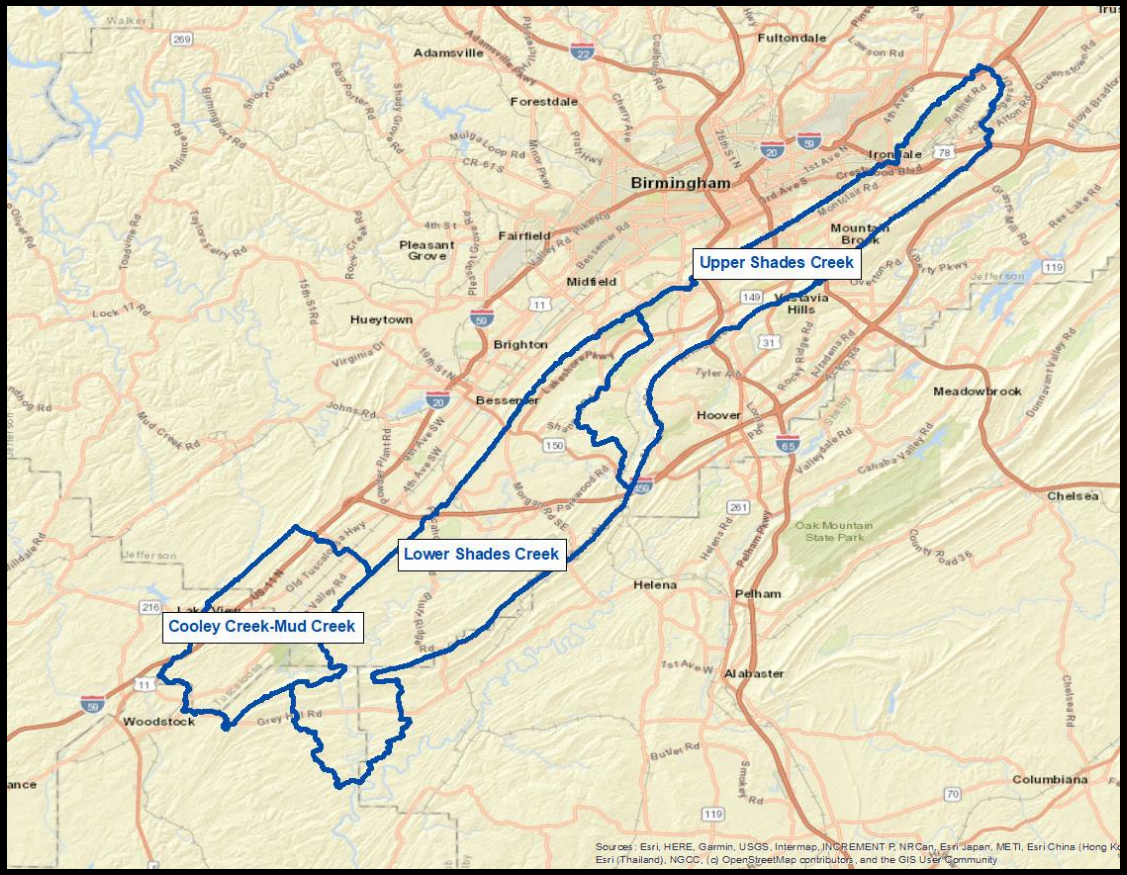
SHADES CREEK WATERSHED MANAGEMENT PLAN

Courtney Reich, AICP, CFM, 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

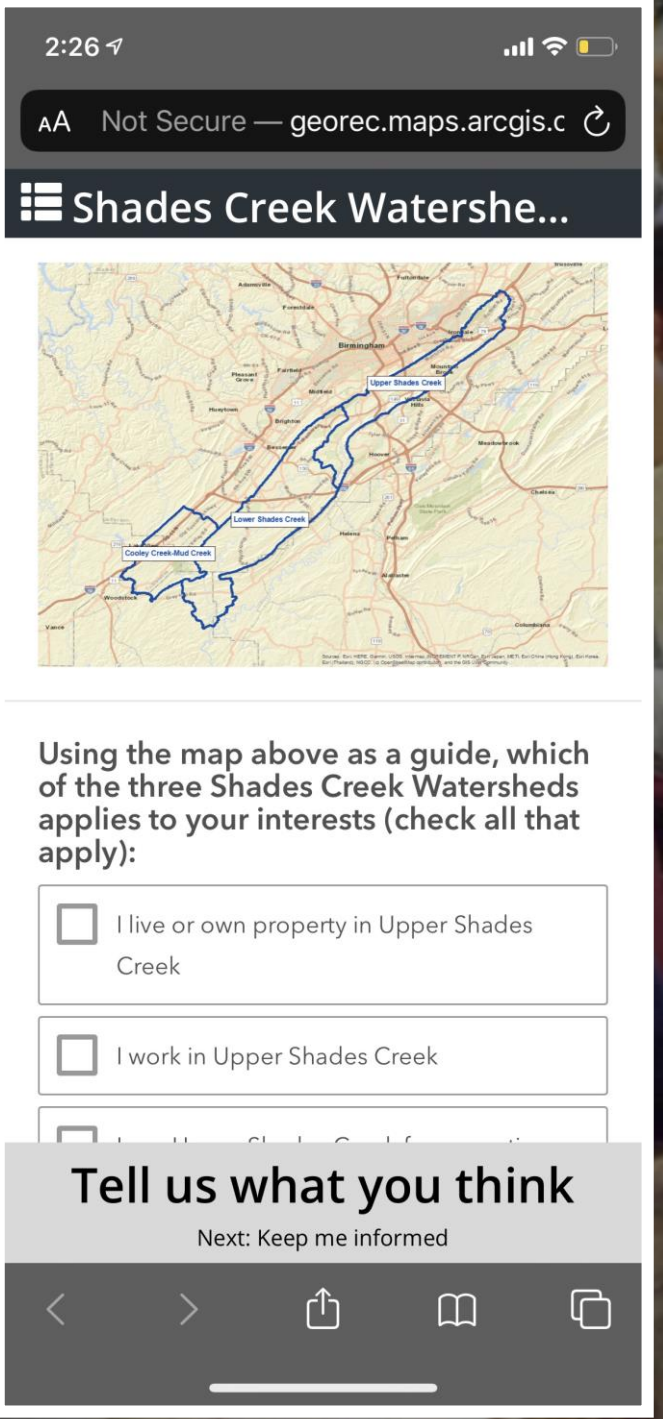
Engagement

Online Survey

» 10 minute survey

» Geographical questions

» Identify issues & areas of concern



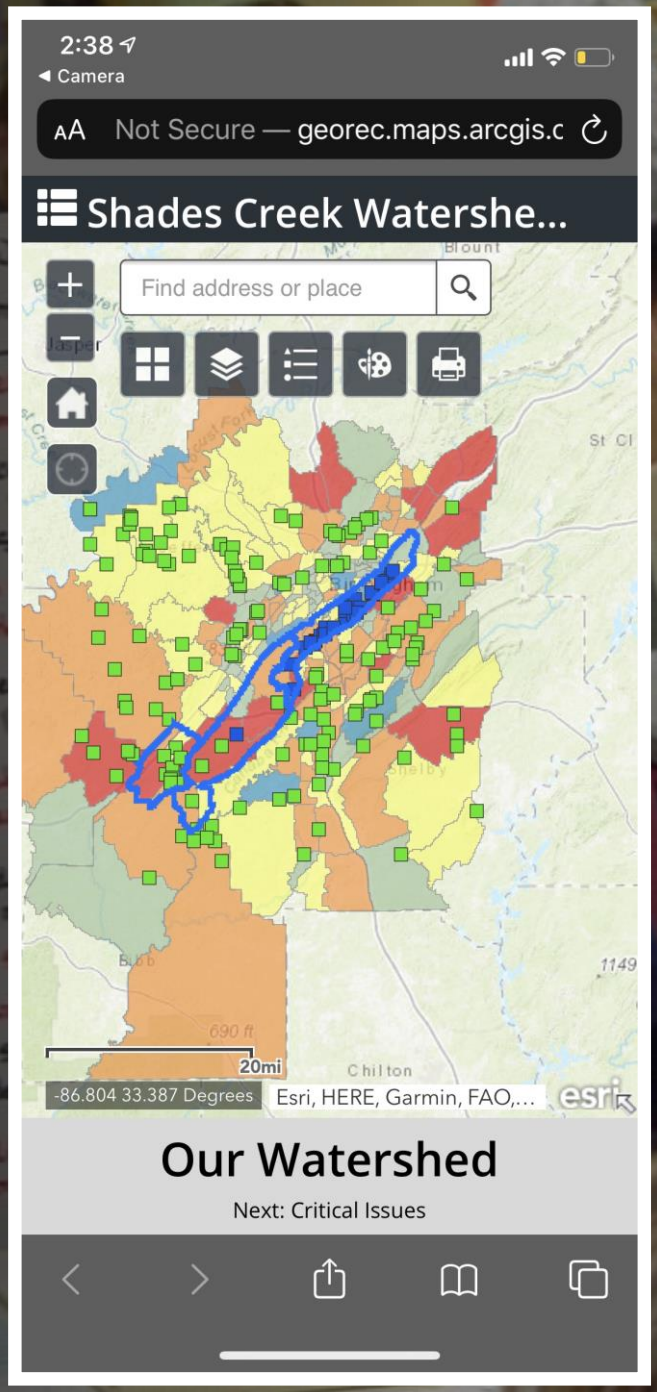
Engagement

Story Map Website

» Community Engagement

» View GIS data

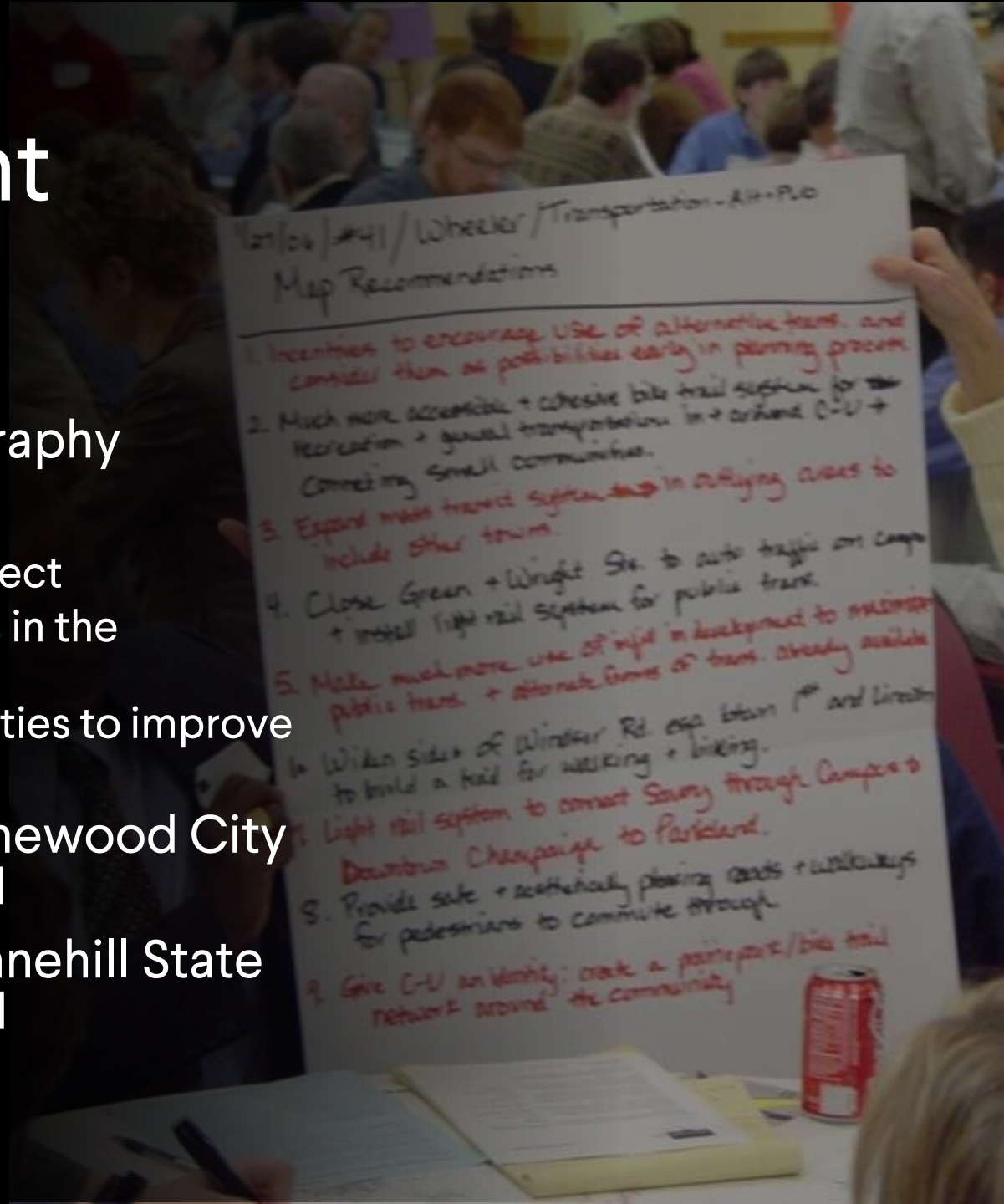
» Access survey



Engagement

Open Houses

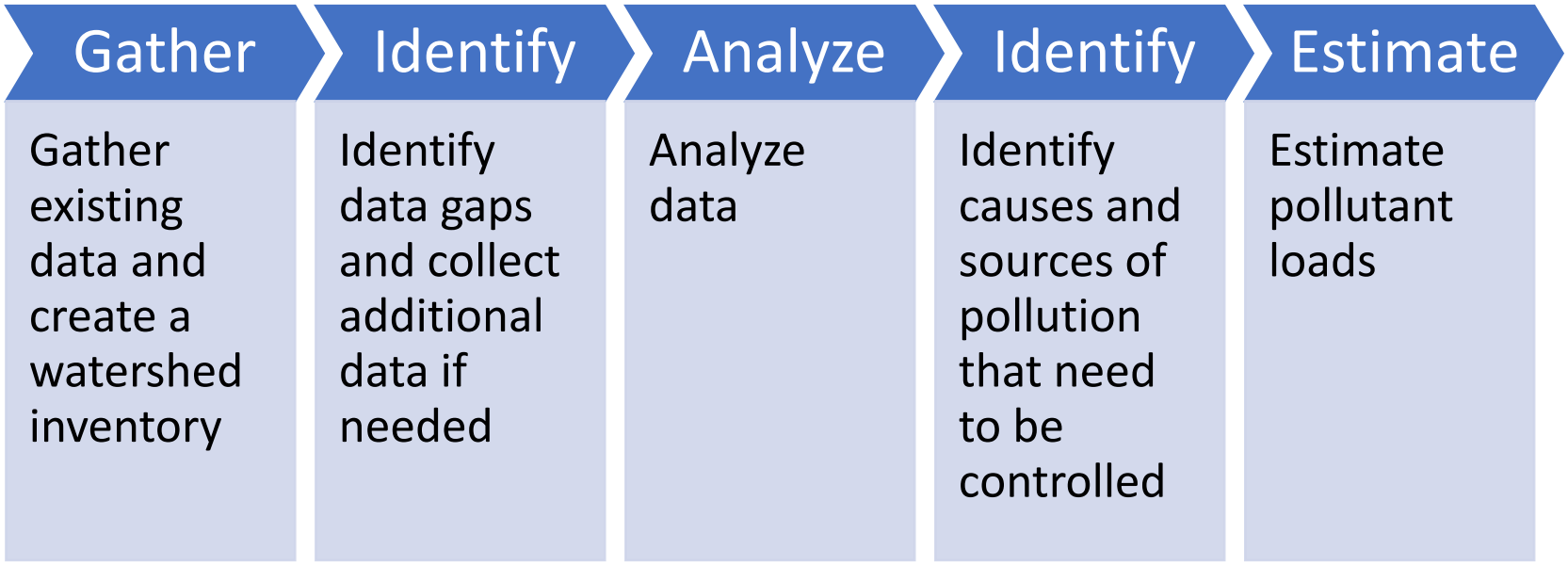
- Targeted by Geography
- Purpose:
  - Introduce the project
  - Understand issues in the watershed
  - Identify opportunities to improve the watershed
- February 11th – Homewood City Hall – 4 PM to 7 PM
- February 25th – Tannehill State Park - 4 PM to 7 PM



Engagement

Community Events

» Salamander Festival
» 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.

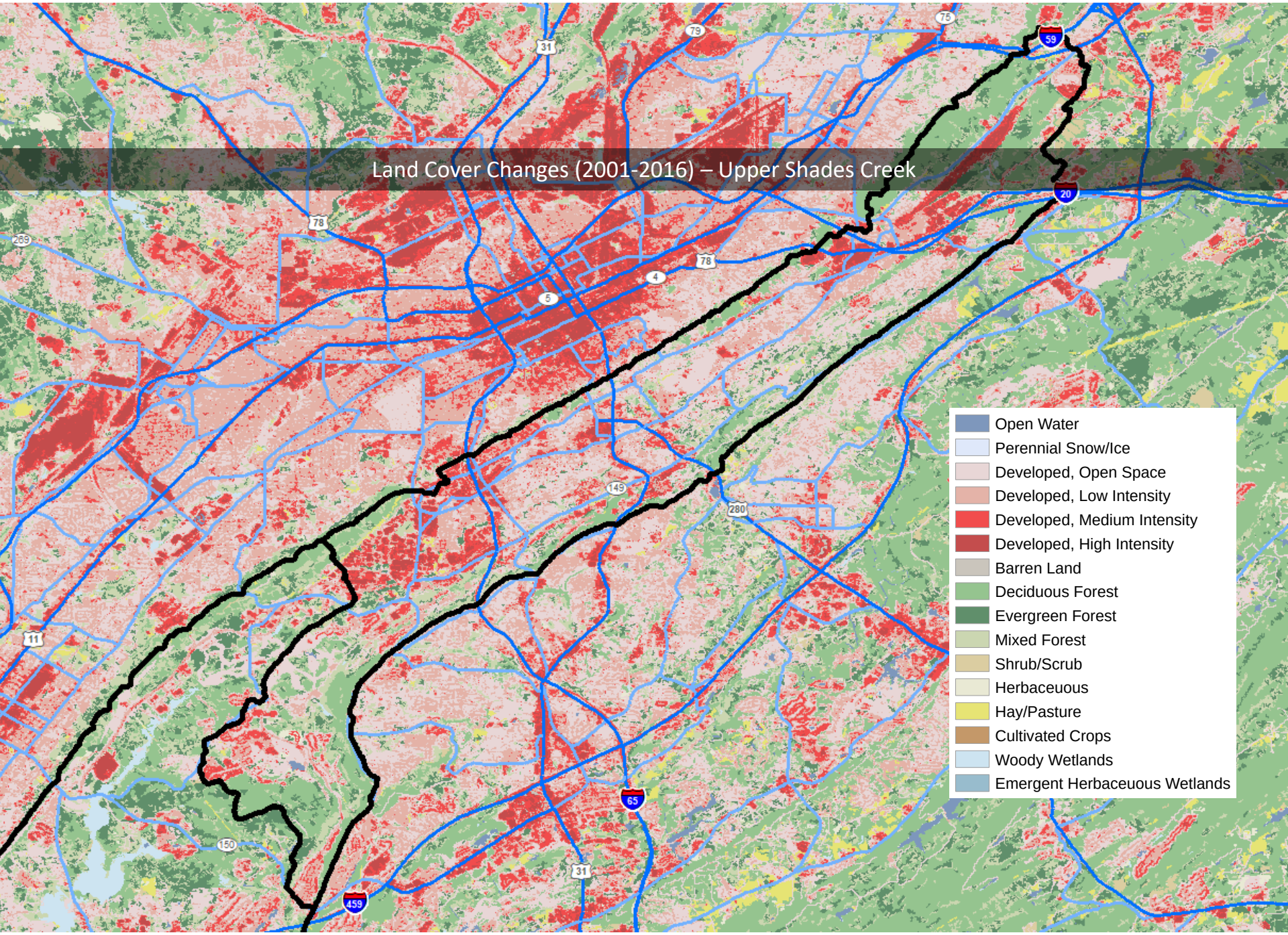
Land use and population characteristics—land use and land cover, existing management practices, demographics.

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

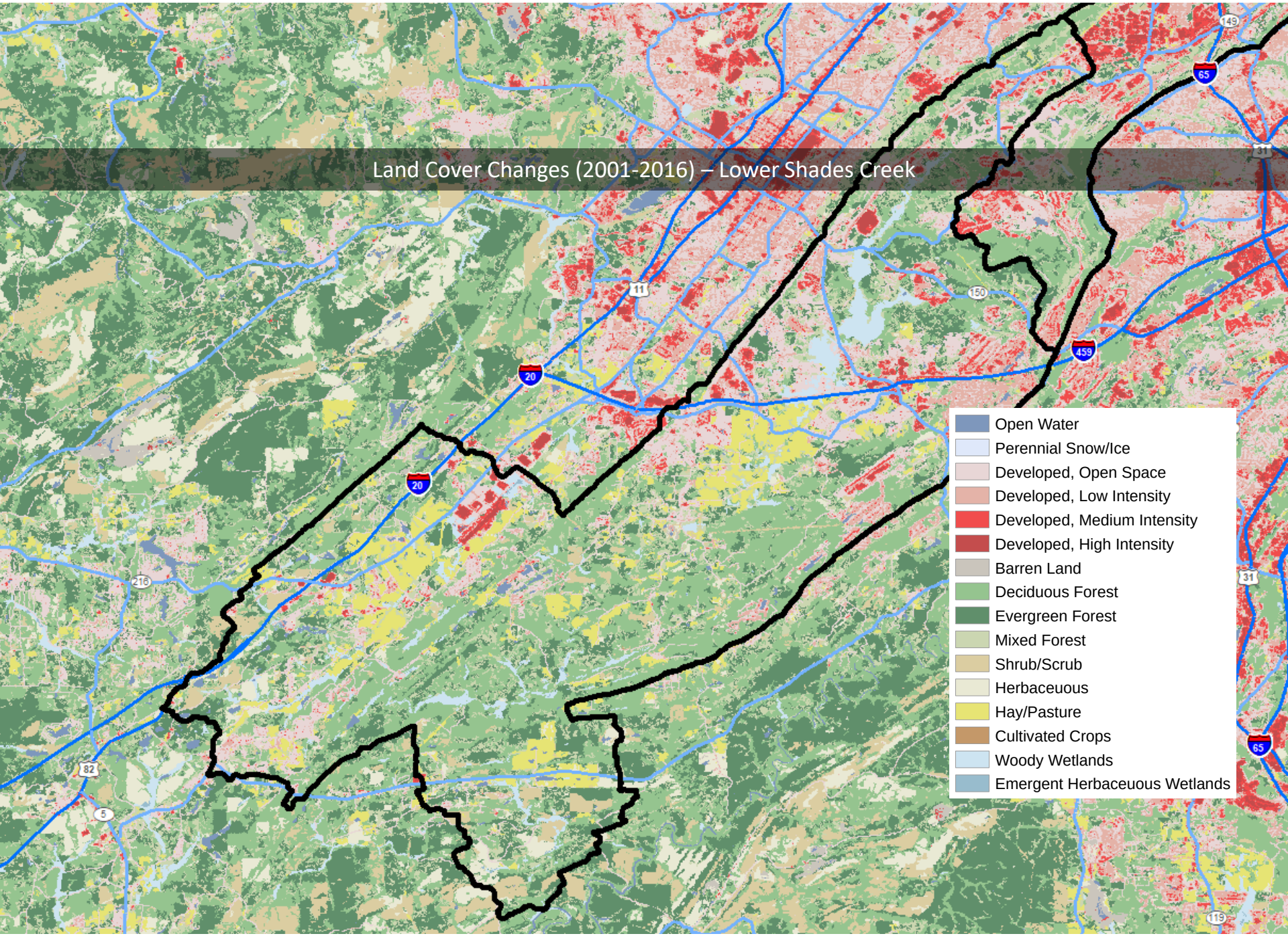
Pollutant sources—point sources, nonpoint sources.

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

Land Cover Changes (2001-2016) – Upper Shades Creek



Land Cover Changes (2001-2016) – Lower Shades Creek



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

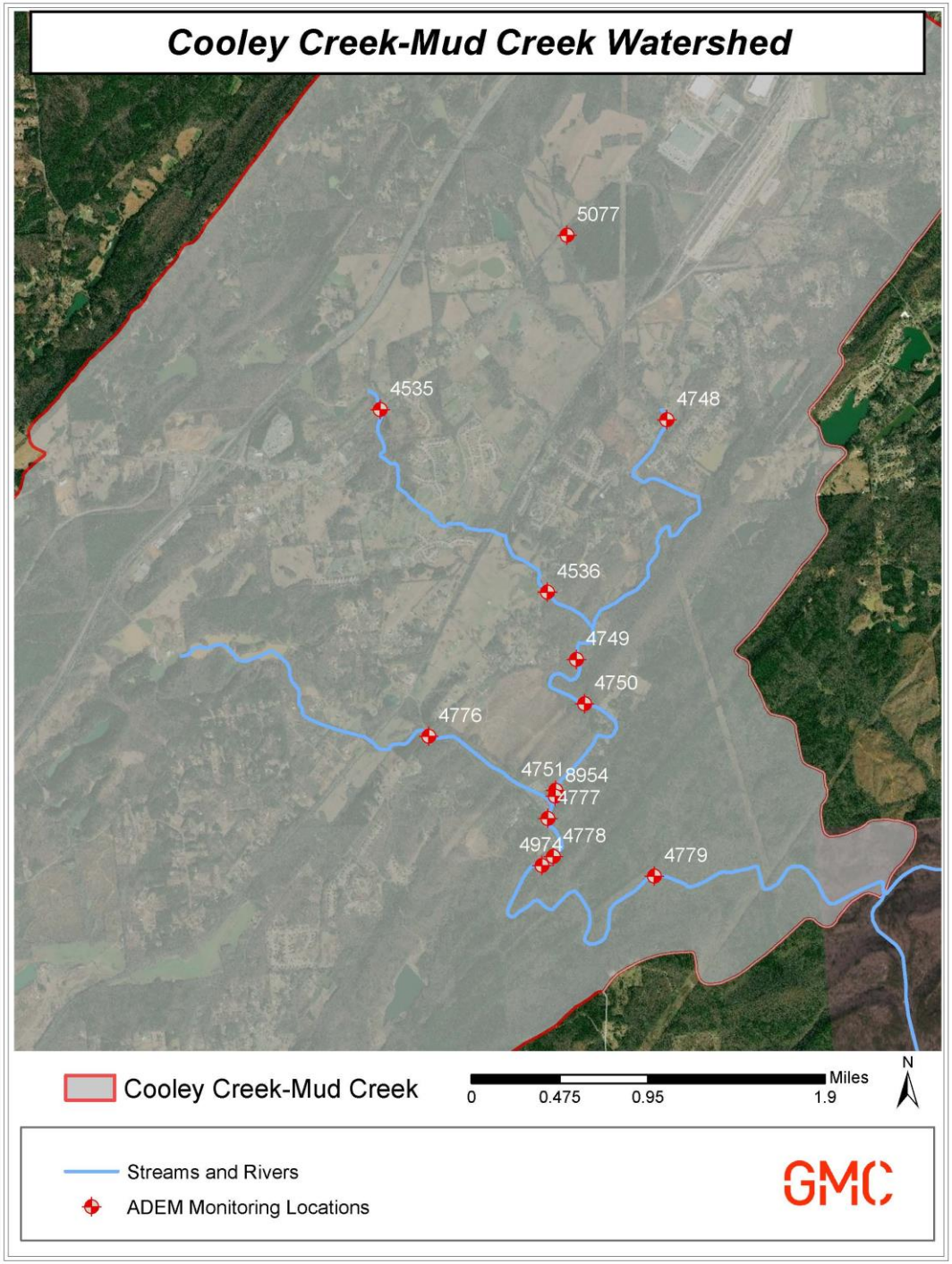
- Fecal Coliform
- E. Coli

Nutrients

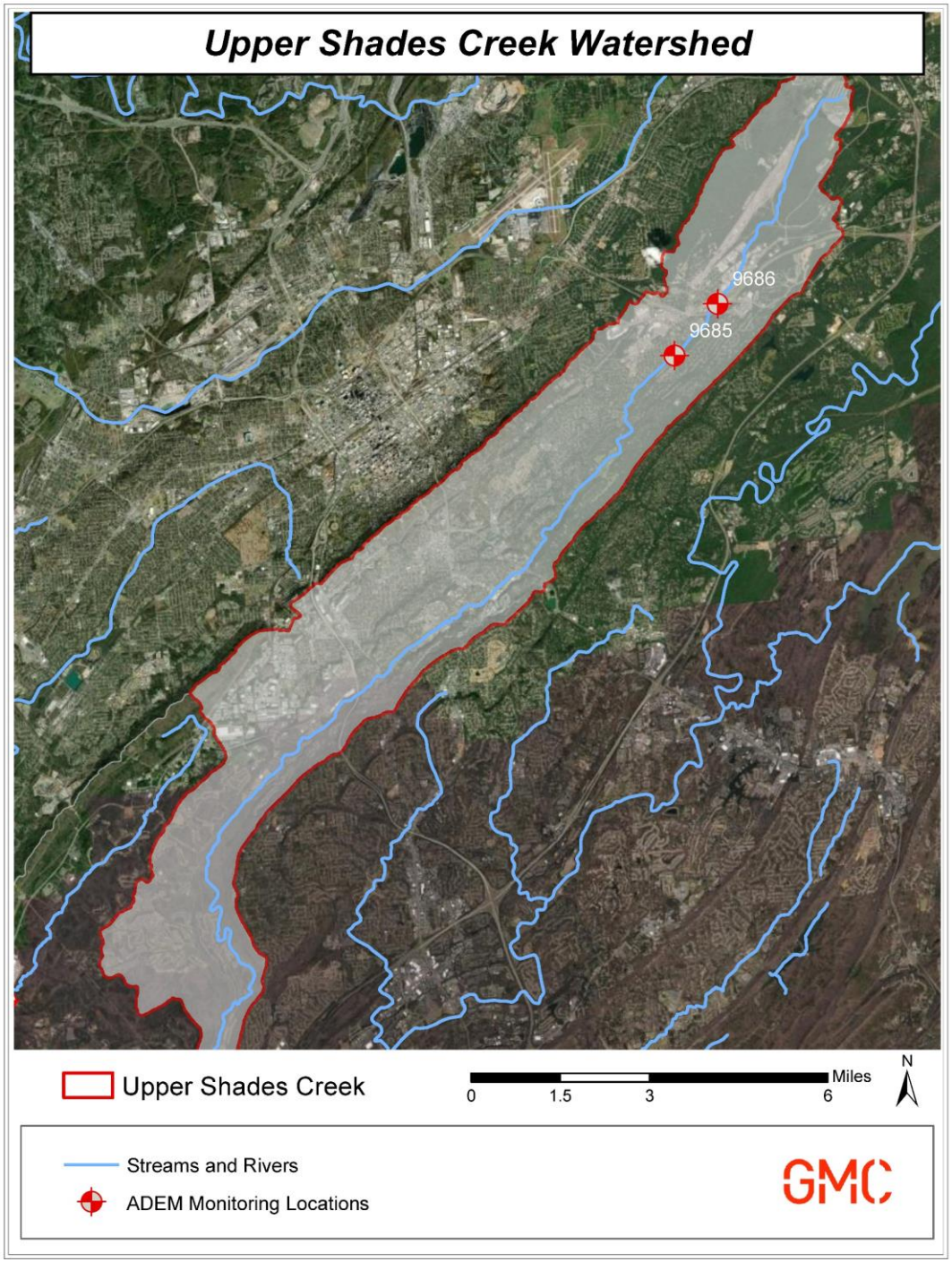
- Nitrogen
- Phosphorus

Sediment

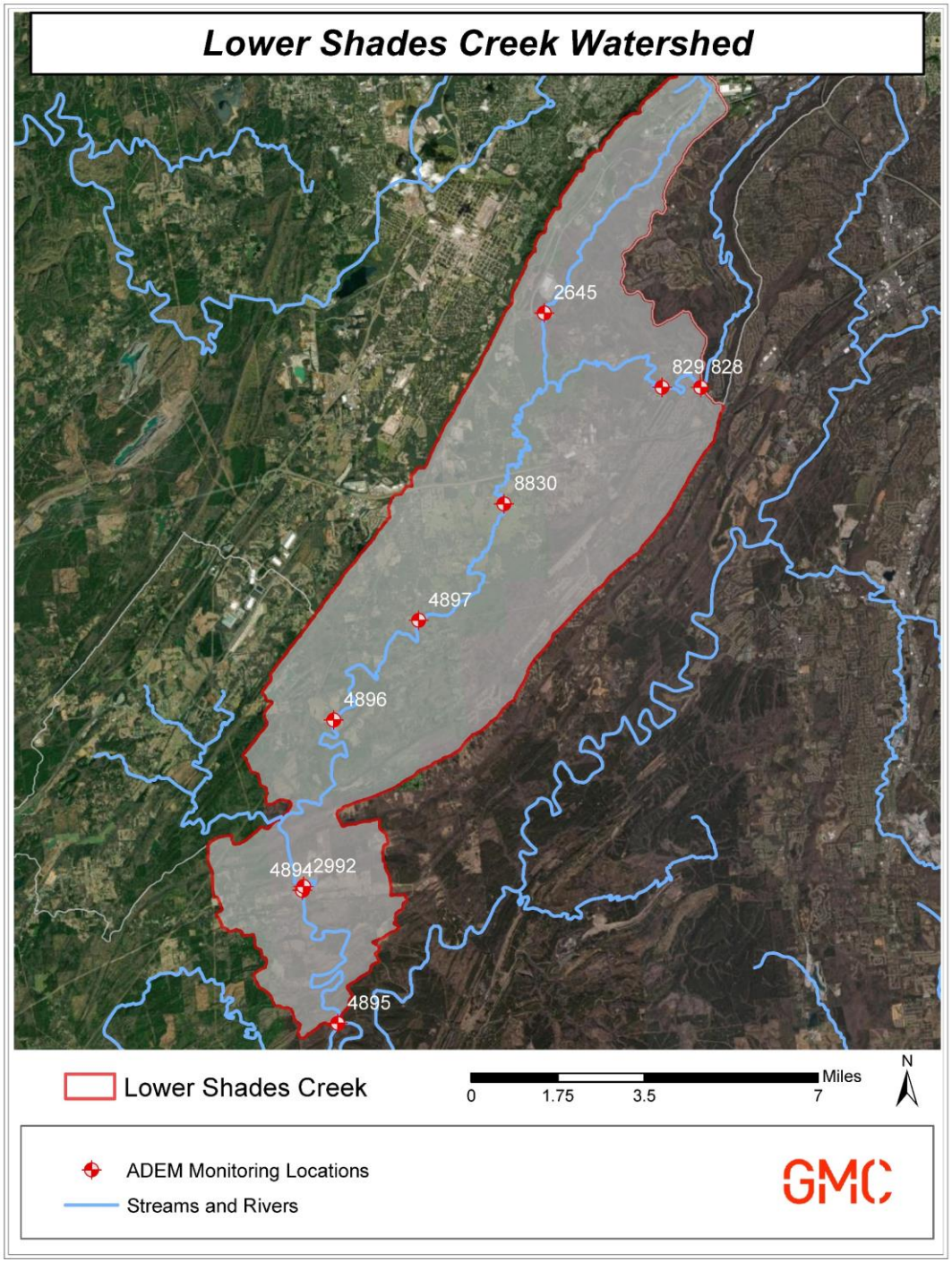
- Turbidity
- Total Suspended Solids


Cooley Creek-Mud Creek Watershed
5077
4535
4748
4536
4749
4750
4776
4751
8954
4777
4778
4974
4779
Cooley Creek-Mud Creek
0
0.475
0.95
1.9
Miles
N
Streams and Rivers
ADEM Monitoring Locations
GMC

GMC


Upper Shades Creek Watershed
9686
9685
Upper Shades Creek
0
1.5
3
6
Miles
N
Streams and Rivers
ADEM Monitoring Locations
GMC

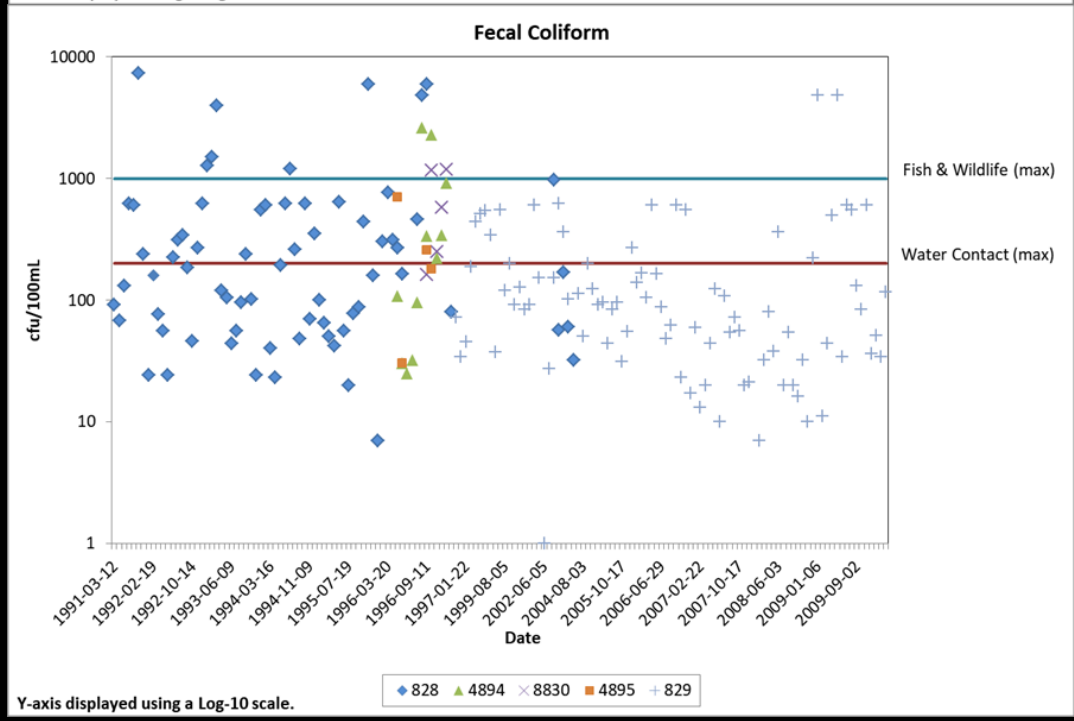
GMC


Lower Shades Creek Watershed
2645
829/828
8830
4897
4896
4894
2992
4895
Lower Shades Creek
0
1.75
3.5
7
Miles
N
ADEM Monitoring Locations
Streams and Rivers
GMC

GMC

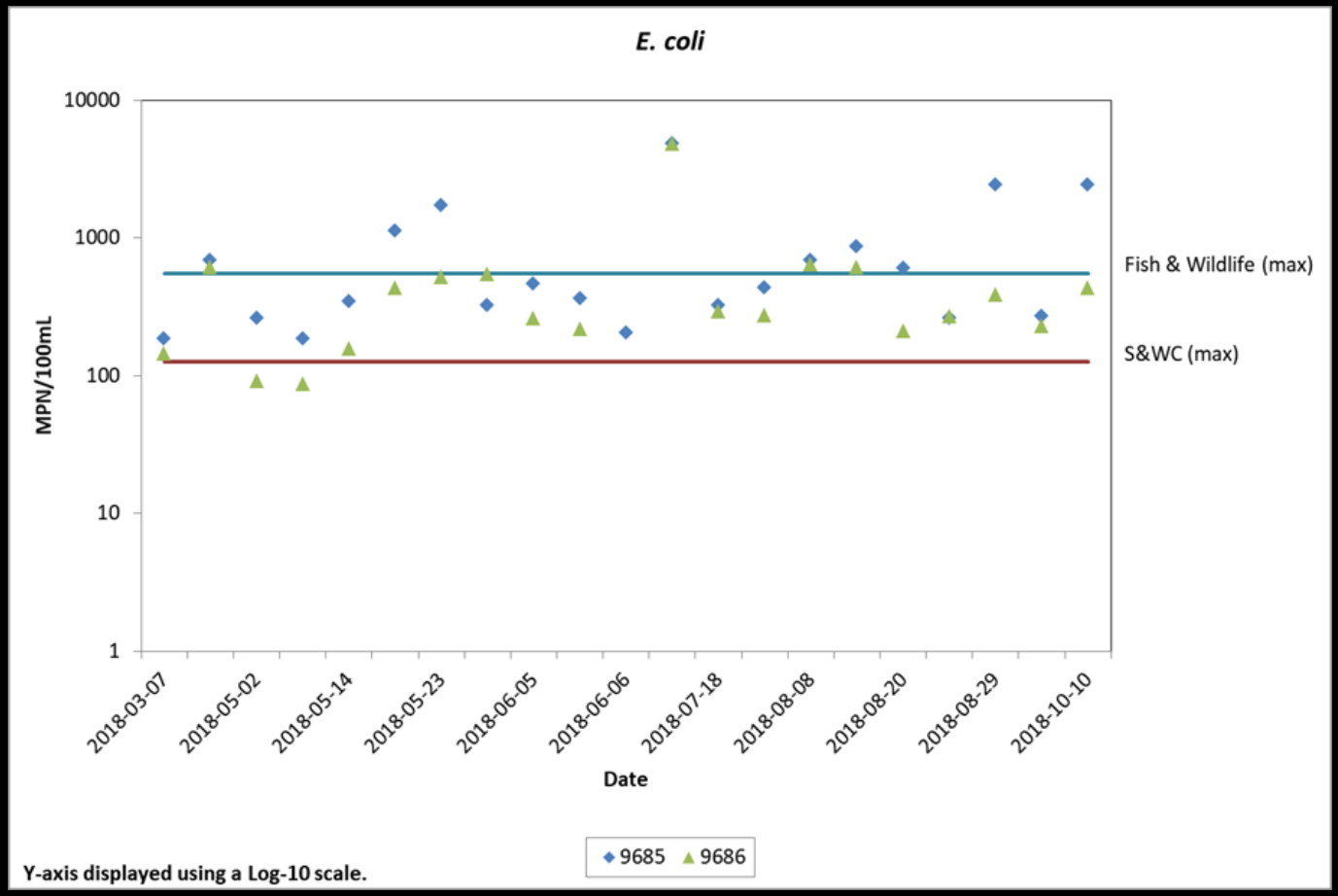
Bacteria

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



Bacteria

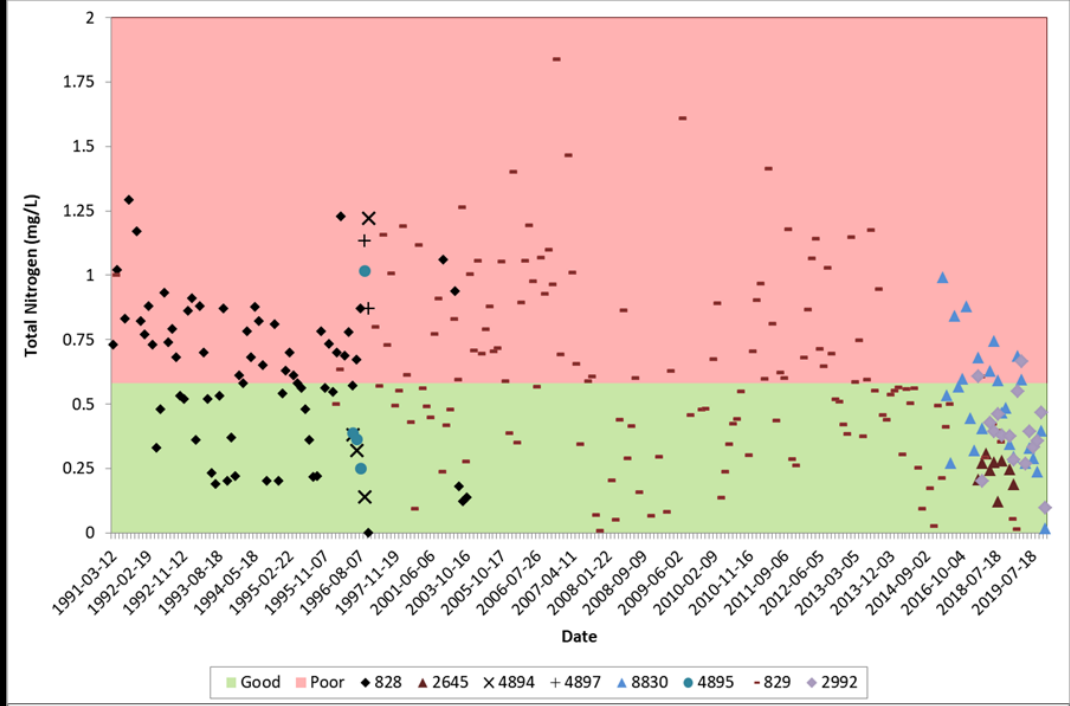
Upper Shades Creek's *E. coli* levels were above standards in almost all sampling events.

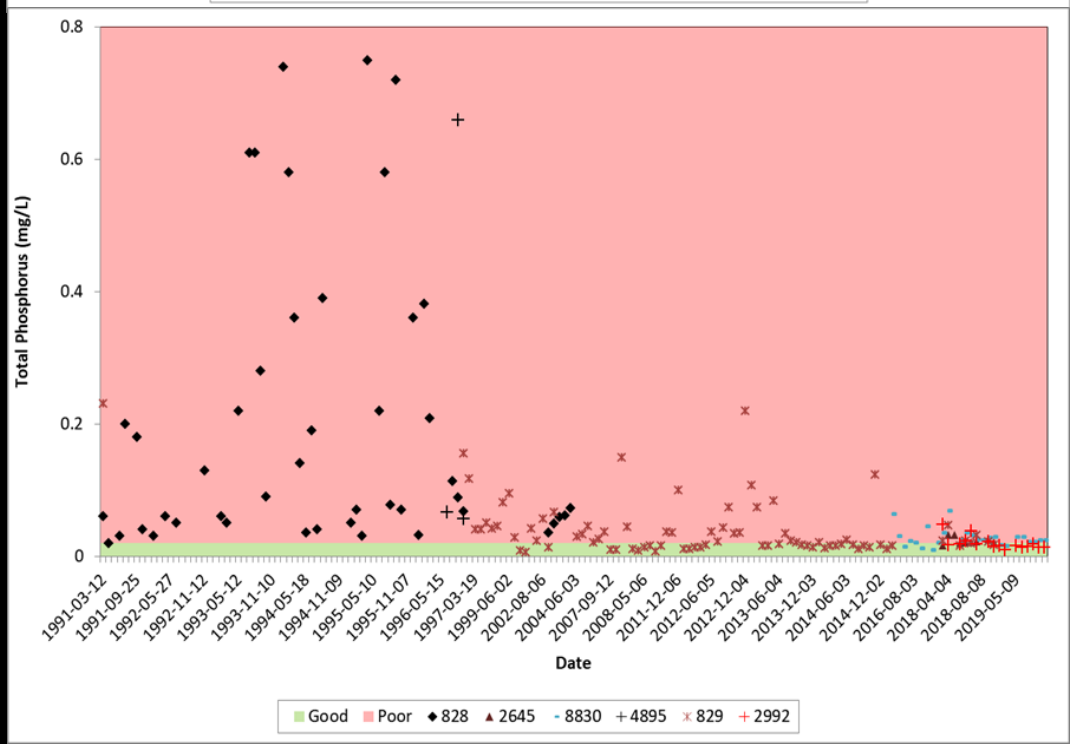


Nutrients

» 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





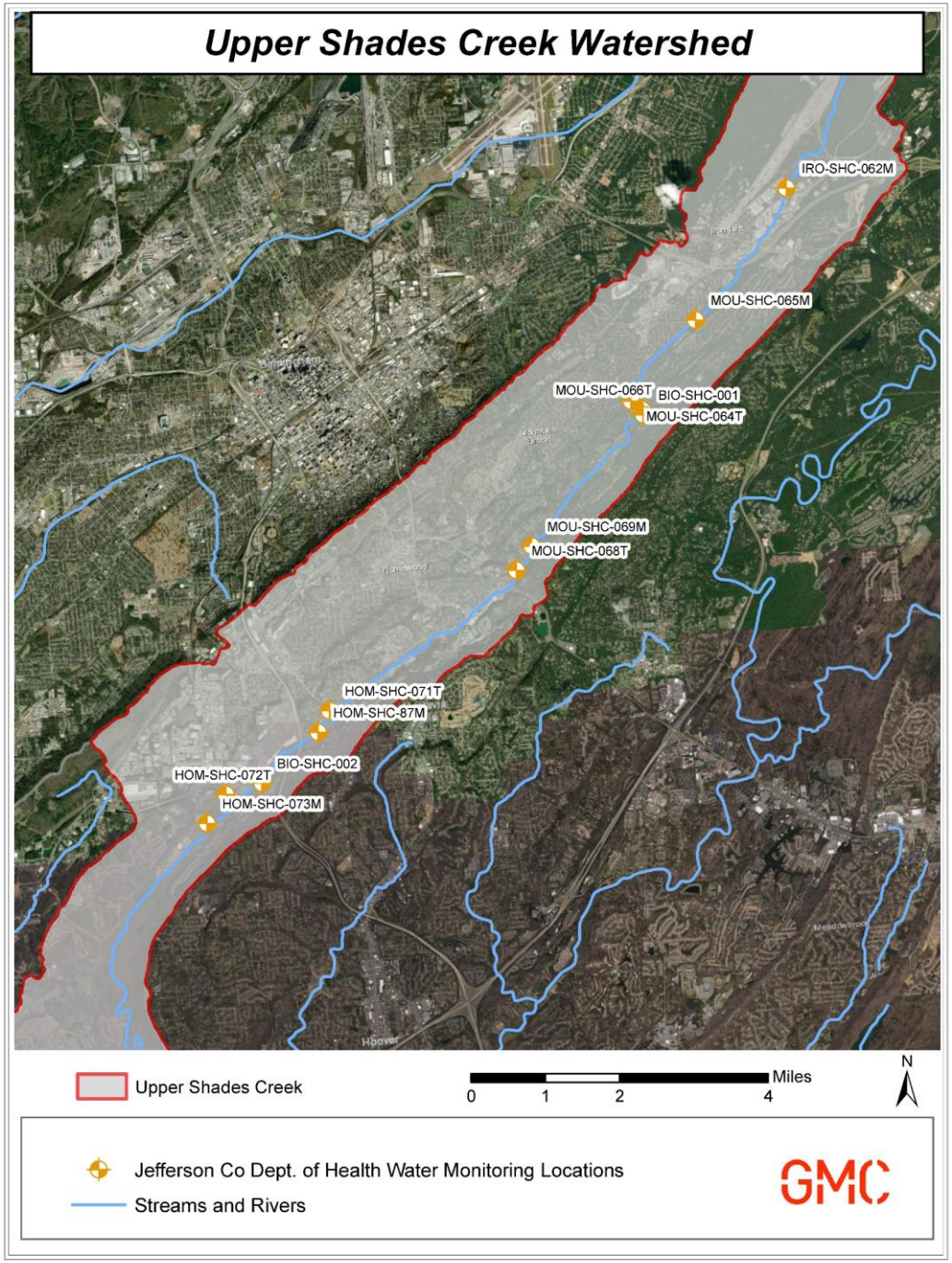
Suspended-Sediment Transport and Bed-Materials Characteristics of Shades Creek, AL and Ecoregion 67: Developing Water Quality Criteria for Suspended and Bed-Material Sediment.[1]

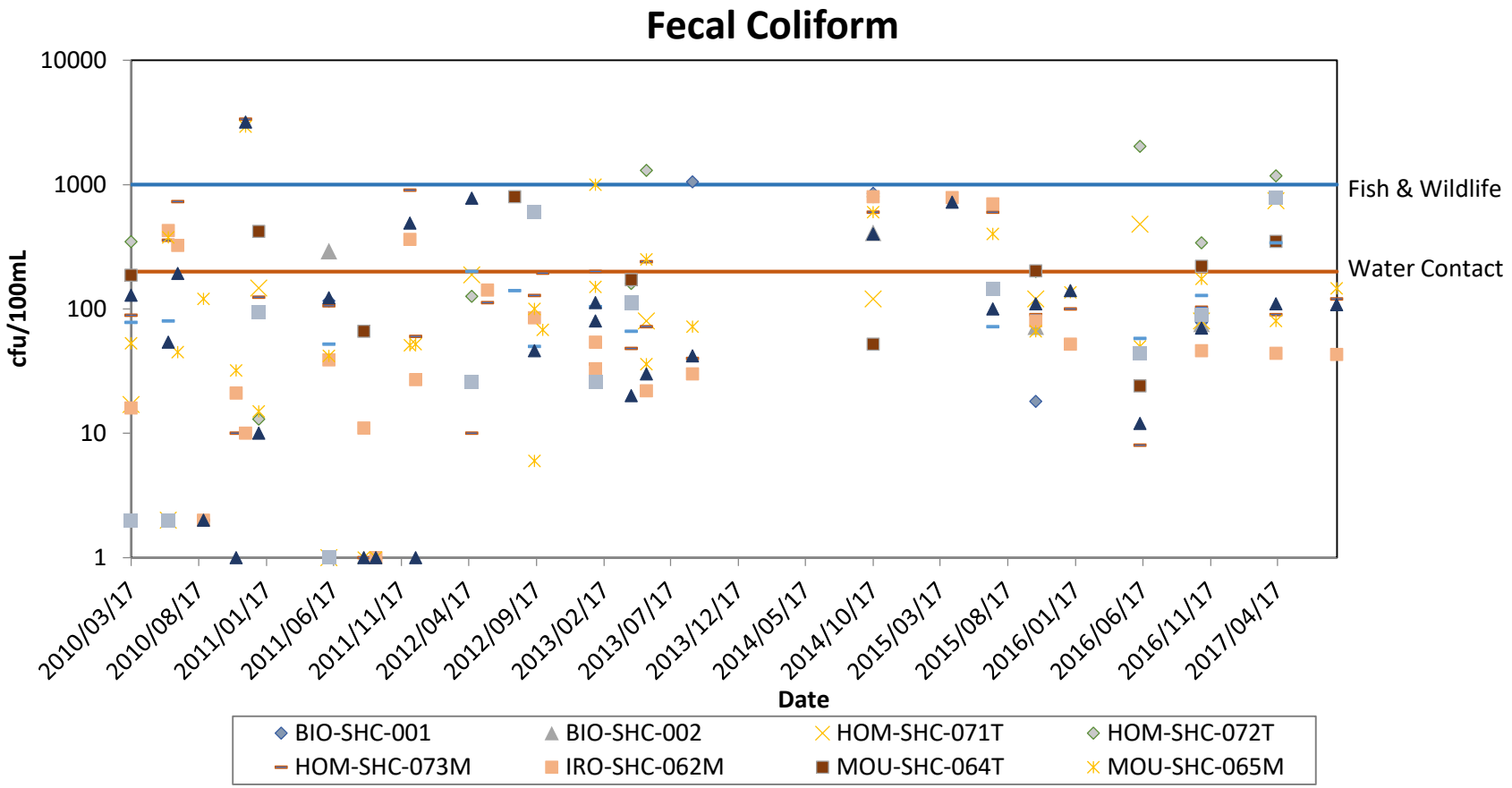
- Increases in sediment load are a direct result of greater runoff rates.
- Streambanks are the greatest source of sediments to suspended load, generally.
- One model simulated protection of 11% of the streambank (in one area) which resulted in a 40% reduction in suspended sediment load (fines) from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

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

GMC

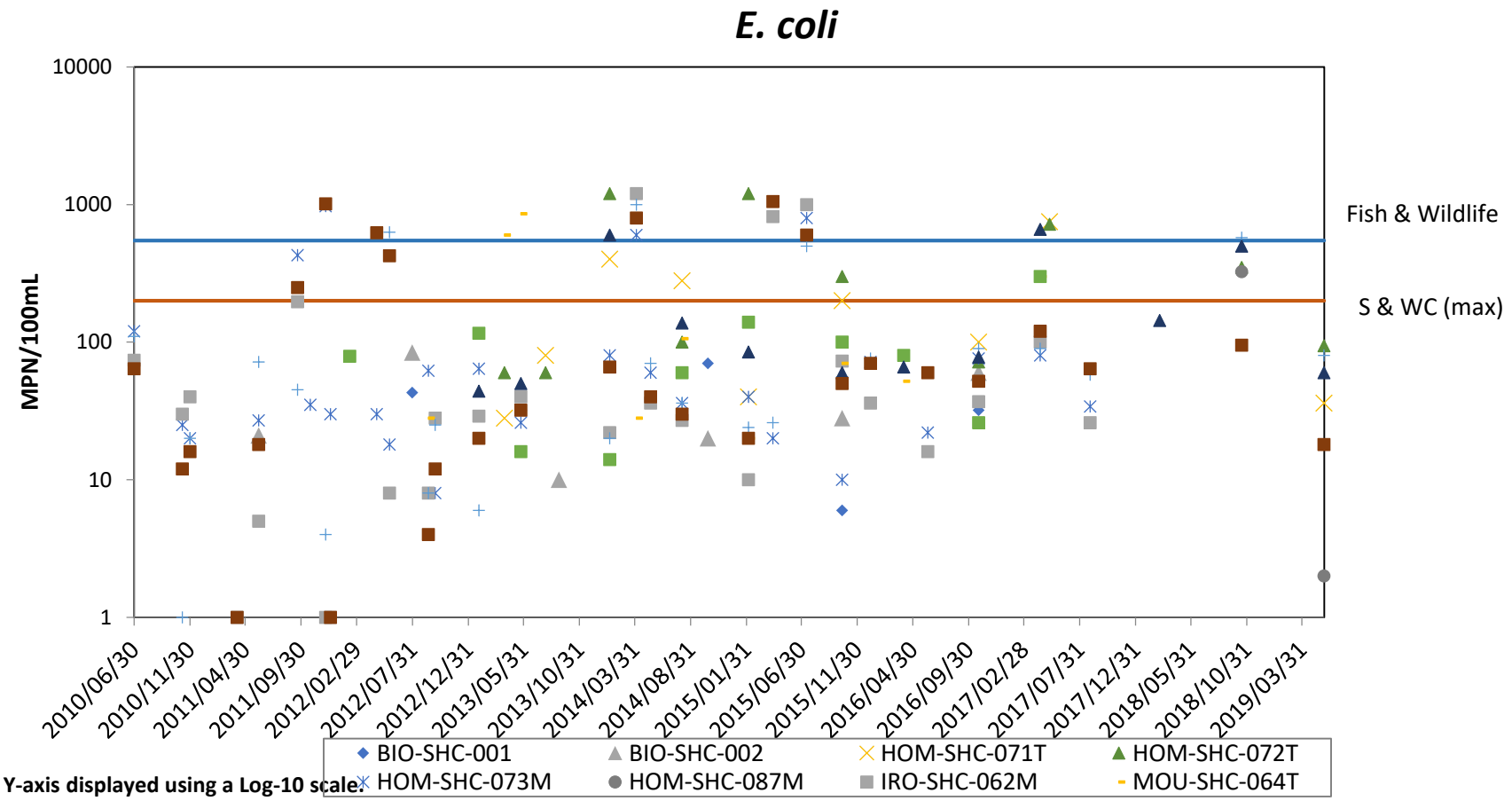
Jefferson County Department of Health Water Quality Monitoring Data





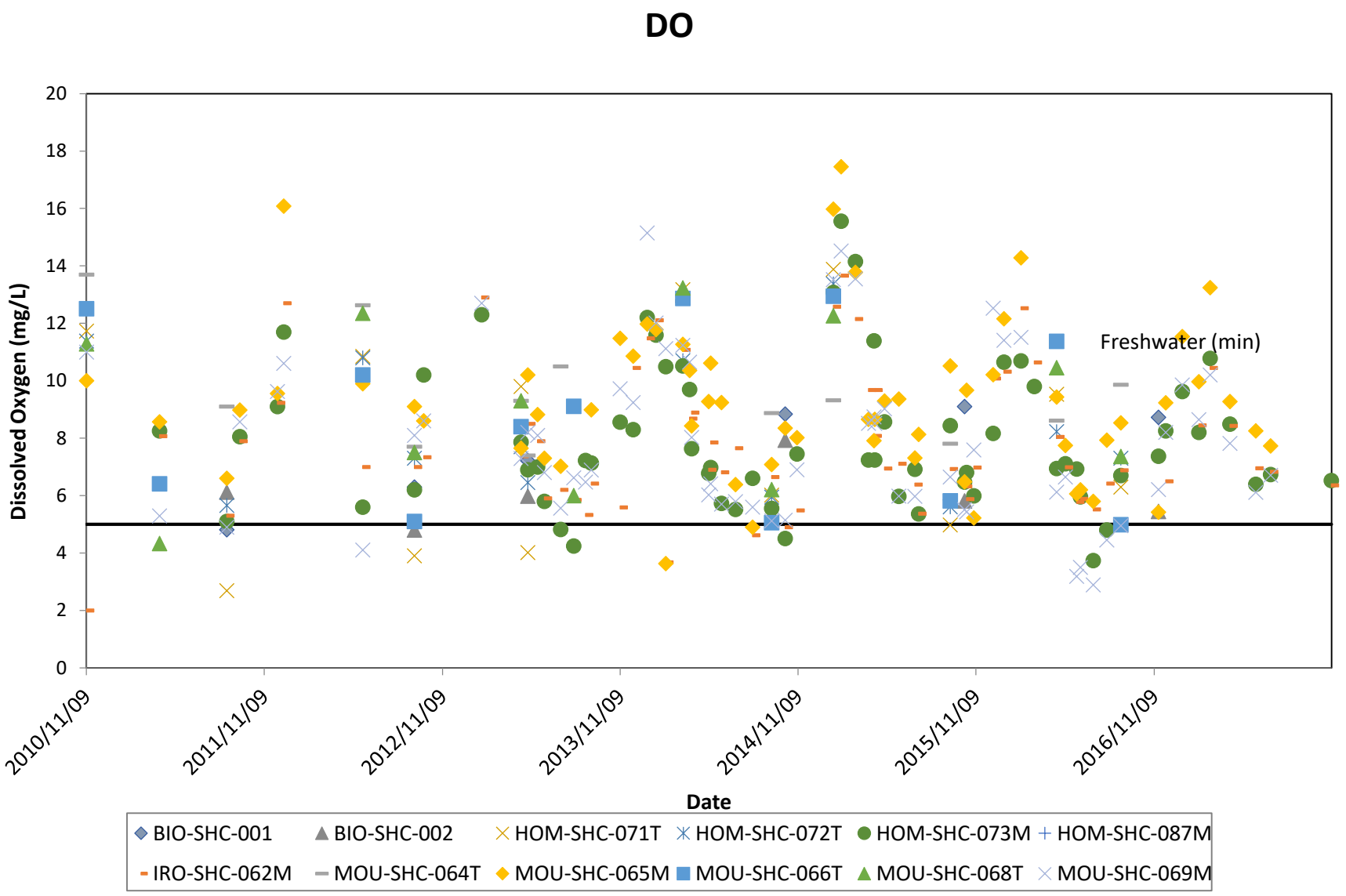
Y-axis displayed using a Log-10 scale.

***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
Freshwater (min)
2010/11/09
2011/11/09
2012/11/09
2013/11/09
2014/11/09
2015/11/09
2016/11/09
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

NPDES MS4 Stormwater Permit Program

- Stormwater management program plan (SWMPP) to prevent the discharge of stormwater pollutants into the MS4 (Municipal Separate Storm Sewer System).
- Phase I – Communities over100,000 people (i.e. Birmingham/Jefferson County). ***Initiated 1994-1995.***
- Phase II – Communities/areas designated as “urbanized” based on Census data. (i.e. Anniston/Calhoun County, Mobile/Baldwin County, etc). ***Initiated 2003.***

MS4 Permits – Jefferson County

- Structural Controls
- Public Education and Public Involvement
- Illicit Discharge Detection and Elimination
- Construction Site Storm Water Runoff Control
- Post-Construction Stormwater Management
- Spill Prevention and Response
- Pollution Prevention/Good Housekeeping for Municipal Operations
- Application of Pesticides, Herbicides, and Fertilizers (PHF's)
- Oils, Toxics, and Household Hazardous Waste Control
- Industrial Storm Water Runoff
- *Water Quality Monitoring and Reporting

Highlights of SWMPP Implementation 2018

Birmingham

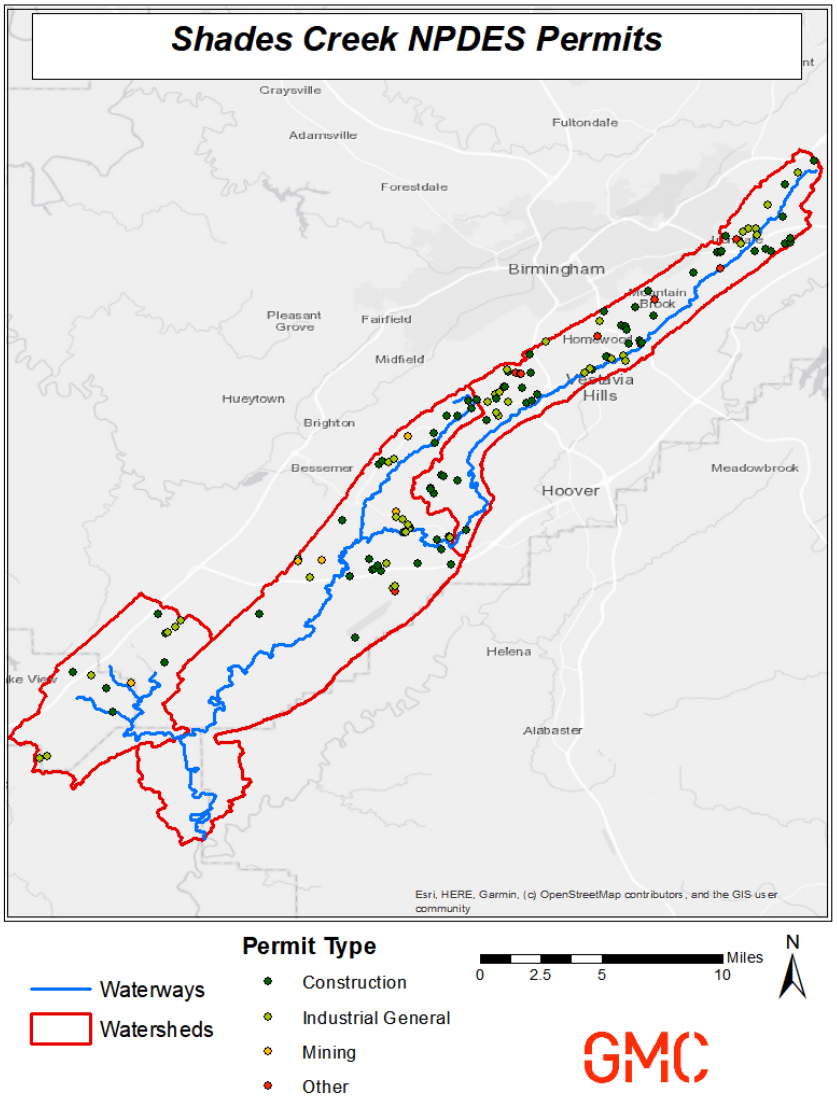
- 23 illicit discharges: 9 ongoing, 12 resolved, and 1 referred.
- Stormwater maintenance: 150 catch basins repaired, 11 cleaned, 522 storm pipes cleaned, 392 streets swept.
- Construction Inspections: 1180 erosion & sedimentation inspections, 108 failed and had corrective actions taken.
- 234 spills were handled.
- Significant unpermitted discharges

Jefferson County

- 418 tons of trash collected from roadways
- 79 roadside cleanups with 2527 volunteers picked up 115 tons of litter.
- 3,694 gallons of cooking oil and grease was recycled
- 162 illicit discharges were investigated
- 50 spills were handled.
- 2145 restaurant grease inspections were completed with 113 enforcement actions taken.
- 870 erosion and sediment control inspections

NPDES Permittees

- Permit types are as follows:
  - 80 Construction
  - 46 Industrial
  - 7 Mining
  - 11 Other



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

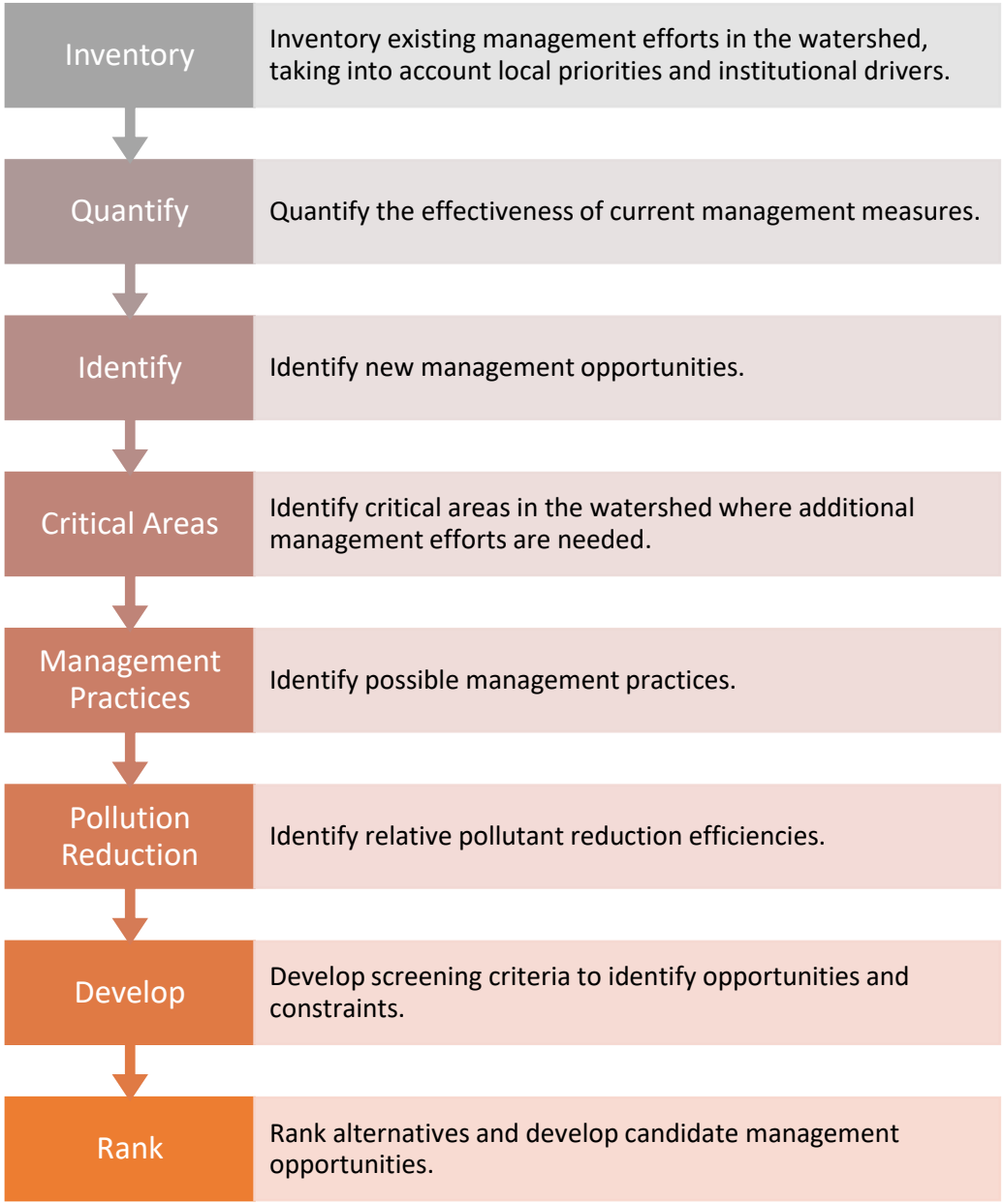
Load Reduction – TMDLs

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



Management Measures: Specific Projects

Example: Shades Creek Enhancement project located on the campus of Samford University in Homewood, Alabama was designed to improve aquatic habitat and water quality while enhancing stream stability and providing native riparian vegetation.

Management Measures: Programs and Policies

LOCAL GOVERNMENTS

- Erosion & Sedimentation Program
- Green Infrastructure
- Sanitary Sewer Inspection & Maintenance
- Volunteer watershed programs

STATE, FEDERAL & REGIONAL AGENCIES

- Revise DO standards for black water streams
- Forestry BMP assessment & compliance
- Prioritize funding for identified projects
- Continue monitoring of Shades Creek

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

Best Management Practice	*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**

GENERAL DISCUSSION

From your perspective, what is essential to the success of this project?

Engagement

Online Survey

» 10 minute survey

» Geographical questions

» Identify issues & areas of concern