

ADEM
SURFACE WATER QUALITY
MONITORING

MBNEP Science Advisory Committee
Meeting
January 17, 2017

The River (Delta) State



✓14 Basins

✓629 Subwatersheds

✓129,769 river/stream miles

✓490,472 acres in 43 reservoirs and lakes

✓3,600,000 acres of freshwater wetlands

✓610 mi² of estuaries, tidal waterways, and bays (Mobile Delta: Second largest intact river delta system in US)

Alabama Water Resources

Municipal, Industrial, Agricultural Uses



Alabama Water Resources

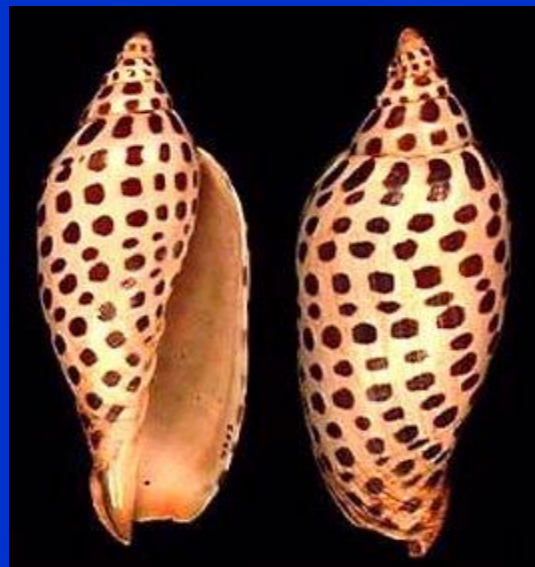
Recreation



Alabama Water Resources

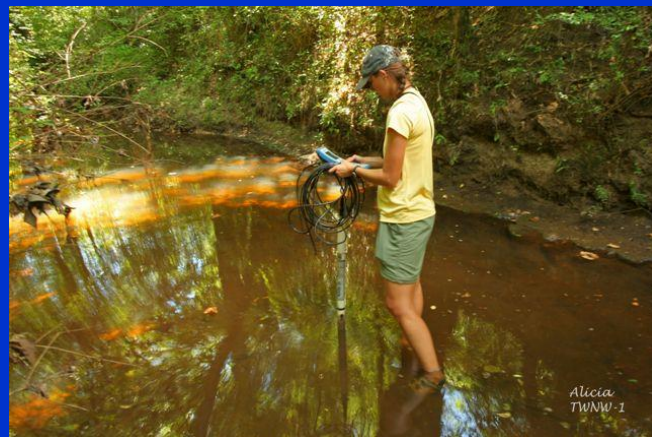


Aquatic Biodiversity : #1 in North America



ADEM
Water Quality
Monitoring

Rivers and Streams Monitoring Program (RSMP)



Rivers and Reservoirs Monitoring Program (RRMP)



Fish Tissue Monitoring Program (FTMP)



ADEM Coastal Monitoring Programs



ADEM Coastal Water Quality Monitoring Programs

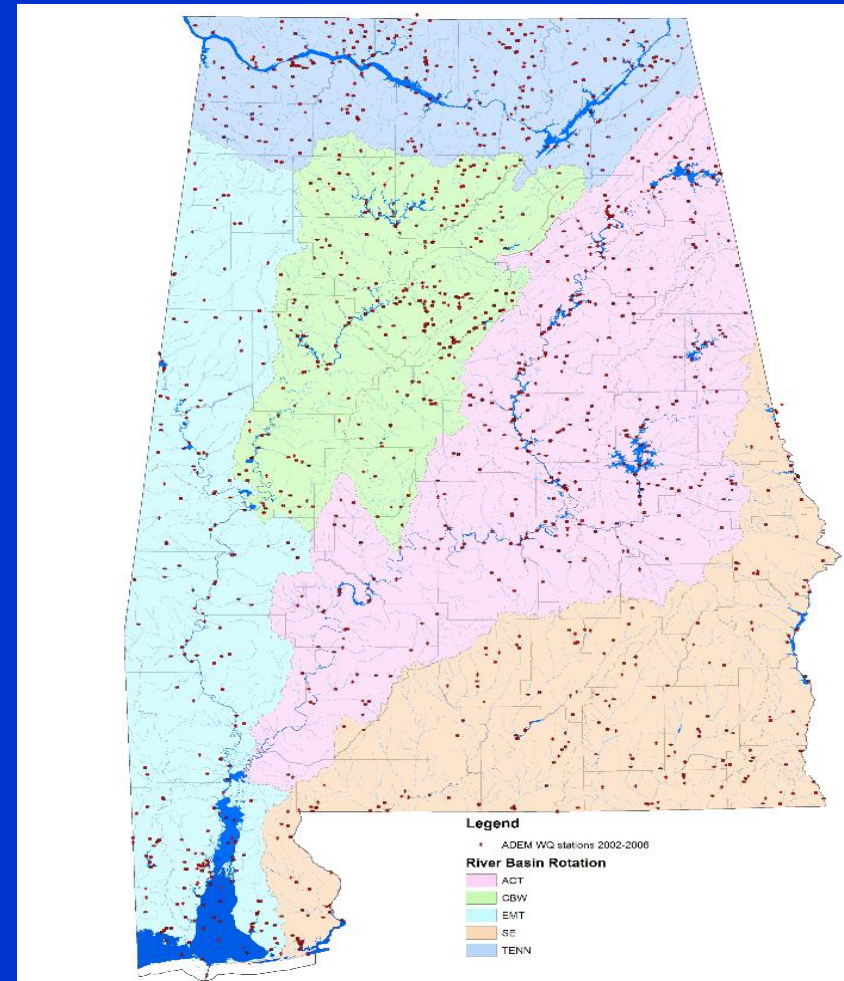
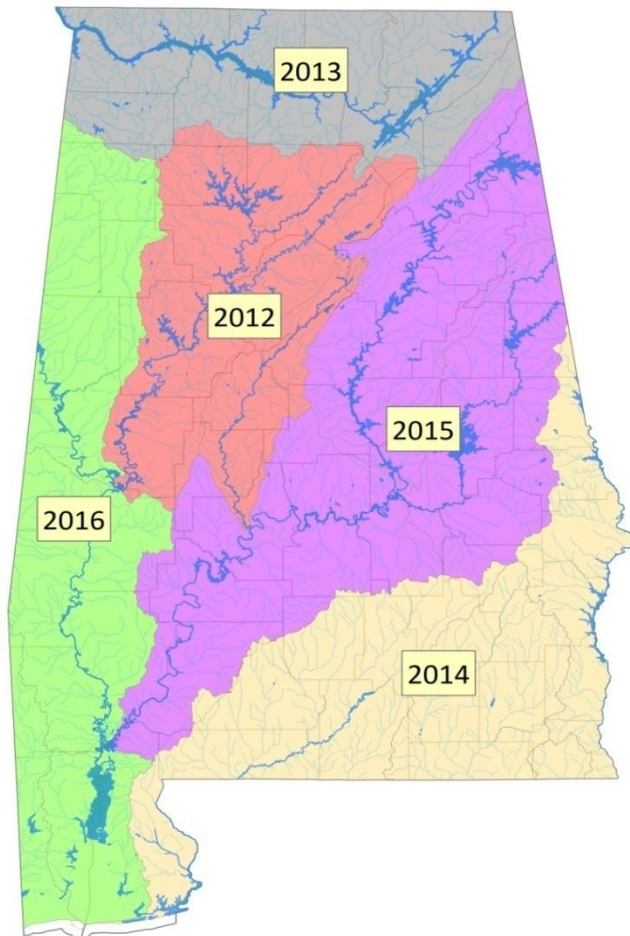
- ❑ Coastal Waters Monitoring Program (CWMP)
- ❑ Alabama Coastal Nonpoint Pollution Control Program (ACNPPCP) (6217)
- ❑ Coastal Alabama Recreational Waters Program
 - Beach Monitoring
- ❑ EPA National Coastal Condition Assessment



From Basin Rotation to Statewide Monitoring 1996-2015



Statewide monitoring over a 5-year period

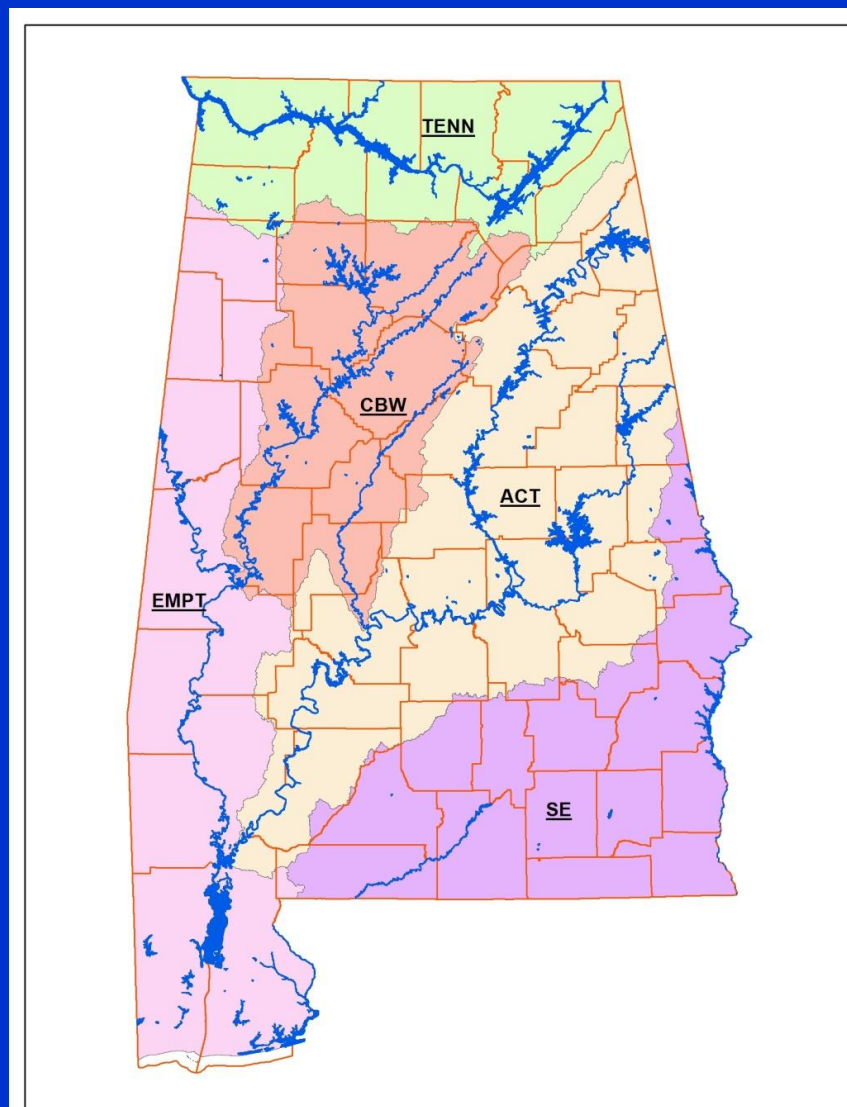


ADEM's 2015 Monitoring Strategy

Statewide Monitoring

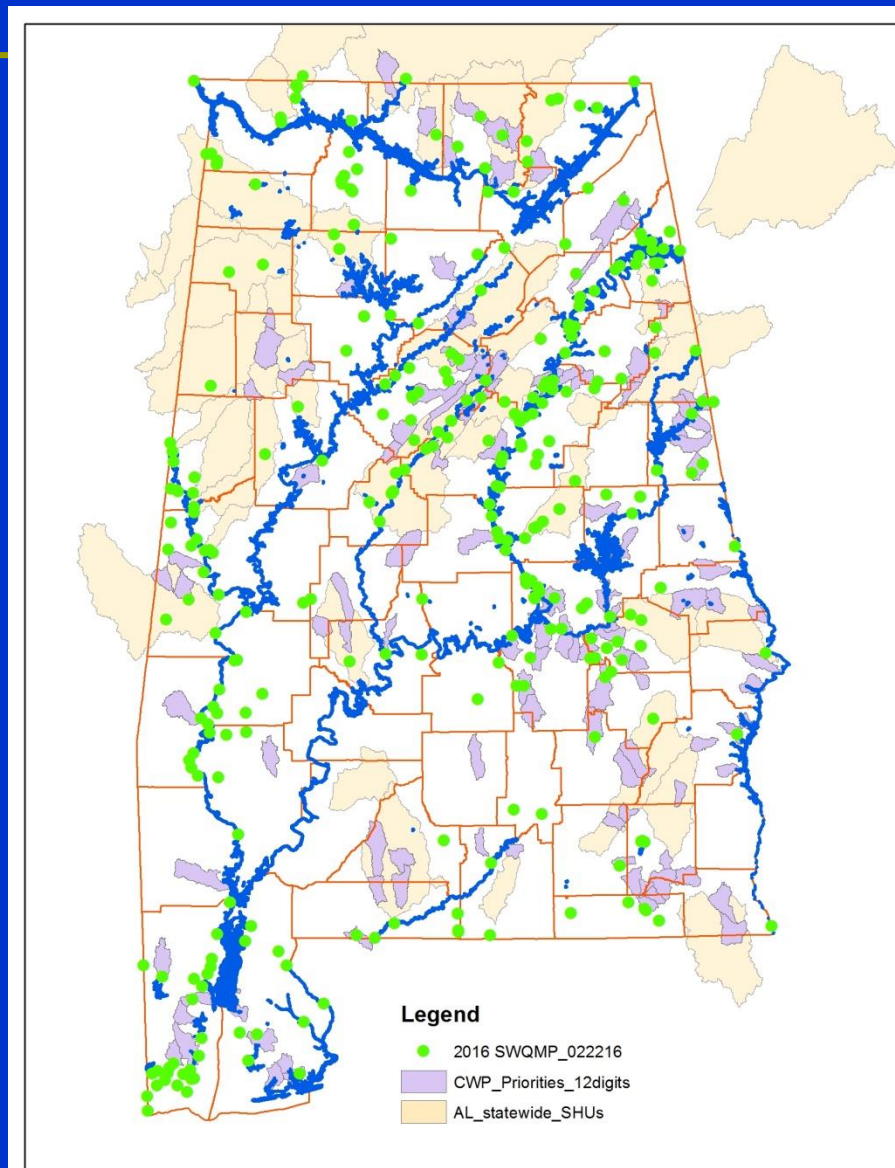
■ Advantages

- More frequent, intensive monitoring
 - NPS and TMDL “success” stories
 - Trends in water quality
- Address different data needs of basins
 - Refine reference conditions
 - Respond to data needs more quickly
- Dataset less impacted by weather
- Program planning
 - Even resource needs year-to-year
 - Smaller basin plans that can be implemented by basin teams



ADEM's 2016 and 2017 Monitoring Plan

- ❑ 2016: 308 Monitoring Locations, statewide
 - 39 in Baldwin and Mobile Counties
- ❑ 2017: Approx 300 locations statewide
 - Approx. 40 in Baldwin and Mobile Counties

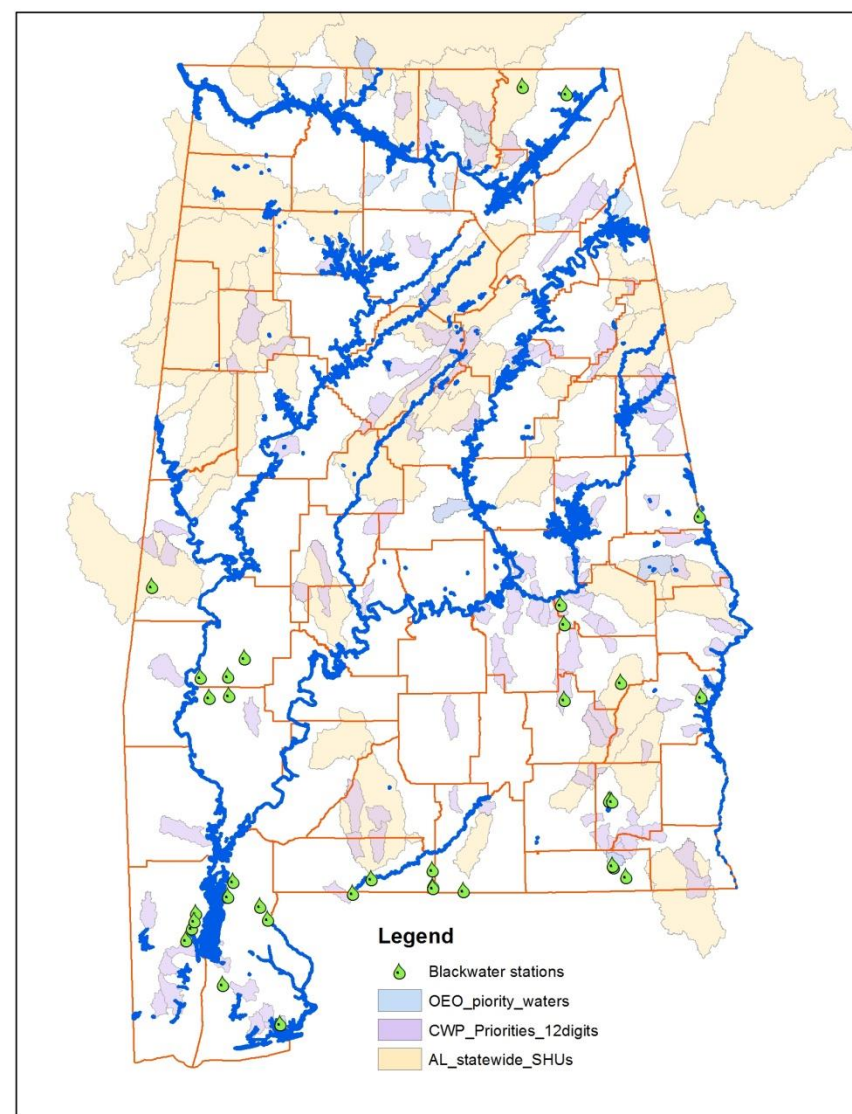


2016

Site classification work

Objective: determine background conditions in different waterbody types

- Blackwater streams in South Alabama
 - 36 sites in south Alabama
 - Color and DOC
- Riverine wetlands
 - 9 sites in east central Alabama
 - Cubahatchee, Calabee, and Line
 - Study-specific reference reaches



Riverine Wetlands: Site Surveys 2017

- ❑ Vegetation Surveys: May 2017
 - Five 100 m² plots per site
- ❑ Soil surveys: May 2017
 - Soil pit with an on-site description of the soil profile and survey of hydric soil field indicators
- ❑ Water Table Monitoring Wells: 2017
 - Continuous data logger deployed in each well
- ❑ Water Chemistry Data (Monthly Apr-Nov)
 - Collected from a stream on each site
 - Affected by drought: Will extend into Spring, 2017
- ❑ Habitat Assessment (RAM): May 2017
- ❑ Amphibian Surveys: May 2017



Siltation Monitoring Indicators

Three types:

- ❑ Visual Habitat Assessment
 - Availability/quality of habitat to support aquatic communities
- ❑ Siltation Survey
 - Estimate sediment movement during high flow events
- ❑ Real-Time Sediment Loading
 - Measure TSS and turbidity through an entire high flow event



Siltation Surveys: 2016-2017

- ❑ Corer method
- ❑ 24 stations within AL
 - Habitat assessment/siltation data sheet
 - Stream flow measurement
 - Background turbidity sample
 - 5 instream suspended sediment samples
- ❑ Currently processing and analyzing data
- ❑ Working along with Water Division TSS study
- ❑ Problems encountered:
 - Drought
 - Stream size limited by depth of corer
- ❑ Plans for 2017
 - 20 stations within AL



2016-2017 CWMP Coastal Monitoring

CWMP: revised 2015-16

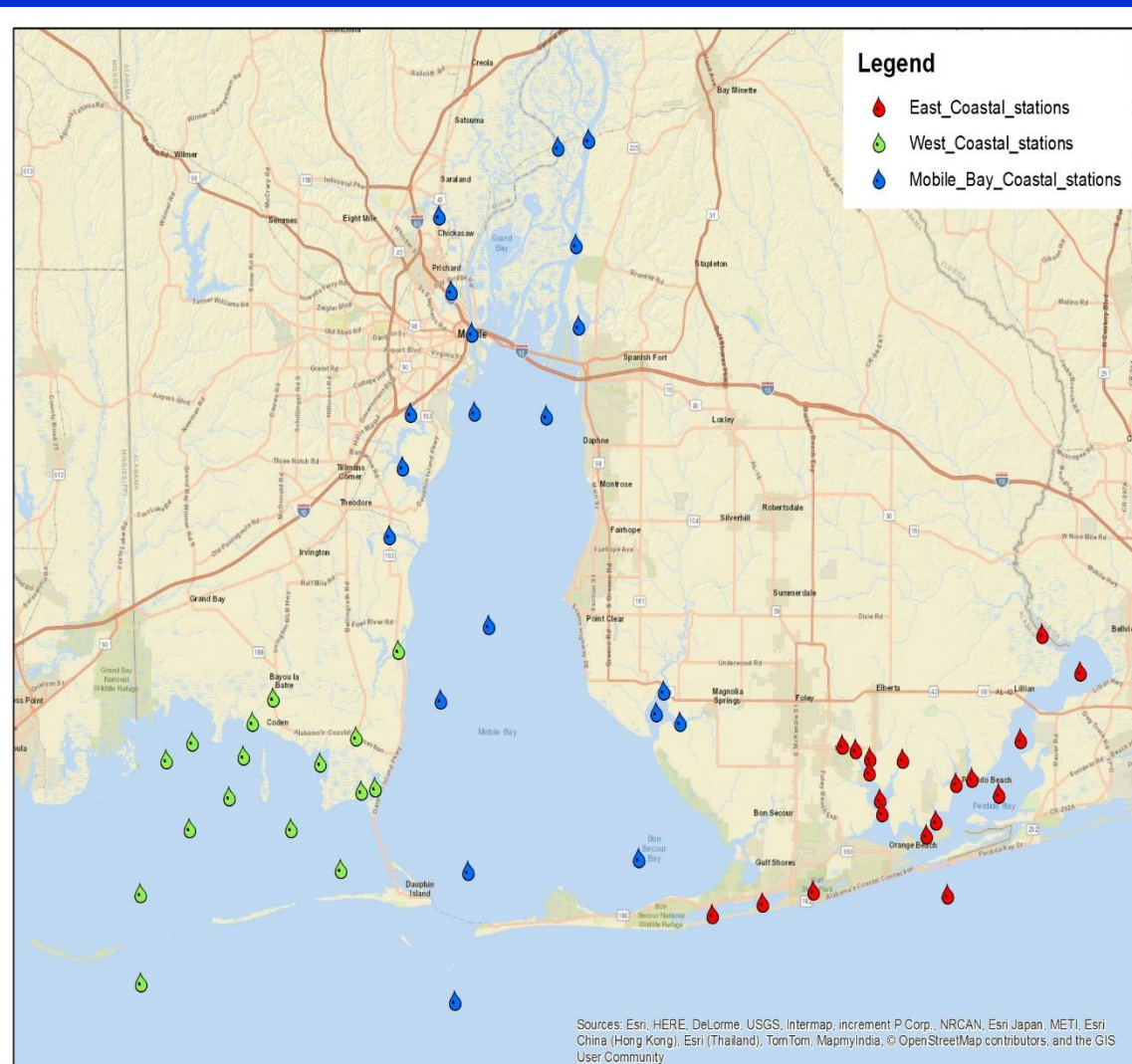
- 3-year monitoring cycle
- All stations sampled 8x
 - Growing season

2016: West

2017: Mobile Bay

2018: East

Estuary nutrient criteria
development



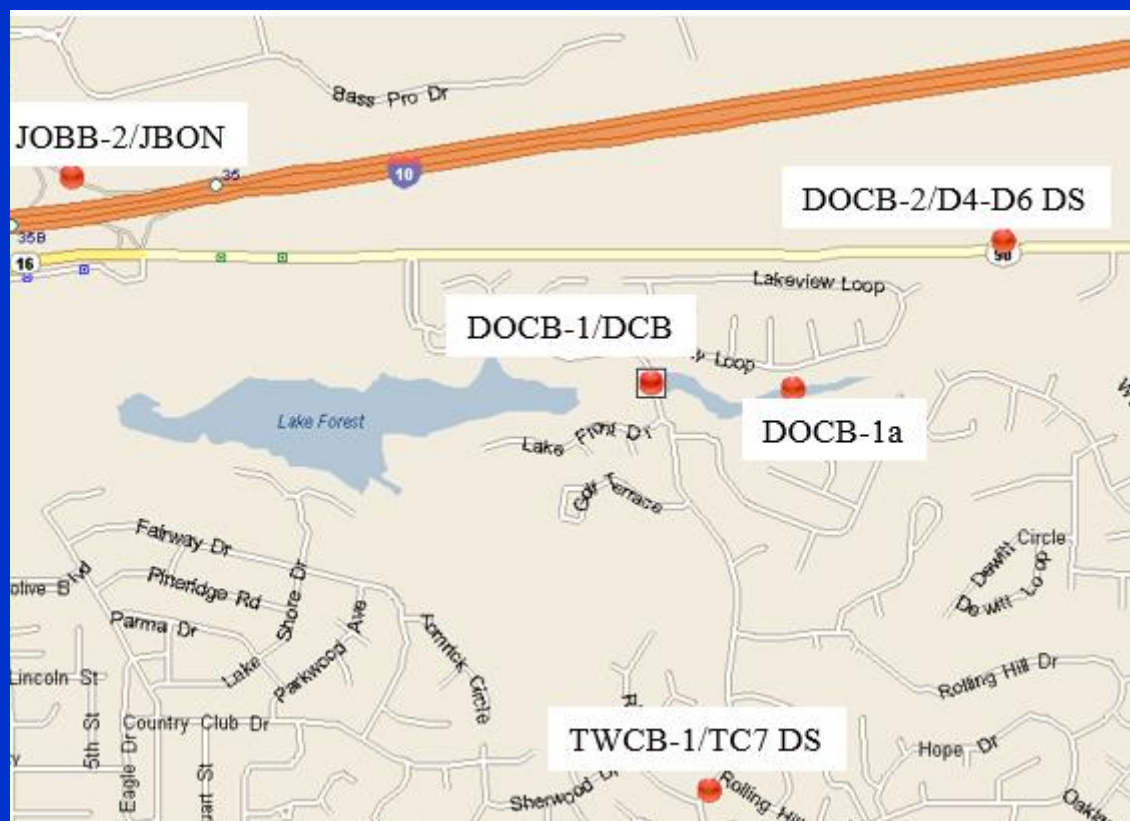
MBNEP Request: D'Olive and Tiawasee Monitoring 2016-2017

2016

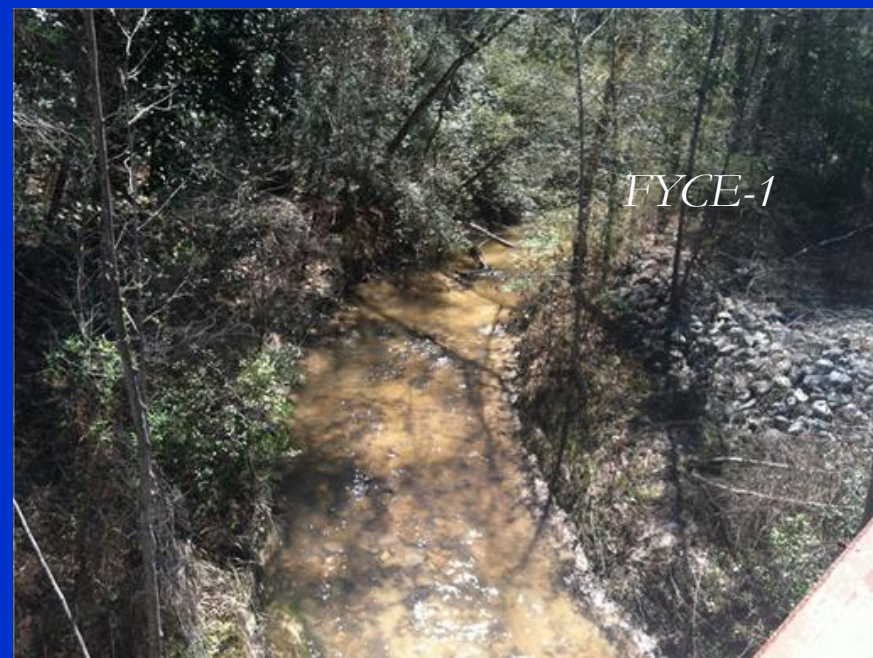
- 4 study reaches established
- 2 study-specific reference reaches established

2017

- Same as above
- DOCB-1 moved to DOCB-1a, based on USGS recommendation
- 2 additional reference reaches monitored
- Sampling Summary:
 - Monthly water quality sampling (Mar-Oct)
 - Macroinvertebrate Surveys
 - 2017: Siltation surveys and real-time flow/TSS monitoring added at DOCB-1a and TWCB-1



MBNEP Request for Monitoring



MBNEP Request for Monitoring



ADEM WQ Monitoring Data and Reports



<http://www.adem.state.al.us/programs/water/waterquality.cnt>



Thank you!



RSMP Information

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RRMP Information

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Coastal Monitoring Contacts

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- ❑ ACNPCP: Randy Shaneyfelt
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- ❑ Beach Monitoring: Suzi Rice
 - ❑ srice@adem.state.al.us

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- ❑ ADPH (Consumption advisories)
Dr. John Guarisco
State Toxicologist
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Wetlands Information

Bonnie Coleman

Aquatic Assessment Unit, Chief

ADEM Field Operations–Montgomery

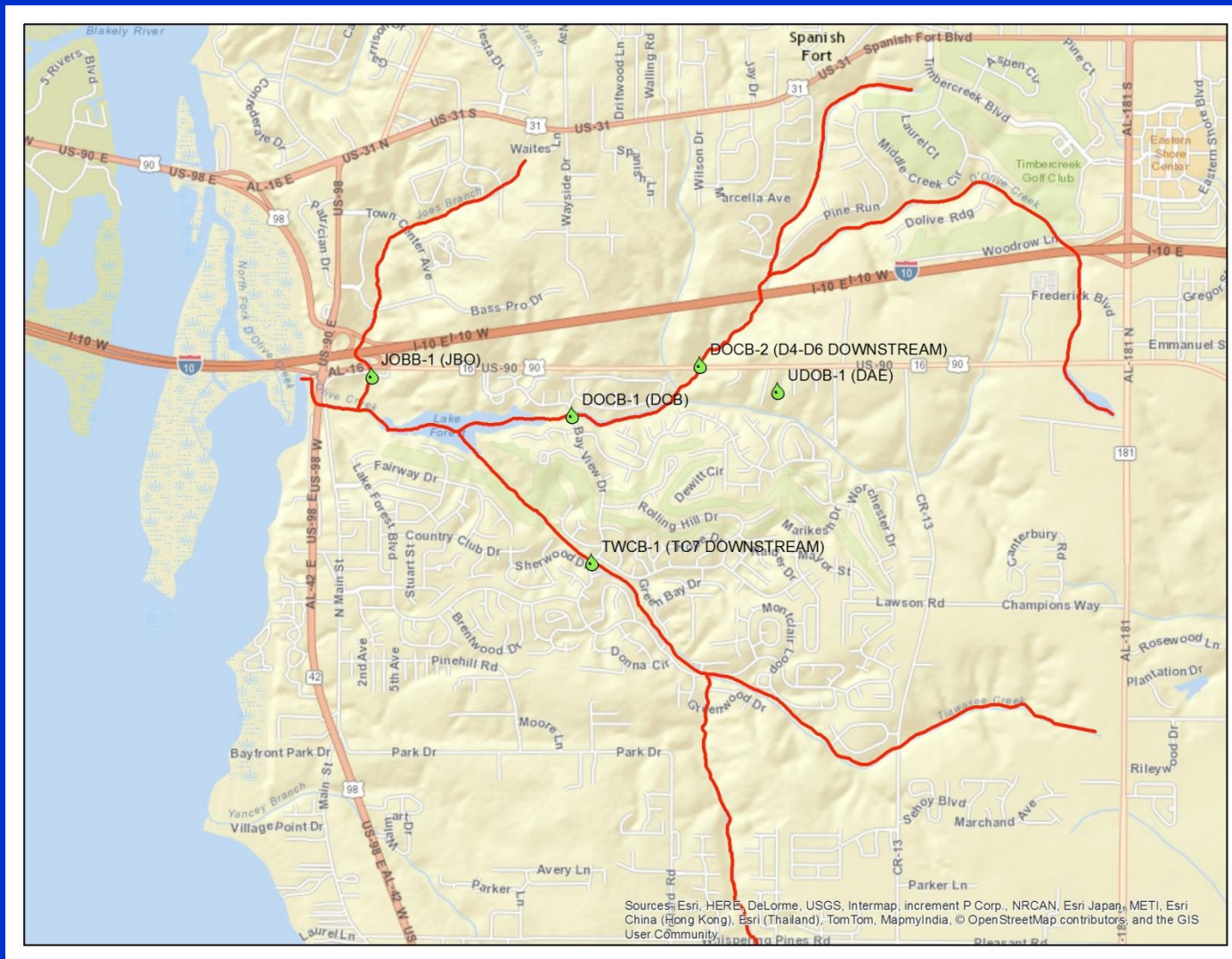
bcoleman@adem.state.al.us

334-260-2737

MBNEP Request for Monitoring

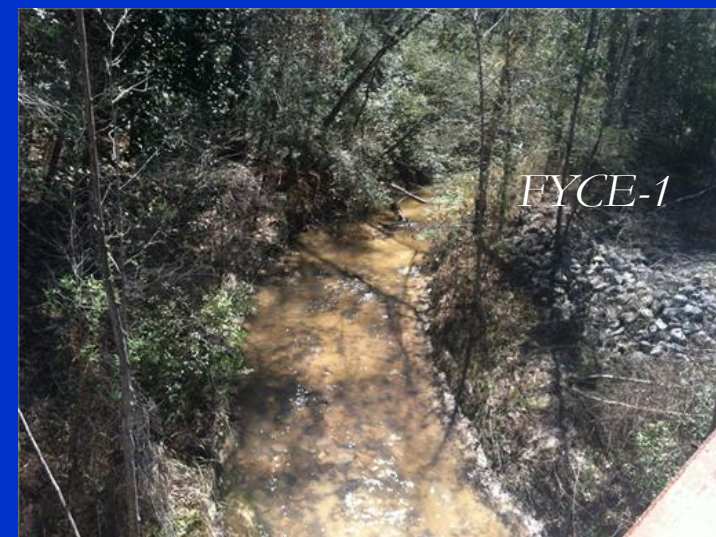
- ❑ Requested sites reconned December 2015
- ❑ Macroinvertebrate assessments appropriate at five study locations
 - DAE (UDOB-1) 0.04 sq mi 65f
 - JBO (JOB-1) 0.9 sq mi 75a
 - D4-D6 DS (DOCB-2) 2.46 sq mi 65f
 - TC7 DS (TWCB-1) 4.85 sq mi 65f
 - DCB (DOCB-1) 5.34 sq mi 75a
- ❑ Two reference reaches (Folley Cr & Gunnison Cr)
 - FYCE-1 3.55 sq mi 65f
 - GNNM-1 11.46 75a

MBNEP Request for Monitoring: Map of ADEM sampling sites

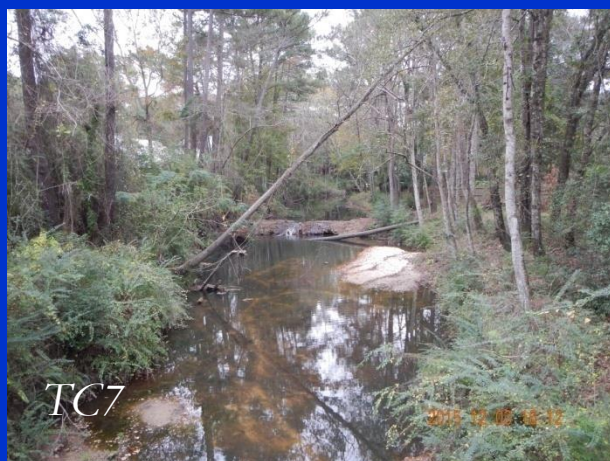




MBNEP Request for Monitoring



MBNEP Request for Monitoring



Siltation Survey Monitoring Development

December 14, 2016

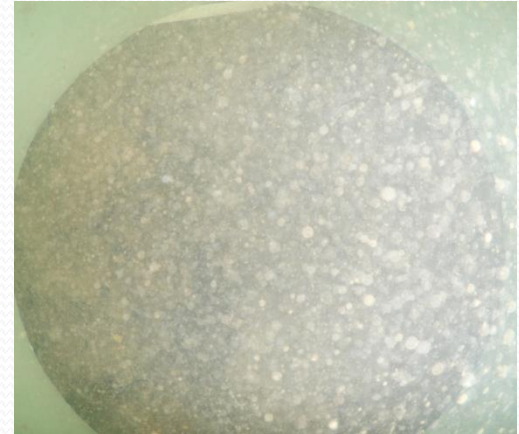
Siltation

- Still in the developmental stage
- Goal: to determine sediment movement within a stream by rain events/high flow conditions








Siltation

- Simulate high flow conditions
- Quorer method



Siltation

- 24 stations within AL
 - Habitat assessment/siltation data sheet
 - Stream flow measurement
 - Background turbidity sample
 - 5 instream suspended sediment samples

SUSPENSIBLE SEDIMENT TURBIDITY (SST)								
Sample #	Picture Taken	Avg Depth (cm)	Dilution	Dilution Factor (e.g., 2, 10)	Diluted Turbidity (NTU)	Turbidity (NTU)	Channel Width (ft)	Channel Height at Thalweg (ft)
1		40	<input type="checkbox"/>			1050	34.0	4.7
2		30	<input type="checkbox"/>			324	34.0	6.1
3		25	<input checked="" type="checkbox"/>	2	558	1116	34.0	6.4
4		47	<input type="checkbox"/>			370	34.0	5.8
5		32	<input type="checkbox"/>			1270 727	37.0	5.3
		Background Turbidity (NTU)		SST (NTU)				

NOTES LB vertical or nearly so, erosion evident but not fresh/active. Several trees overhanging bank.



Siltation

- Currently processing and analyzing data
- Working along with Water Division TSS study
- Problems encountered:
 - Weather cooperation
 - Stream depth limitations





Bonnie Coleman

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2015 Monitoring Strategy Priorities and objectives

Assess water quality

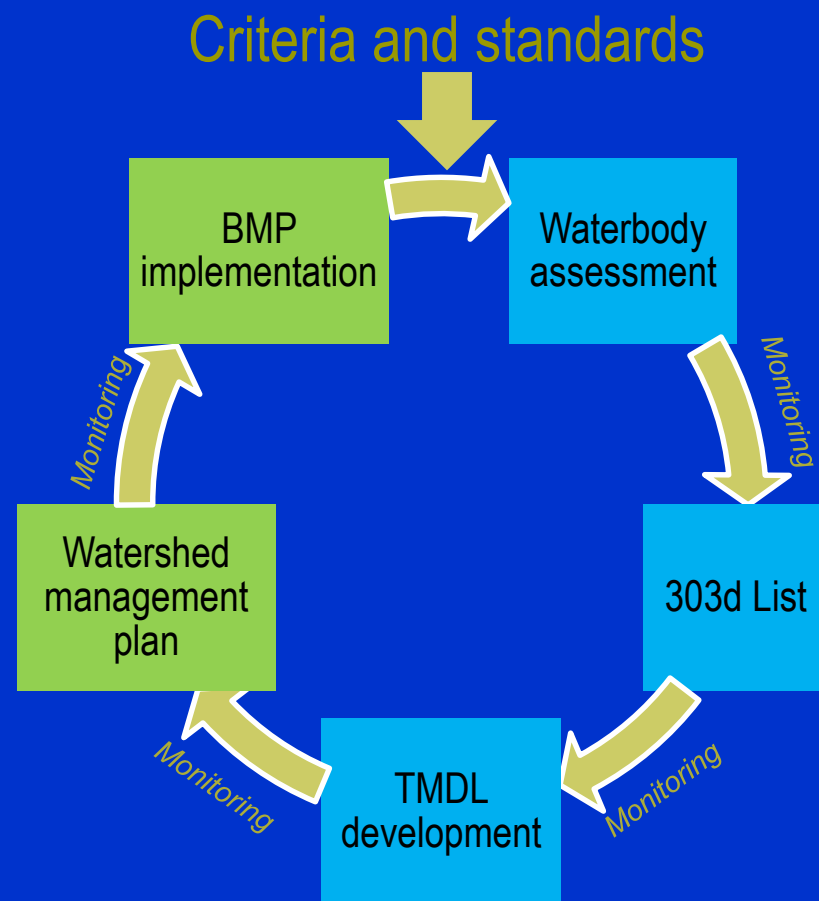
- Monitor waters in all 5 assessment categories

Evaluate program effectiveness

- Estimate trends after BMP implementation
- Estimate trends after TMDL implementation

Develop criteria & indicators

- Refine reference conditions and site classes
- Nutrient criteria
- Siltation indicators
- Biological indicators
- Collaborate with agency partners and stakeholder groups to meet common goals
- Lay groundwork for 2020 Monitoring Strategy



2016 SWQMP Priorities



Assess waters in all categories

1: fully meeting all use classifications

5: not meeting one or all use classifications (303d list)

2: Insufficient data

2a: available data indicate impairment

2b: available data do not indicate impairment

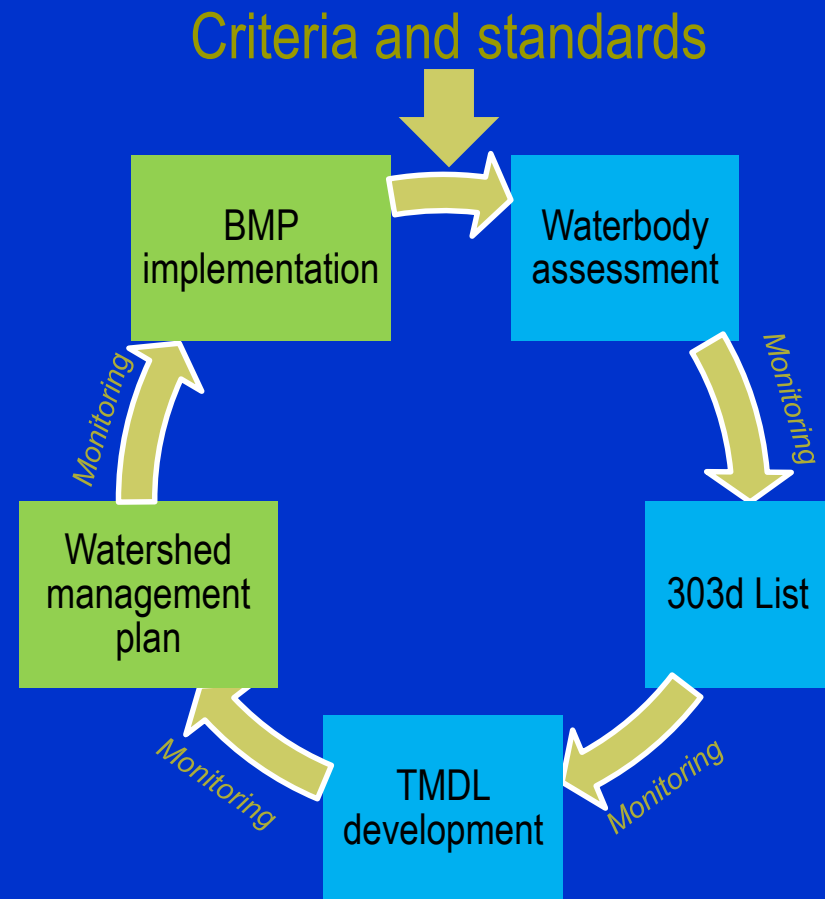
3: No data available

4: Waterbody impaired but remediation plan in place

4a: Approved TMDL

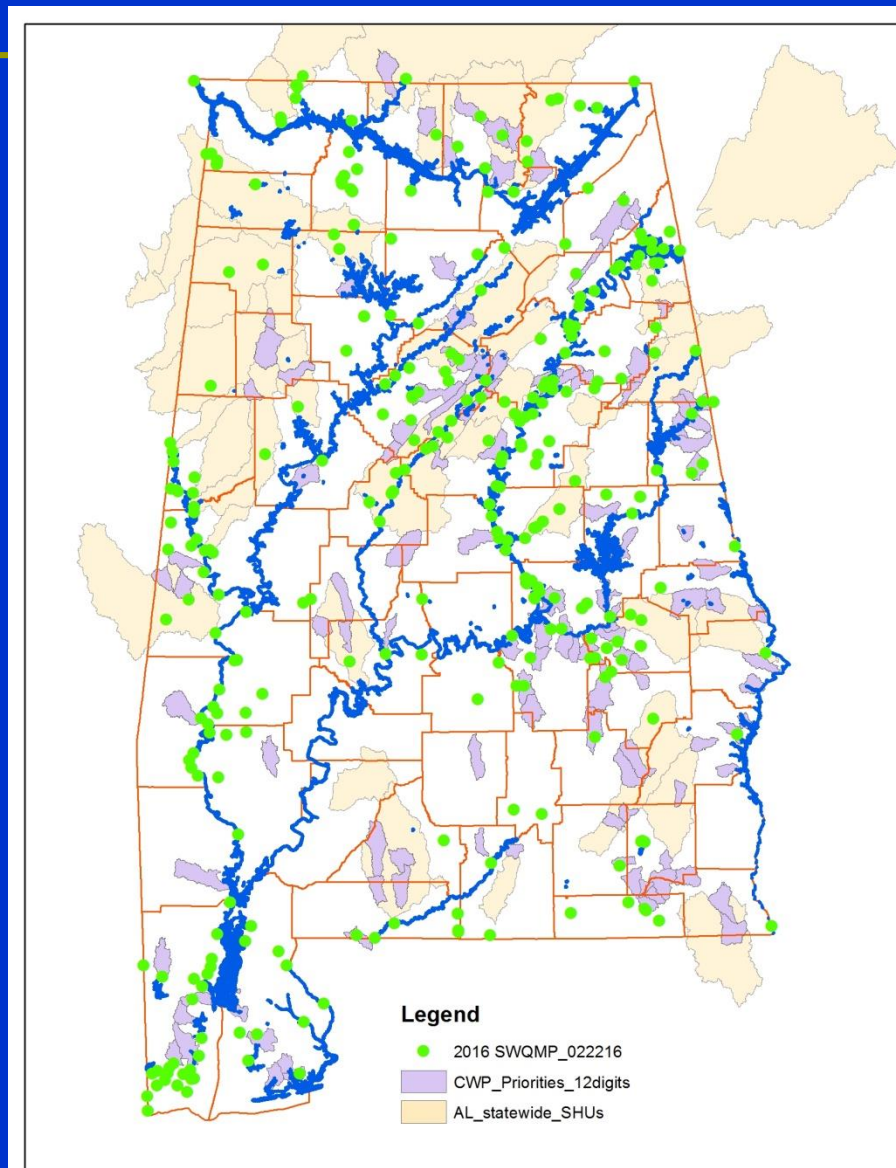
4b: Other action expected to result in attainment

4c: impairment not caused by pollutant



ADEM 2016 Monitoring Plan

- 308 Monitoring locations statewide
- 39 in Baldwin and Mobile Counties
- Coastal Monitoring Program revised
 - Development of nutrient criteria for estuaries
 - Coastal area divided into 3 zones
 - West (2016)
 - East
 - Mobile Bay



2016-2017

RRMP and Nutrient Embayment Studies

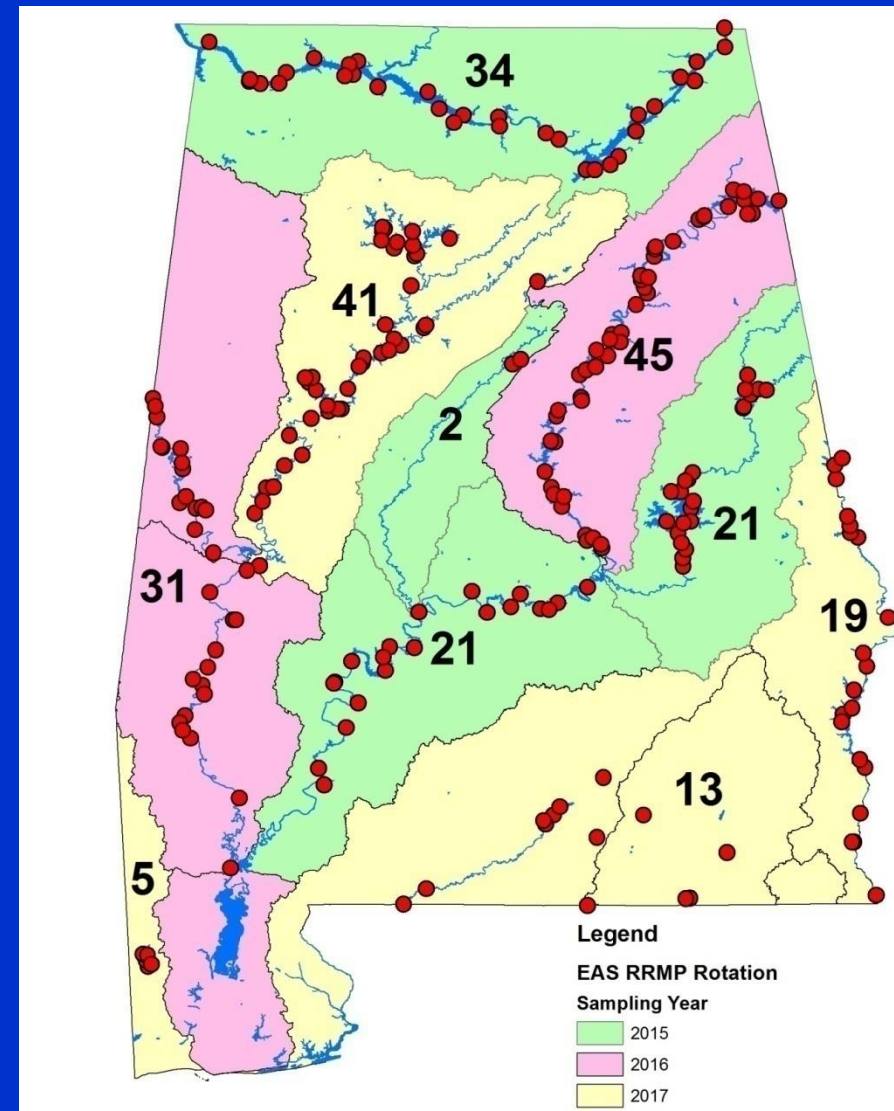
2016 RRMP

- 3-year monitoring cycle
- 2016: Coosa and Tombigbee

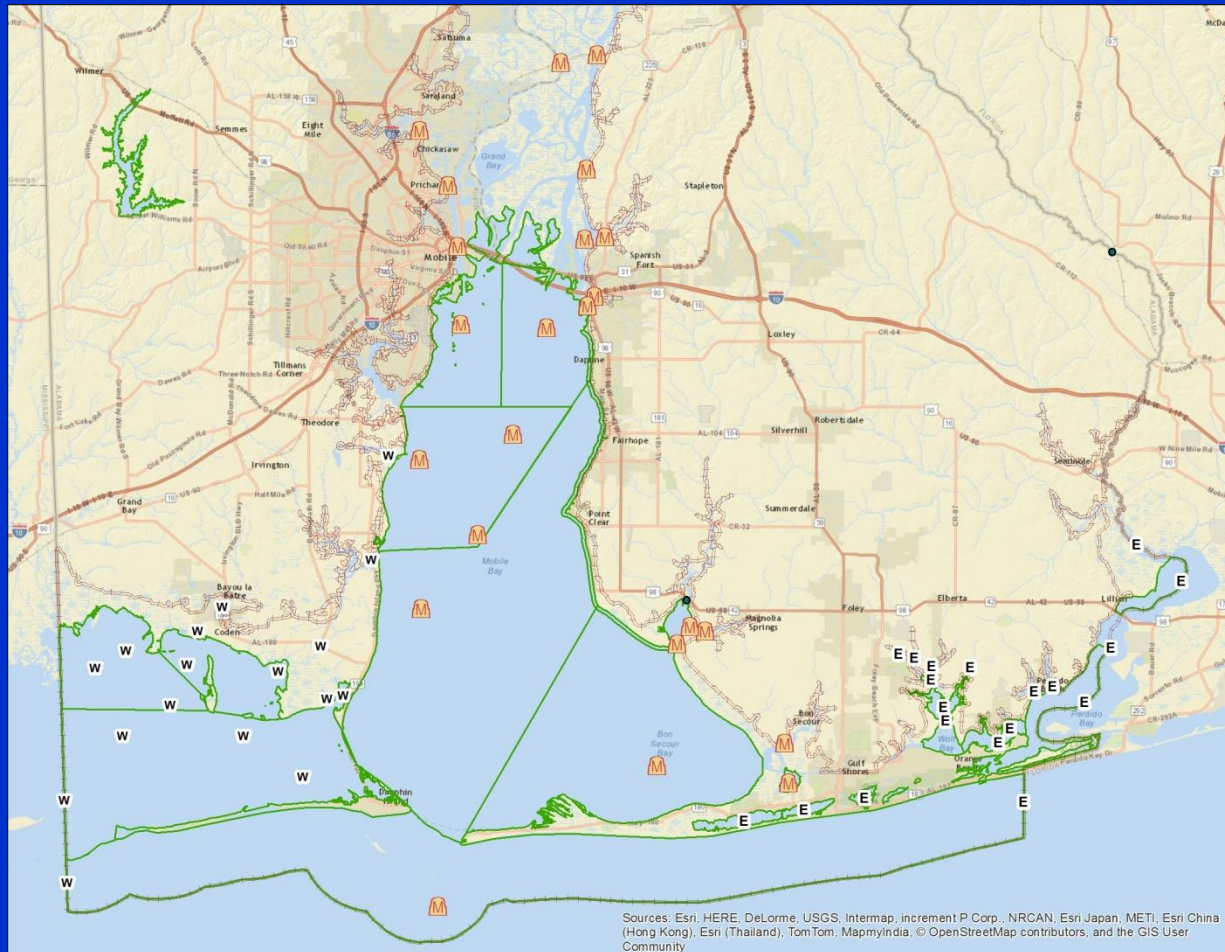
2017 RRMP: Black Warrior, Escatawpa, SE

Nutrient Embayment Studies:

- Concentrate monitoring efforts in embayments during intensive RRMP sampling
- slower flows, open canopy=good conditions for expression of nutrient enrichment issues
- Additional indicators: Diurnal DO studies



*CWMP 2016: Monitoring Zones**



**Intensive monitoring stations only.*

WQ Planning Projects

- **Tributary Embayment Surveys**

- 72 hour deployments
- DO, temp, pH, cond, turb, chl_a
- Use a buoy/anchor system to deploy anywhere vs. being dependant on near-shore structure such as piers & docks
- Provides valuable data for nutrient criteria development and for assessment/listing

- **Sediment/Turbidity Research**

- Teaming up with USGS in FY16
- Funding 4 new stream gages
- Little Coon Creek, Estill Fork – Tennessee Basin
- Line Creek, Cubahatchee Creek – Tallapoosa Basin
- Stations will report continuous “real-time” flow, temp, turbidity, rain
- Stations will be equipped to “remotely” sample TSS, Nutrients and other parameters using various triggers such as flow, stage or turbidity to capture storm events.

