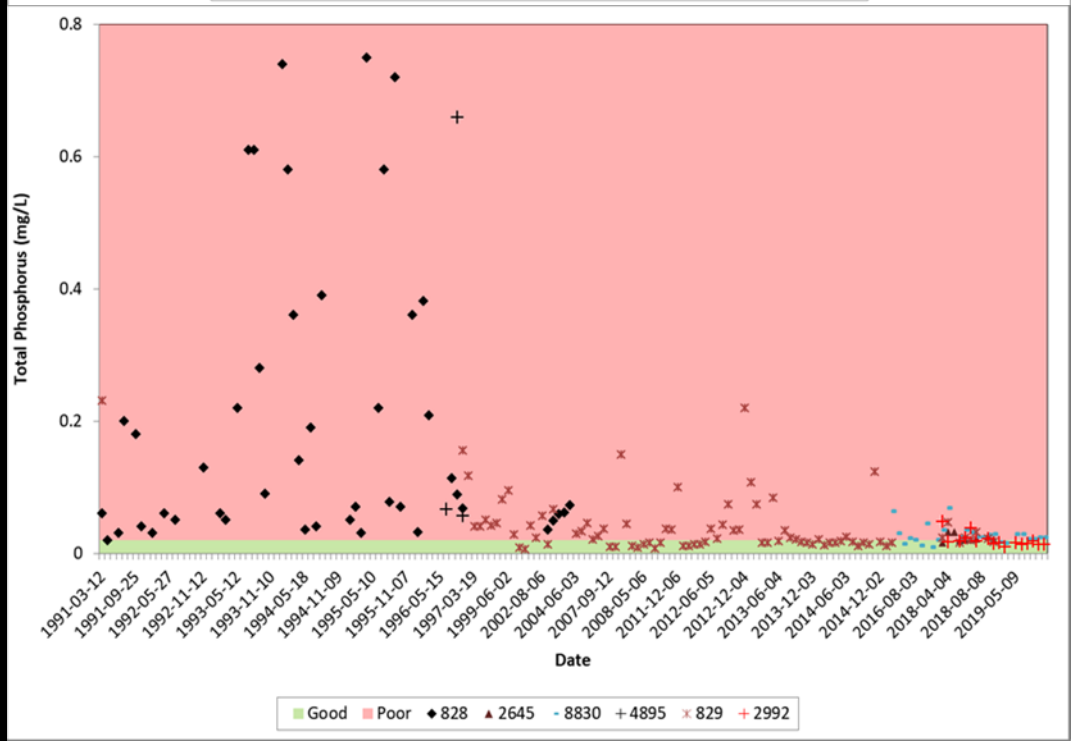


Nutrients

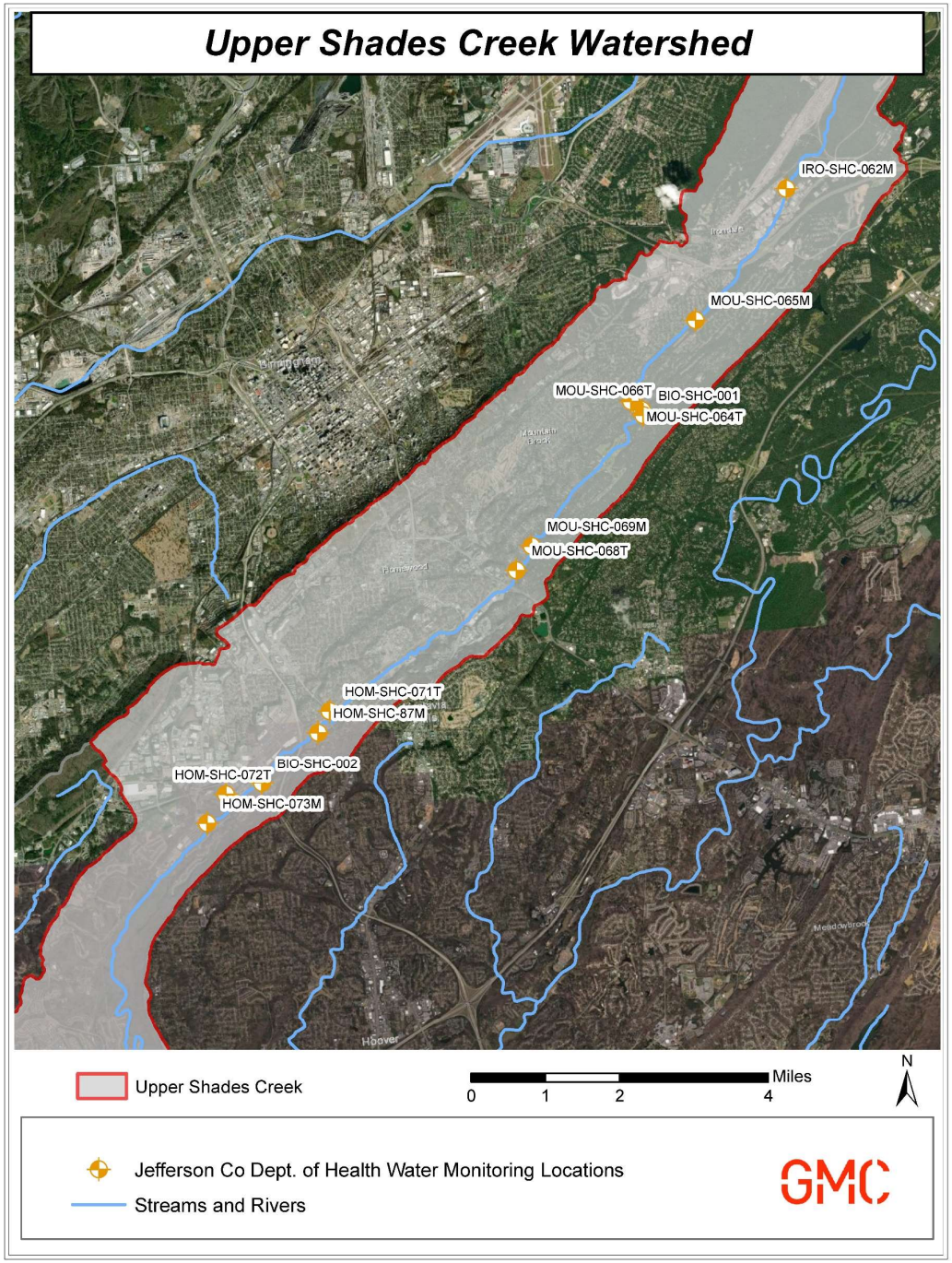
» Lower Shades Creek saw high total phosphorus (TP) and mostly high total nitrogen (TN) (Right)

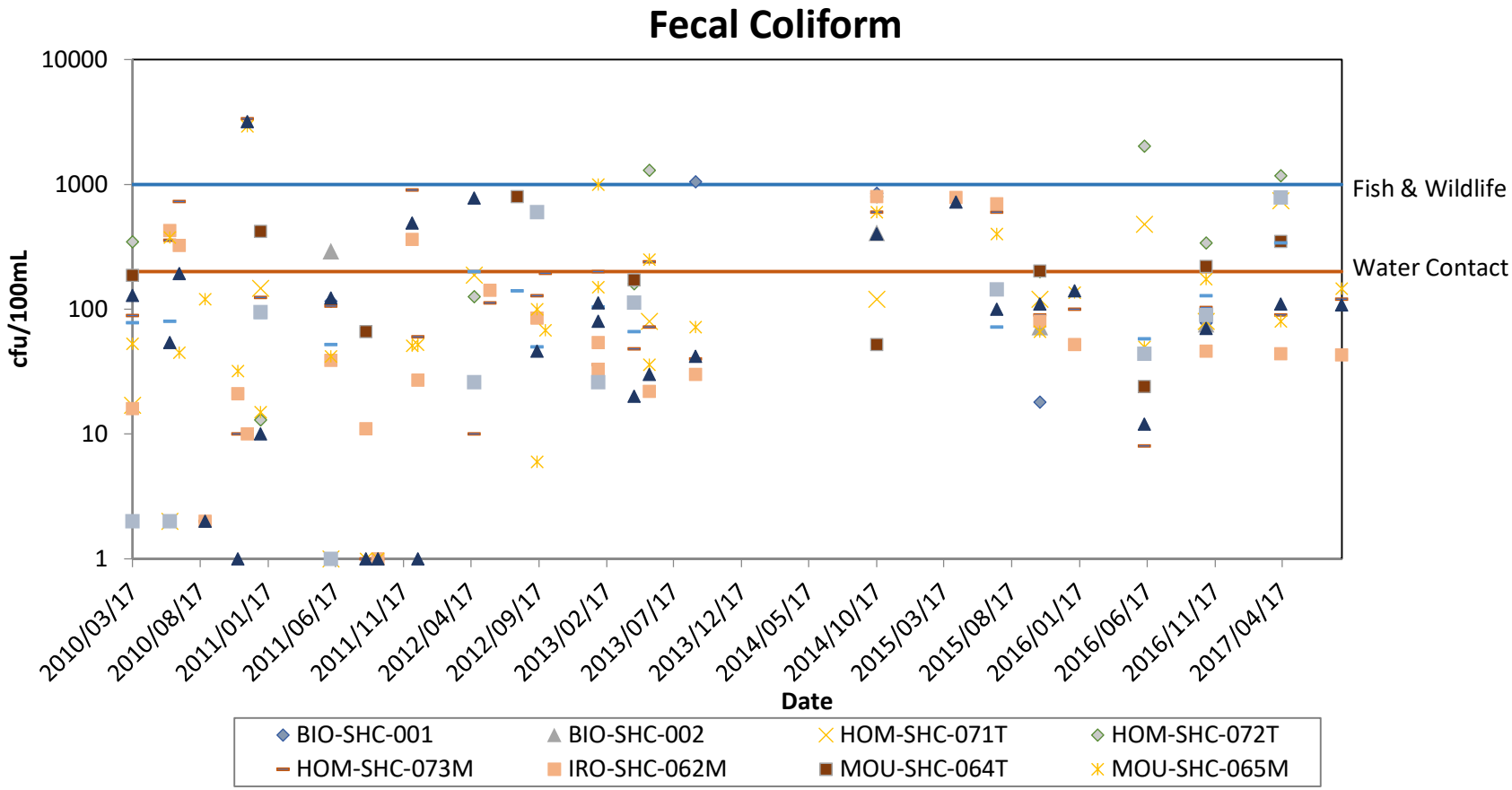
» Cooley Creek-Mud Creek and Upper Shades Creek stations have limited data that show occasional elevated levels of TN and TP





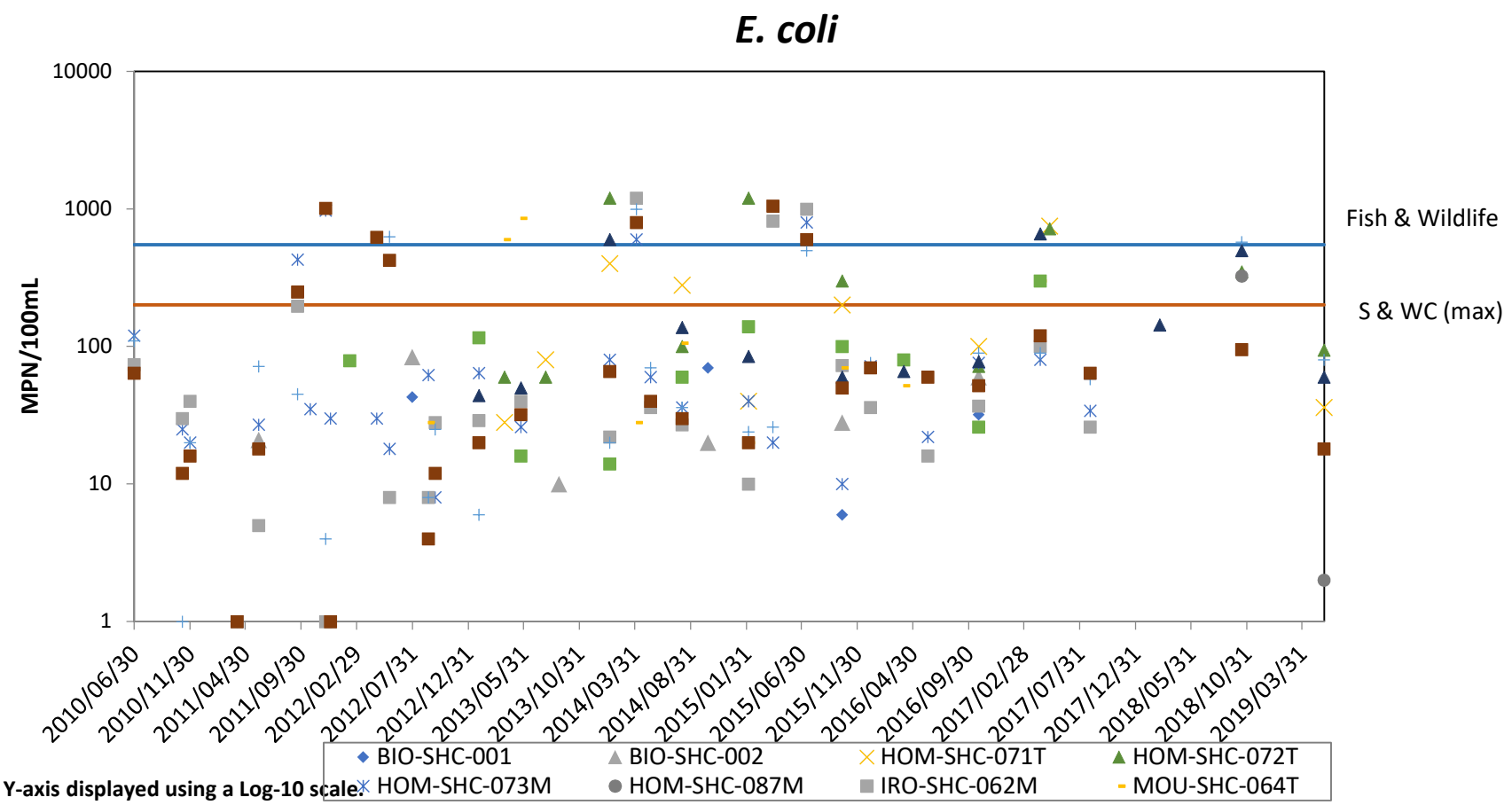
Jefferson County Department of Health Water Quality Monitoring Data





Y-axis displayed using a Log-10 scale.

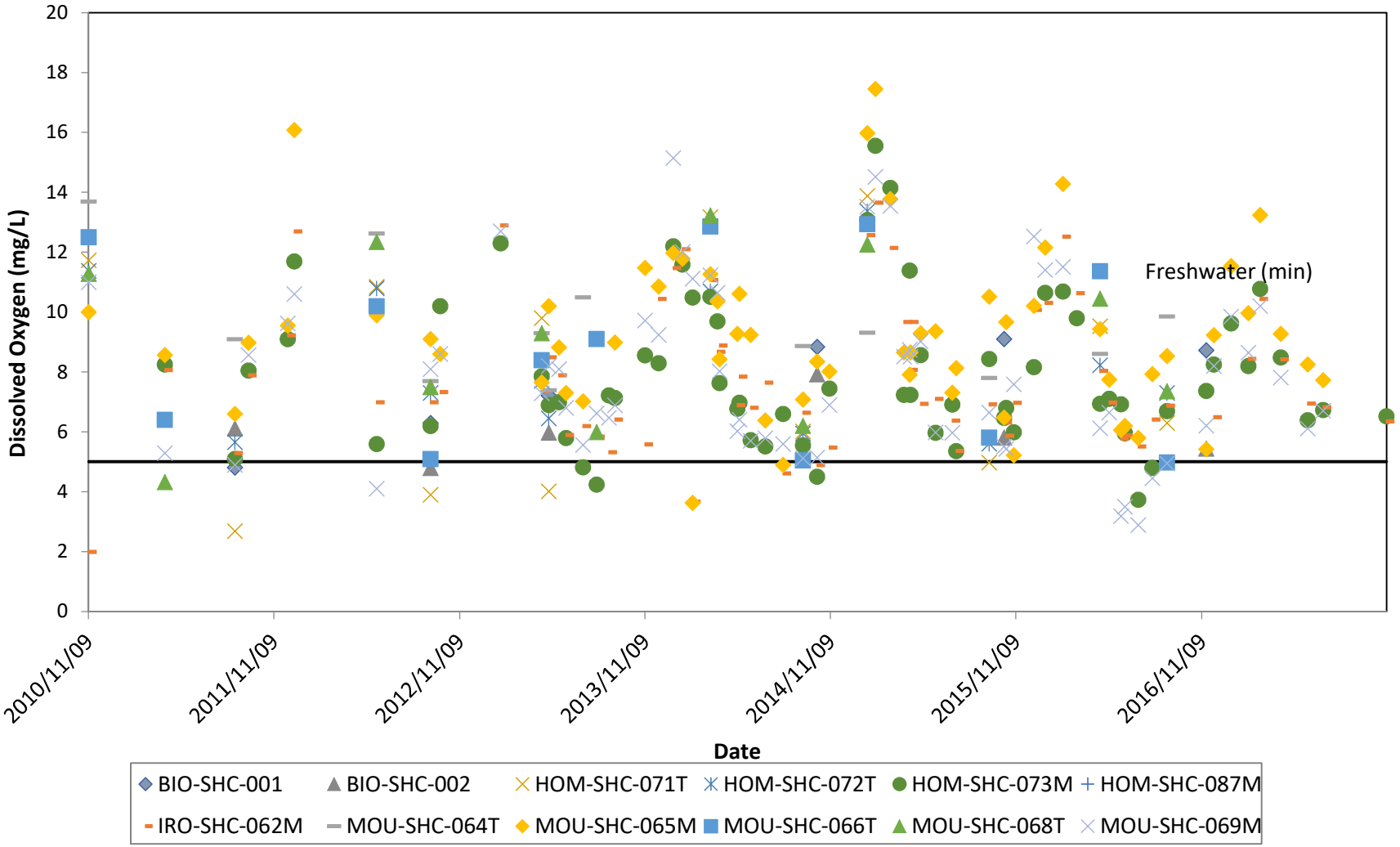
***Fecal coliform standards for Fish & Wildlife are less than 1000colonies/100mL in a geometric mean sample, and less than 200 colonies/100mL in a geometric mean sample in the months June-September when water contact and recreation might occur.



Y-axis displayed using a Log-10 scale.

***The designations of Fish & Wildlife and Swimming and Other Whole Body Water-Contact Sports (S&WC) are displayed as 548colonies/100mL in geometric mean and 126colonies/100mL in geometric mean, respectively.

DO


Dissolved Oxygen (mg/L)
20
18
16
14
12
10
8
6
4
2
0
2010/11/09
2011/11/09
2012/11/09
2013/11/09
2014/11/09
2015/11/09
2016/11/09
Freshwater (min)
Date
BIO-SHC-001
BIO-SHC-002
HOM-SHC-071T
HOM-SHC-072T
HOM-SHC-073M
HOM-SHC-087M
IRO-SHC-062M
MOU-SHC-064T
MOU-SHC-065M
MOU-SHC-066T
MOU-SHC-068T
MOU-SHC-069M

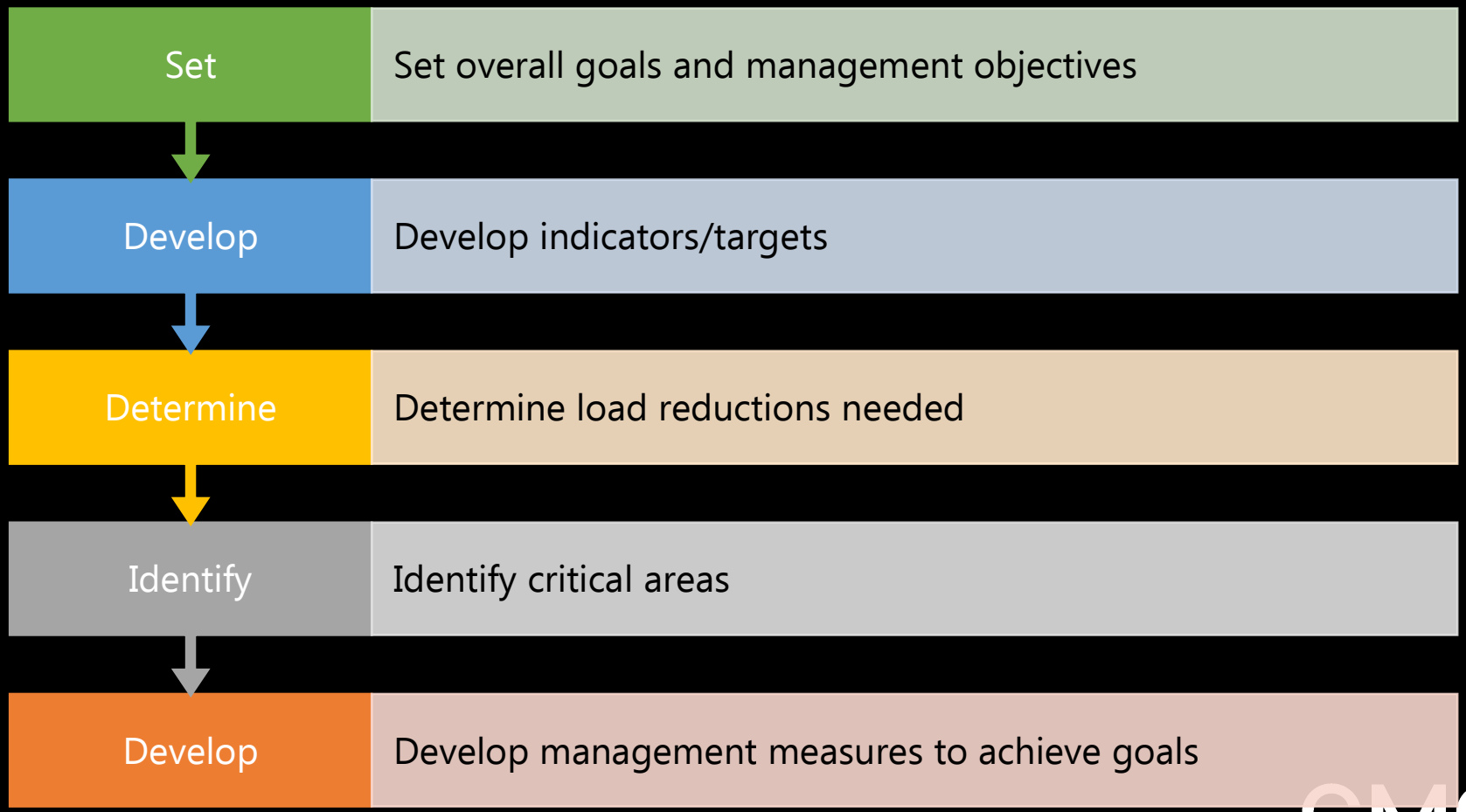
Suspended-Sediment Transport and Bed-Materials Characteristics of Shades Creek, AL and Ecoregion 67: Developing Water Quality Criteria for Suspended and Bed-Material Sediment.[1]

[1]USDA Research Service National Sedimentation Laboratory Technical Report 43, Channel and Watershed Processes Research Unit, January 2004.

- Increases in sediment load are a direct result of greater runoff rates.
- Streambanks are the greatest source of sediments to suspended load, generally.
- One model simulated protection of 11% of the streambank (in one area) which resulted in a 40% reduction in suspended sediment load (fines) from the banks.

GMC

Step 3: Set Goals and Identify Solutions



Planning Process

Overall Goal	Management Objective	Performance Indicator
Restore Aquatic Habitat & Improve Water Quality	Reduce Sediment Loads	Number of river miles that meet water quality standards.
	Improve Riparian Vegetation	Miles of vegetated riparian buffer
	Reduce Non-Point Source Discharges	Number of management measures implemented in watershed
		Rates of volunteer participation in watershed activities

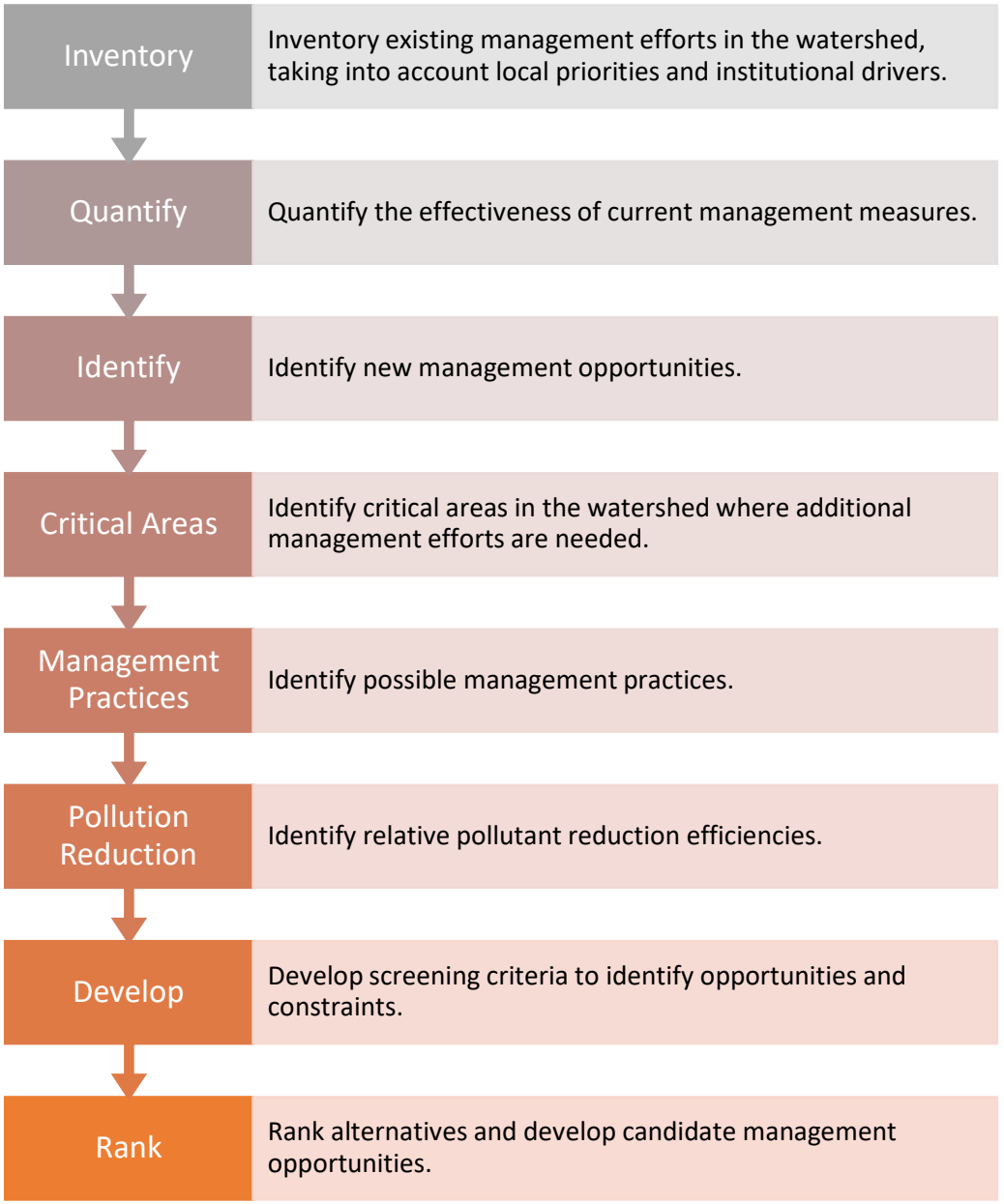
Load Reduction – TMDLs

TMDL for Sediment, Turbidity, and Habitat Alteration in Shades Creek is **24.7** T/yr/km$^{2.}$

Shades Creek currently has an estimated sediment yield of **52.6** T/yr/km$^{2.}$

A 53% reduction in suspended-sediment yield is required for Shades Creek.

Process to Select Management Practices



Step 4: Design Implementation Program

- Develop an implementation schedule
- Develop interim milestones
- Develop criteria to measure progress
- Develop water quality monitoring program
- Develop education program
- Develop evaluation process
- Identify needed technical and financial assistance
- Assign responsibility

Implementation Plan Example – St. Marys WMP

BMP	*Responsible Agency*	*Cost*	*Funding Source*	*Evaluation Measure*	*Milestone*		
					Short (<2 yr)	*Mid (2 – 5 yr)*	*Long (5 – 10 yr)*
BMP 6: Implementation of the CSS to the Georgia Stormwater Management Manual	**Camden County, St Marys, Kingsland**	**Staff Time**	**General Fund, Fees**	**Percent of applicable site plans reviewed inspected for compliance with CSS**	**50%**	**75%**	**100%**
BMP 19: University of Georgia River Basin Center Septic System Retrofit Program	**University of Georgia River Basin Center**	**$166,667**	**319 Grant Funding**	**Number of septic systems inspected/retrofitted/ repaired/pumped** **Number of public outreach events**	**14** **2**	**n/a**	**n/a**

Engagement

Online Survey

- 10 minute survey
- Geographical questions
- Identify issues & areas of concern