LOWER NECHES BASIN WATER QUALITY UPDATES

Lucas Gregory
Texas Water Resources Institute
Upper Neches Basin CRP Steering Committee Mtg.
June 17, 2019

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Texas Surface Water Quality Standards

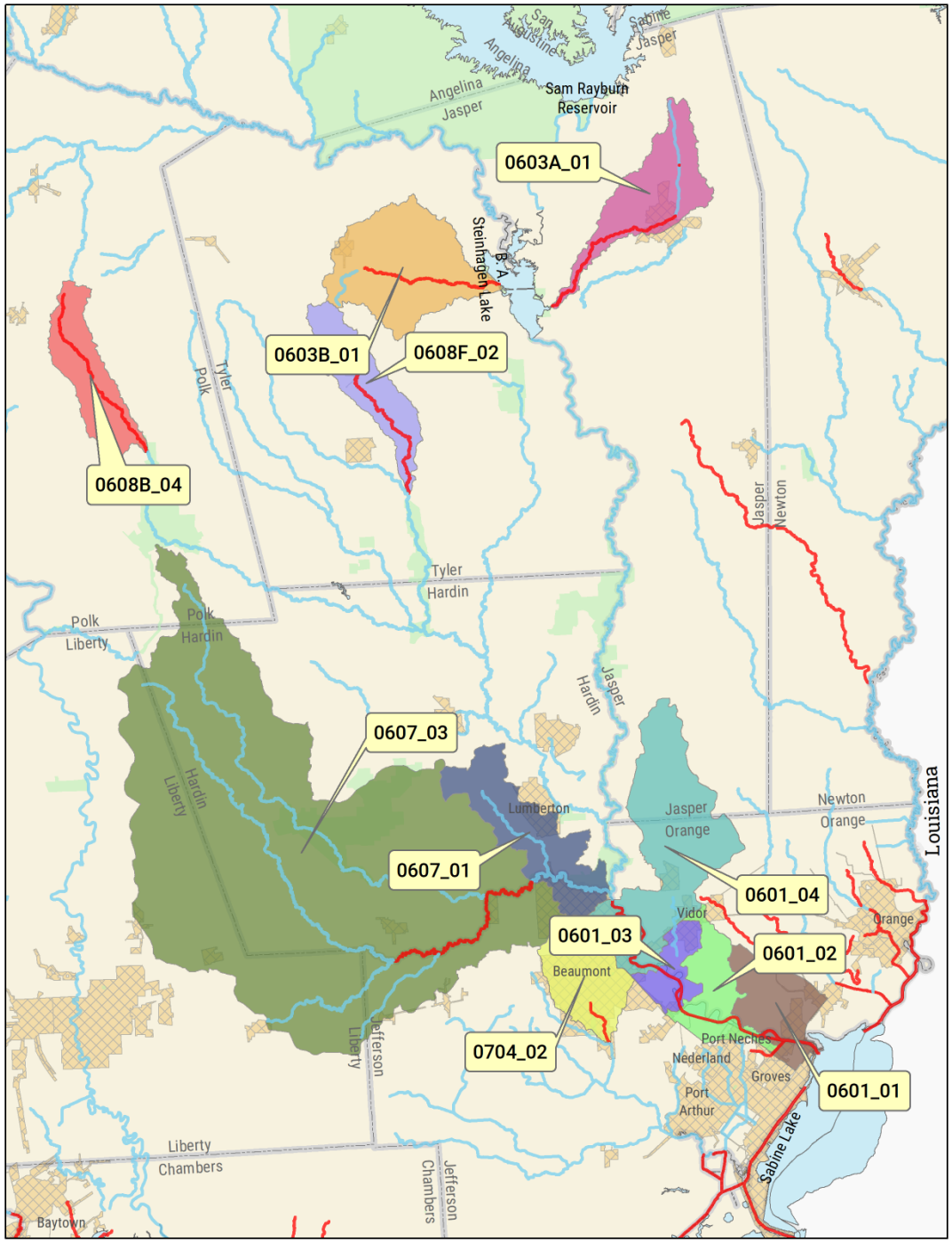
Consist of:

1) Beneficial Uses – Waterbodies are assigned a use.
   - General Use
   - Aquatic Life Use
   - Recreational Use
   - Public Water Supply

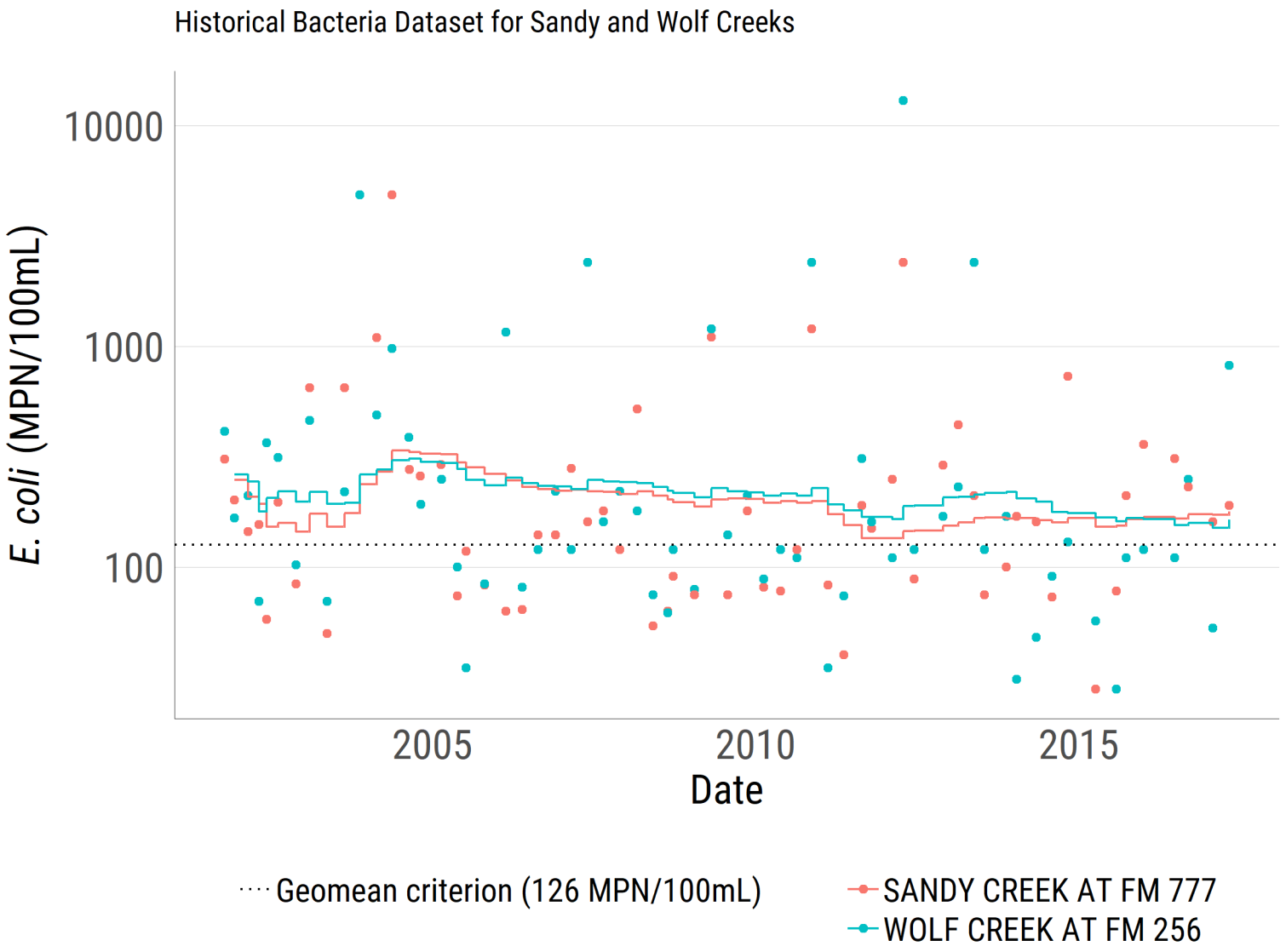
2) Criteria – The numeric or narrative limit used to evaluate if the waterbody meets its use.
   - Target of where water quality should be

Lower Neches Basin Water Quality Impairments

Contact Recreation Use - Bacteria




Sam Rayburn Reservoir
Angelina
Jasper
Graham Creek
Neches River Below Lake Palestine
Jasper
Tyler
Neches River Below Sam Rayburn Reservoir
Newton
Jasper
69
Colmesneil
Wolf Creek
Wolf Creek
B. A. Steinhagen Lake
Sandy Creek in Jasper County
Jasper
96
190
Big Walnut Run
N
287
Woodville
0
2
4
8 Miles
Map area
Assessment Units
Unimpaired (Bacteria)
Impaired (Bacteria)
Impaired Watersheds
Sandy Creek in Jasper County
Wolf Creek
SWQM
County Boundaries
Cities


Historical Bacteria Dataset for Sandy and Wolf Creeks
10000
1000
100
E. coli (MPN/100mL)
2005
2010
2015
Date
Geomean criterion (126 MPN/100mL)
SANDY CREEK AT FM 777
WOLF CREEK AT FM 256

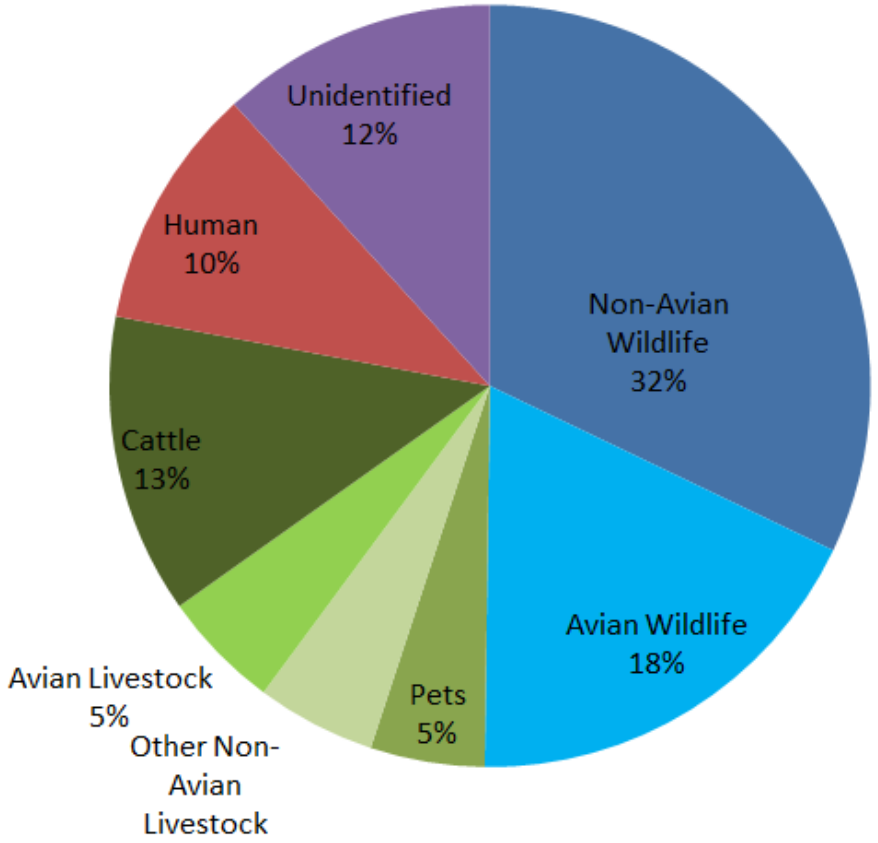
Draft 2016 Texas Integrated Report Assessment Results

Water Body	Assessment Unit (AU)	Parameter	Station	Data Range	No. of Samples	Station Geometric Mean (MPN/100mL)
Sandy Creek in Jasper County	0603A_01	*E. coli*	10484	12/01/07 - 11/30/14	28	168.93
Wolf Creek	0603B_01	*E. coli*	15344	12/01/07 - 11/30/14	28	174.40

Historic Bacteria Monitoring Records

Water Body	Assessment Unit (AU)	Parameter	Station	Data Range	No. of Samples	Station Geometric Mean (MPN/100mL)
Sandy Creek in Jasper County	0603A_01	*E. coli*	10484	10/16/01 - 05/01/17	63	185.13
Wolf Creek	0603B_01	*E. coli*	15344	10/16/01 - 05/01/17	63	190.15

Major Sources of Bacteria (based on prior projects)



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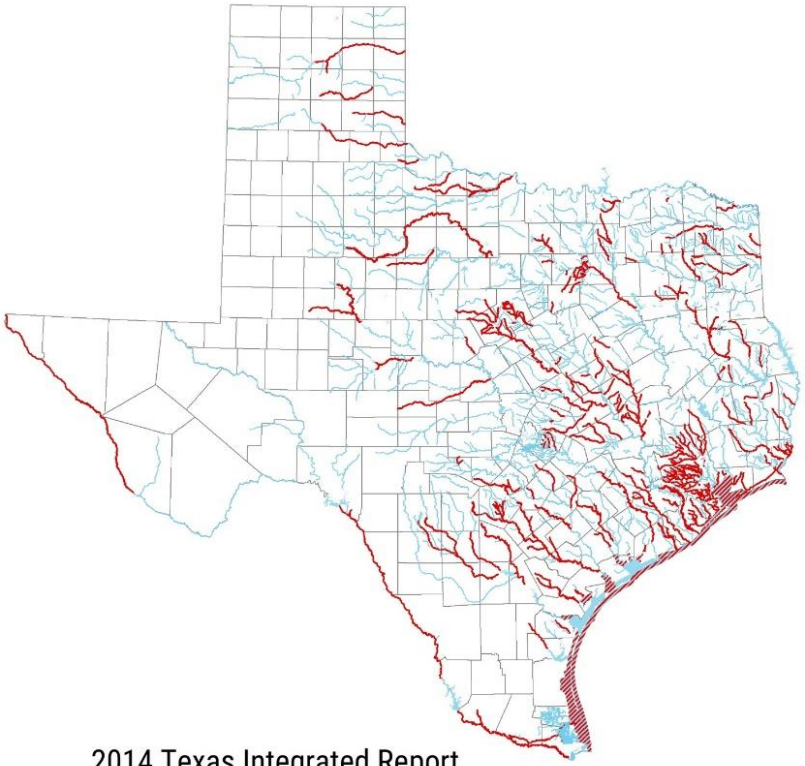
Water Quality is Impaired; Now What?



2014 Texas Integrated Report
Waterbodies with Bacteria Impairments

Path Forward

State of Texas is working systematically to address water quality impairments statewide.

- Begin by gathering baseline information about watersheds
- Initiate stakeholder engagement to select specific approach
- Two Approaches
  - Total Maximum Daily Load (TMDL)
  - Watershed Protection Plan (WPP)

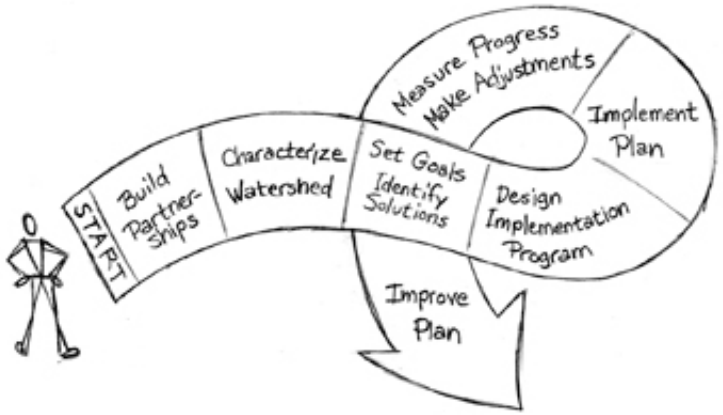
TMDL

- The TMDL is a document submitted to EPA to fulfill requirements of the Clean Water Act. TMDLs identify the pollutant of concern, potential sources, and allocates the allowable load.

Implementation Plan

- Accompanies a TMDL
- Outlines steps and schedules for reducing a pollutant load in the waterbody covered by the TMDL.
- Management measures and control actions identified in the I-Plan are developed by local stakeholders.

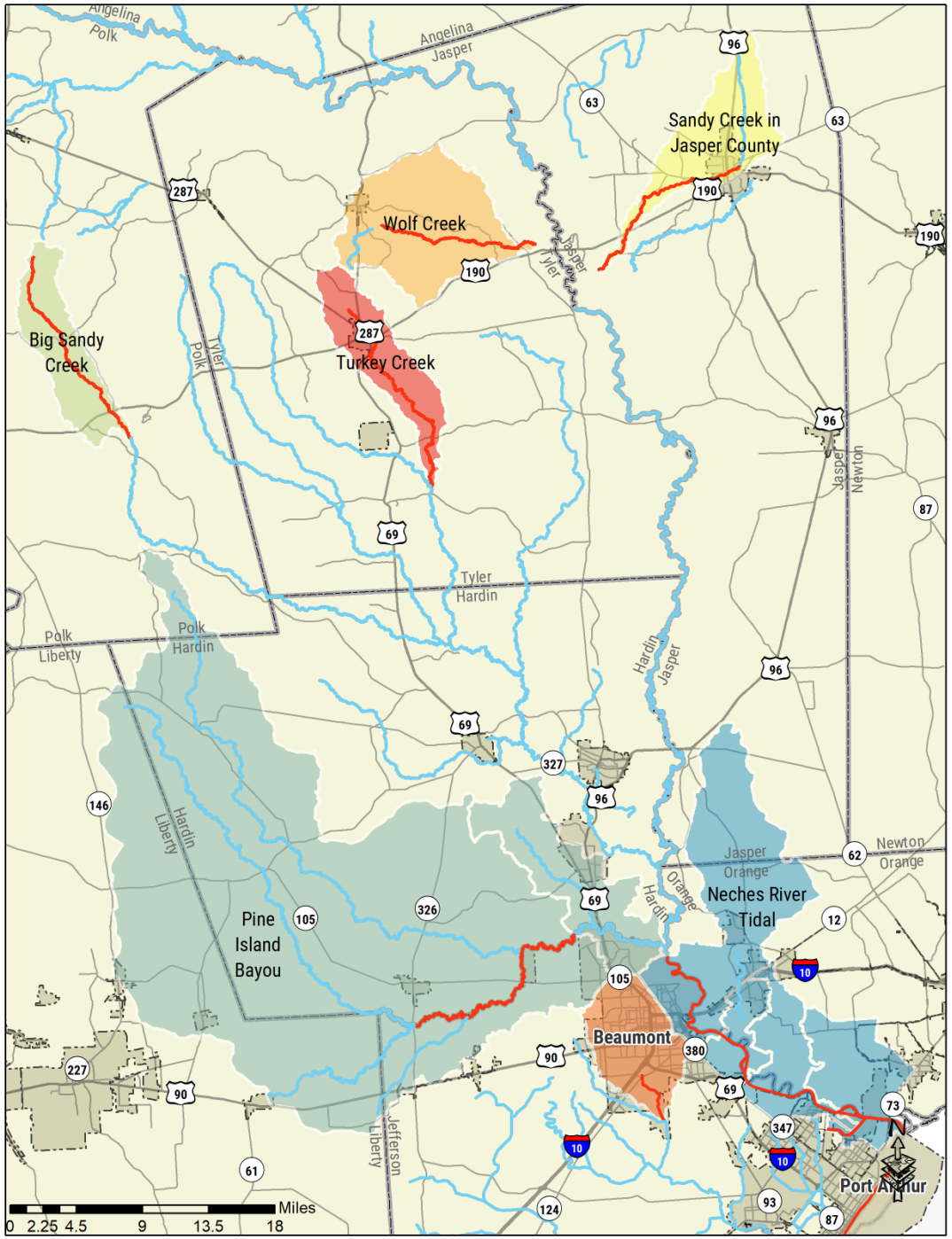
Watershed Protection Plans



- A holistic stakeholder driven plan that addresses water quality in a watershed rather than political subdivisions
- Addresses all impairments in a watershed
- A mechanism for voluntarily addressing complex water quality problems that cross multiple jurisdictions
- Provides a framework for coordinated implementation of prioritized and integrated protection and restoration strategies
- Integrates ongoing activities, prioritizes implementation projects based on technical merit and benefits to the community

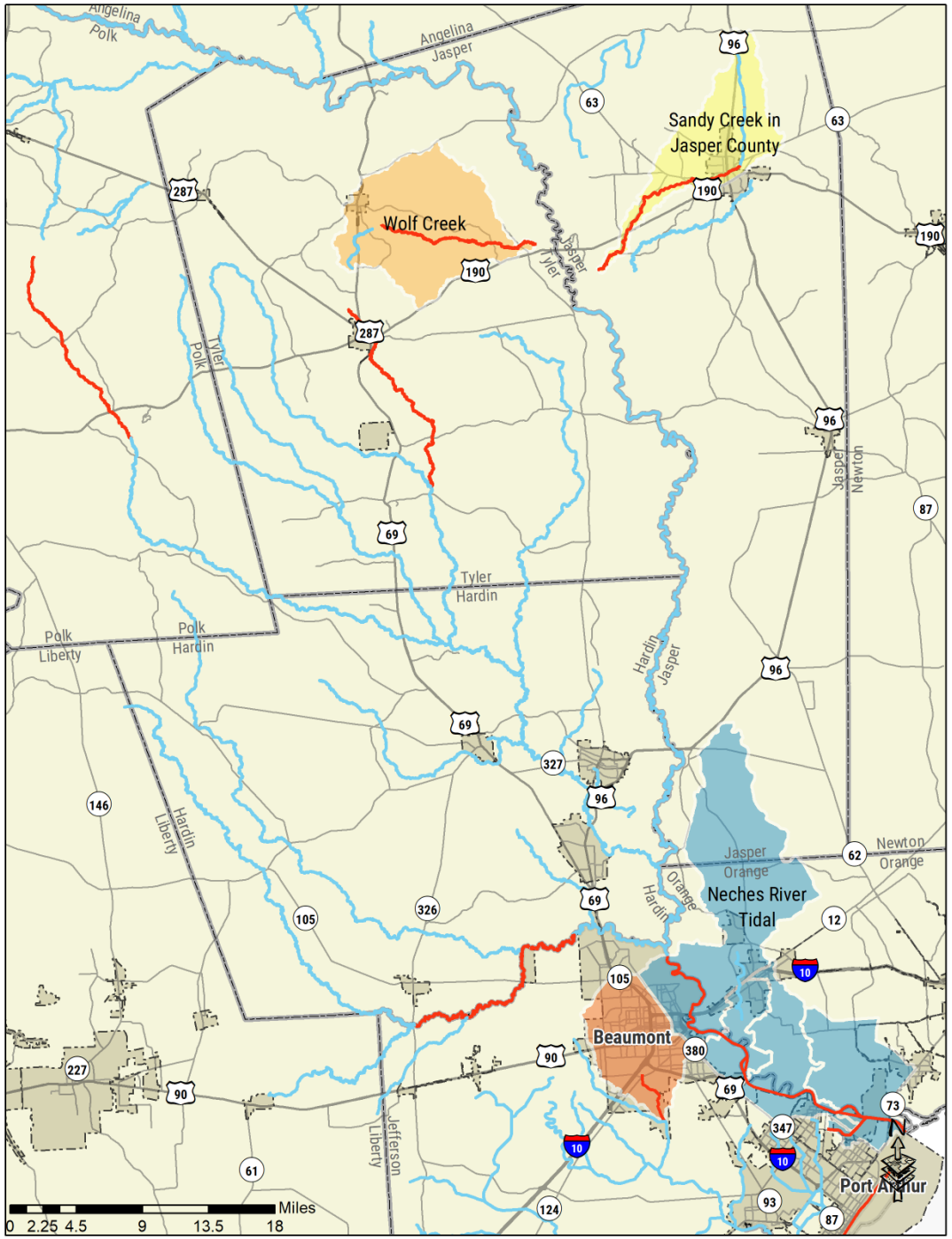
Initial Efforts

- Technical Support Documents (FY19)
  - Describe hydrology and characteristics of impaired watersheds
  - Broadly link potential sources and causes of impairments
  - Quantify allowable and existing pollutant loads



Next Steps

- Watershed Planning (FY20)
  - Stakeholder meetings to address bacteria impairments in Hillebrandt Bayou, Tidal Neches, Sandy and Wolf Creeks
  - Start development of TMDL I-Plans, and Watershed Protection Plans as needed
  - Provide technical support for TMDL development



Are you a stakeholder?

- Yes
- Anyone that lives, works, plays, or has an interest in the impacted watersheds
- Stakeholders determine the planning process
- Sign up to stay up to date on future events and meetings

QUESTIONS?

Michael Schramm
Research Associate
Michael.Schramm@ag.tamu.edu

Lucas Gregory
Sr. Research Scientist
LFGregory@ag.tamu.edu

MIDDLE NECHES AND ANGELINA PROJECT UPDATES

Anna Gitter- Texas Water Resources Institute

June 17, 2019

Upper Neches Basin Steering Committee Meeting

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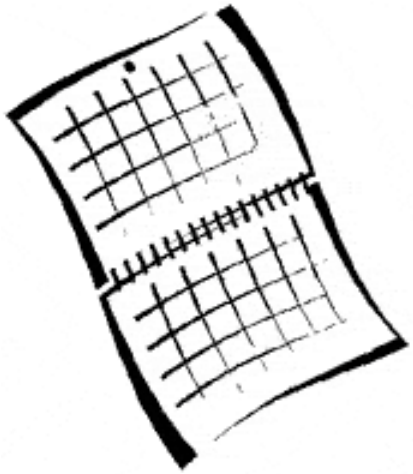
Project Timelines

- **Angelina River above Sam Rayburn Reservoir**
  - May 1, 2017 - October 31, 2019
  - Currently ~ 25 months into the project

- **Tributaries of the Neches River below Lake Palestine (Middle Neches)**
  - September 1, 2018 – August 31, 2019
  - Currently ~ 10 months into the project

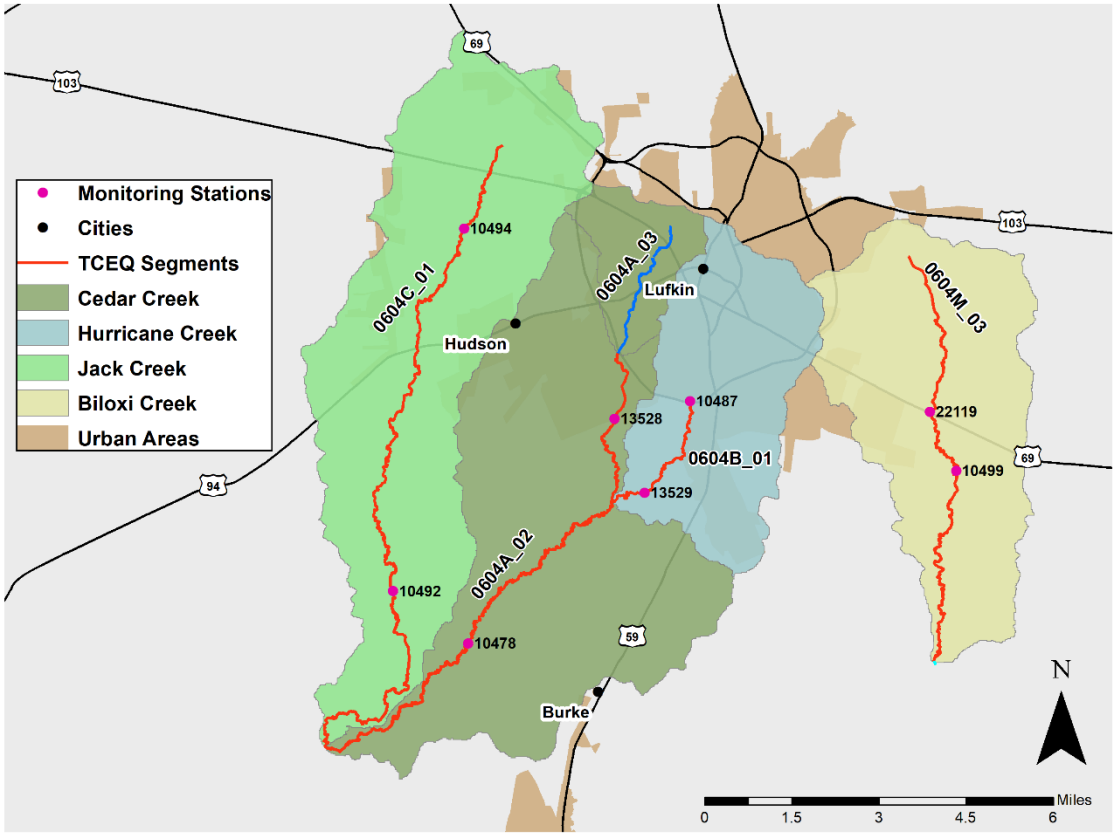


Tributaries of Neches River below Lake Palestine: Middle Neches

- Cedar (0604A), Hurricane (0604B) and Biloxi (0604M) Creeks are impaired for not meeting *E. coli* standards for contact recreation

- Biloxi Creek (0604M) is also impaired for depressed dissolved oxygen levels

- Jack Creek (0604C) listed to have a concern for elevated levels of *E. coli*



Middle Neches Watershed (Source: TWRI)

Water Quality

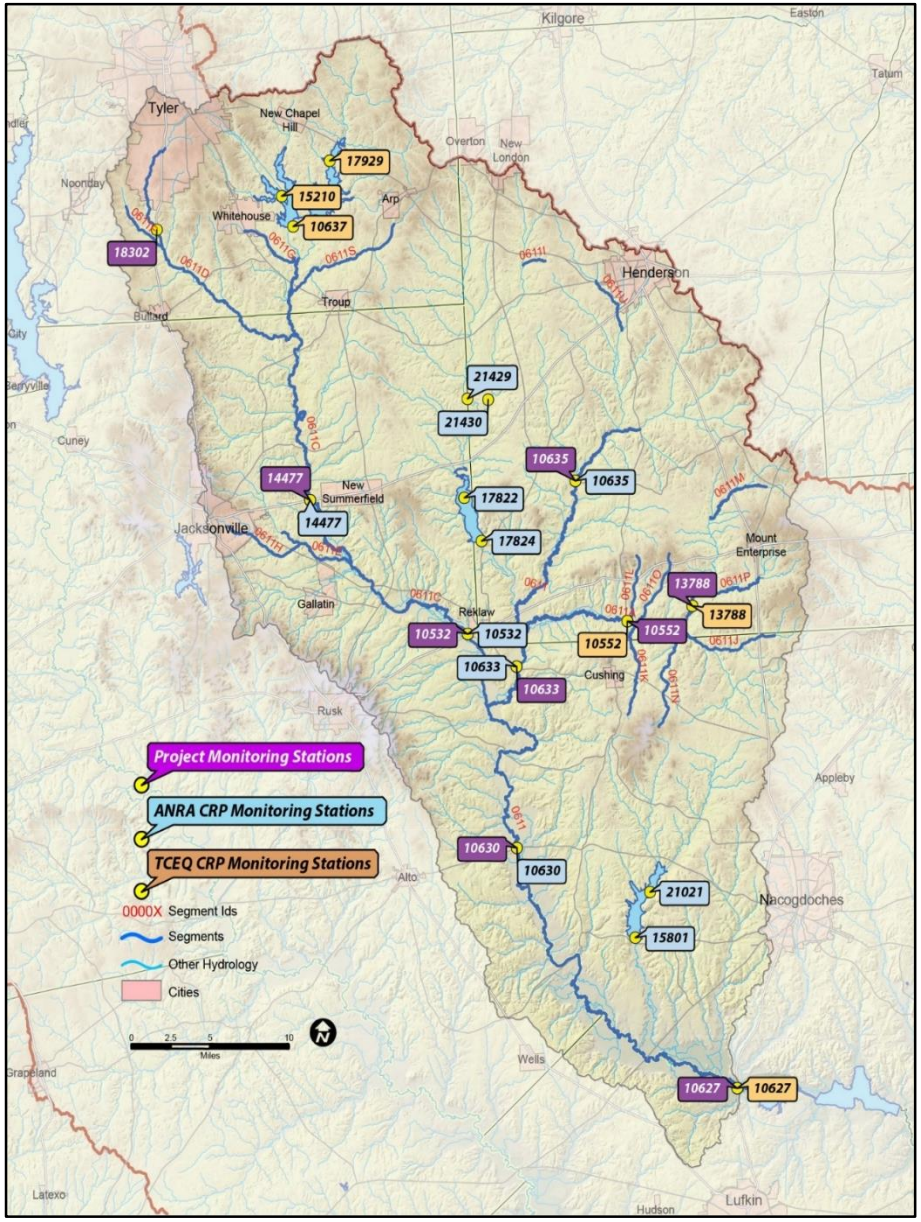
- Historical *E. coli* data from 2009-2018
  - Two sites only had data from 2013-2018
- Began monitoring at station 22119, located on AU 0604M_03 of Biloxi Creek this year
- Currently wrapping up supplemental water quality monitoring for the project
- During the past ten years, *E. coli* geometric means for all sites have exceeded 126 cfu/100 mL

Station ID	Segment	Site Description	Number of Samples	Data Range	*E. coli* Geometric Mean (MPN/ 100 mL)
13528	0604A	Cedar Creek at CR 1336	41	2009-2018	179
10478	0604A	Cedar Creek at FM 2497	41	2009-2018	243
10494	0604C	Jack Creek at FM 3150	22	2013-2018	306
10492	0604C	Jack Creek at FM 2497	41	2013-2018	131
10487	0604B	Hurricane Creek at Loop 287	22	2013-2018	329
13529	0604B	Hurricane Creek at SH24	41	2009-2018	236
10499	0604M	Biloxi Creek at Angelina CR216	52	2009-2018	165


0604A
0604B
0604C
0604M
E. coli (MPN/100mL)
2500
2000
1500
1000
500
0
2010
2012
2014
2016
2018
Date
Station ID
10478
10487
10492
10494
10499
13528
13529

Angelina River above Sam Rayburn

- 4 segments impaired for not meeting primary contact recreation *Escherichia coli* (*E. coli*) standard
  - 0611: Angelina River above Sam Rayburn
  - 0611A: East Fork Angelina River
  - 0611C: Mud Creek
  - 0611D: West Mud Creek
- *E. coli* standard: geometric mean of 126 cfu/100mL
- Concerns for low dissolved oxygen and elevated nitrate, ammonia, and total phosphorus

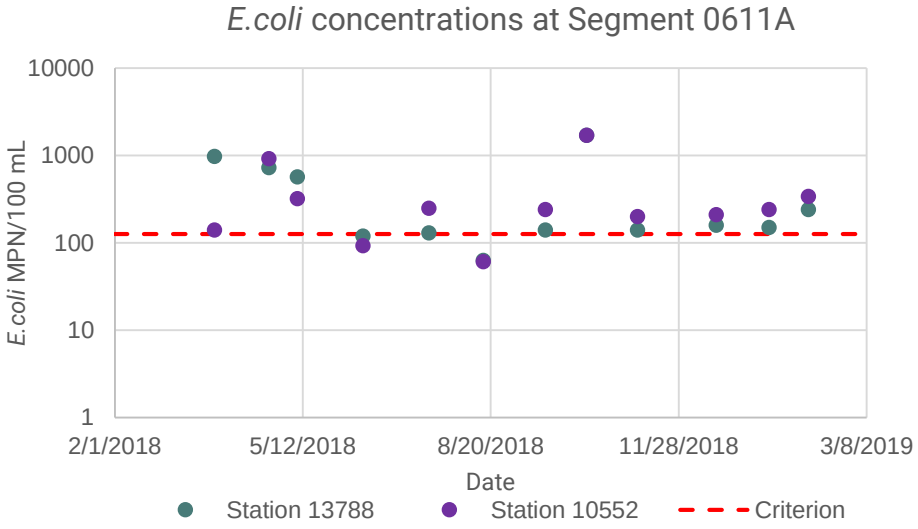


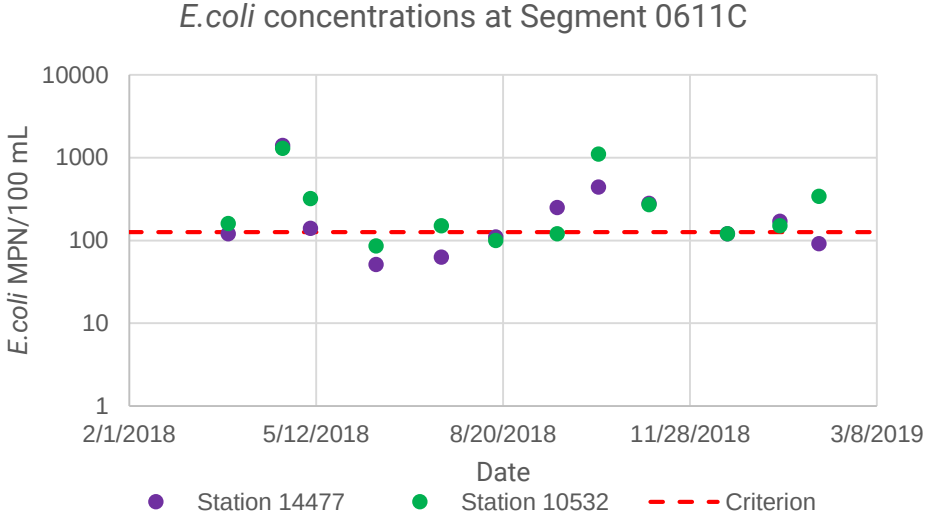
Upper Angelina River Watershed (Source: ANRA 2015 Basin Highlights Report)

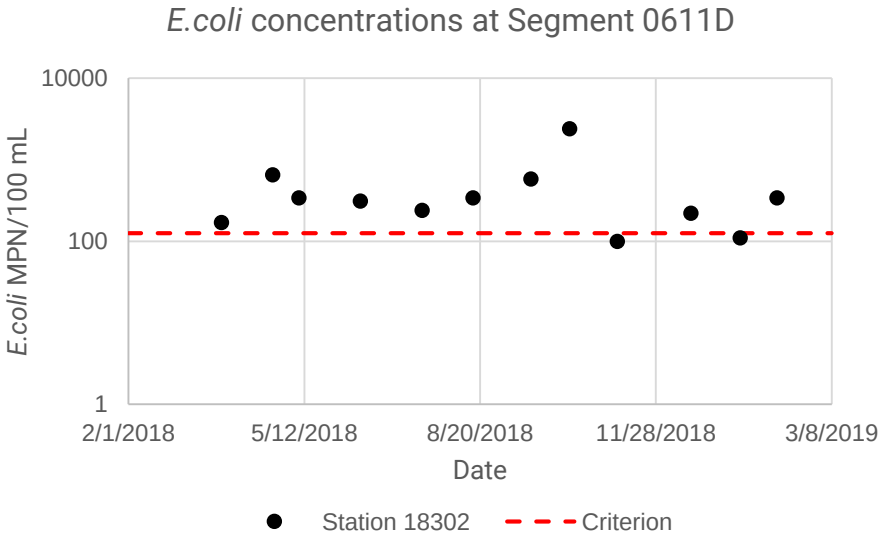
Project Data

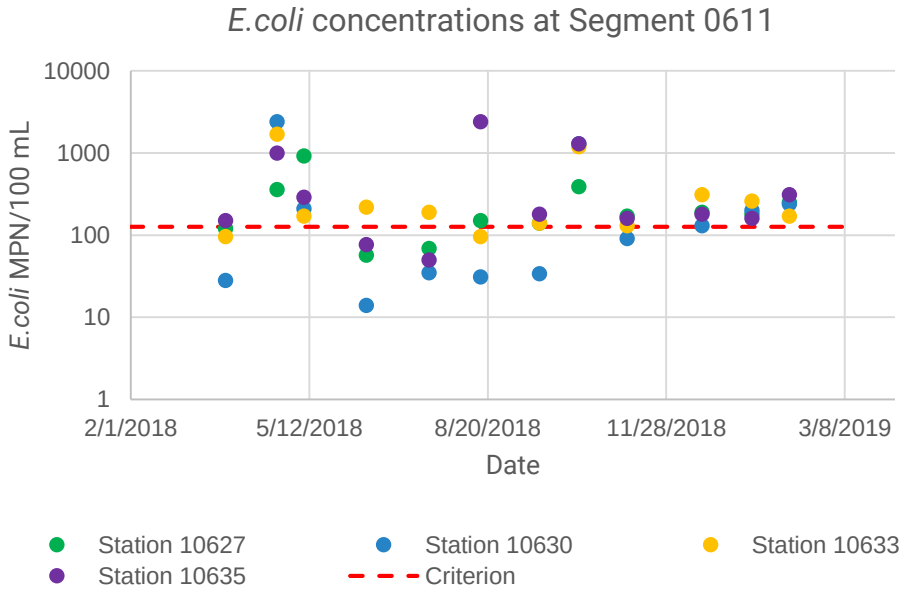
- Conducted monthly sampling from March 2018-February 2019 (12 samples)
- Gather data on current watershed conditions, specifically *E. coli*
- Sampling conducted at 9 sites by both TWRI and ANRA
- Within the past year, almost all sites had a geometric mean greater than 126 cfu/ 100 mL

Station ID	Segment ID	Description	*E. coli* Geometric Mean (MPN/100 mL)
10627	0611	Angelina River at US 59	187
10630	0611	Angelina River at SH 21	115
10633	0611	Angelina River 340m upstream of SH 204	238
10635	0611	Angelina River at FM 1798	268
13788	0611A	East Fork Angelina River at Rusk CR 3218	255
10552	0611A	East Fork Angelina River at FM 225	257
14477	0611C	Mud Creek at US 79	167
10532	0611C	Mud Creek at US 84	227
18302	0611D	West Mud Creek at US 69	318


E.coli concentrations at Segment 0611A
10000
1000
100
10
1
E.coli MPN/100 mL
2/1/2018
5/12/2018
8/20/2018
11/28/2018
3/8/2019
Date
Station 13788
Station 10552
Criterion


E.coli concentrations at Segment 0611C
10000
1000
100
10
1
E.coli MPN/100 mL
2/1/2018
5/12/2018
8/20/2018
11/28/2018
3/8/2019
Date
Station 14477
Station 10532
Criterion


E.coli concentrations at Segment 0611D
10000
100
1
E.coli MPN/100 mL
2/1/2018
5/12/2018
8/20/2018
11/28/2018
3/8/2019
Date
Station 18302
Criterion

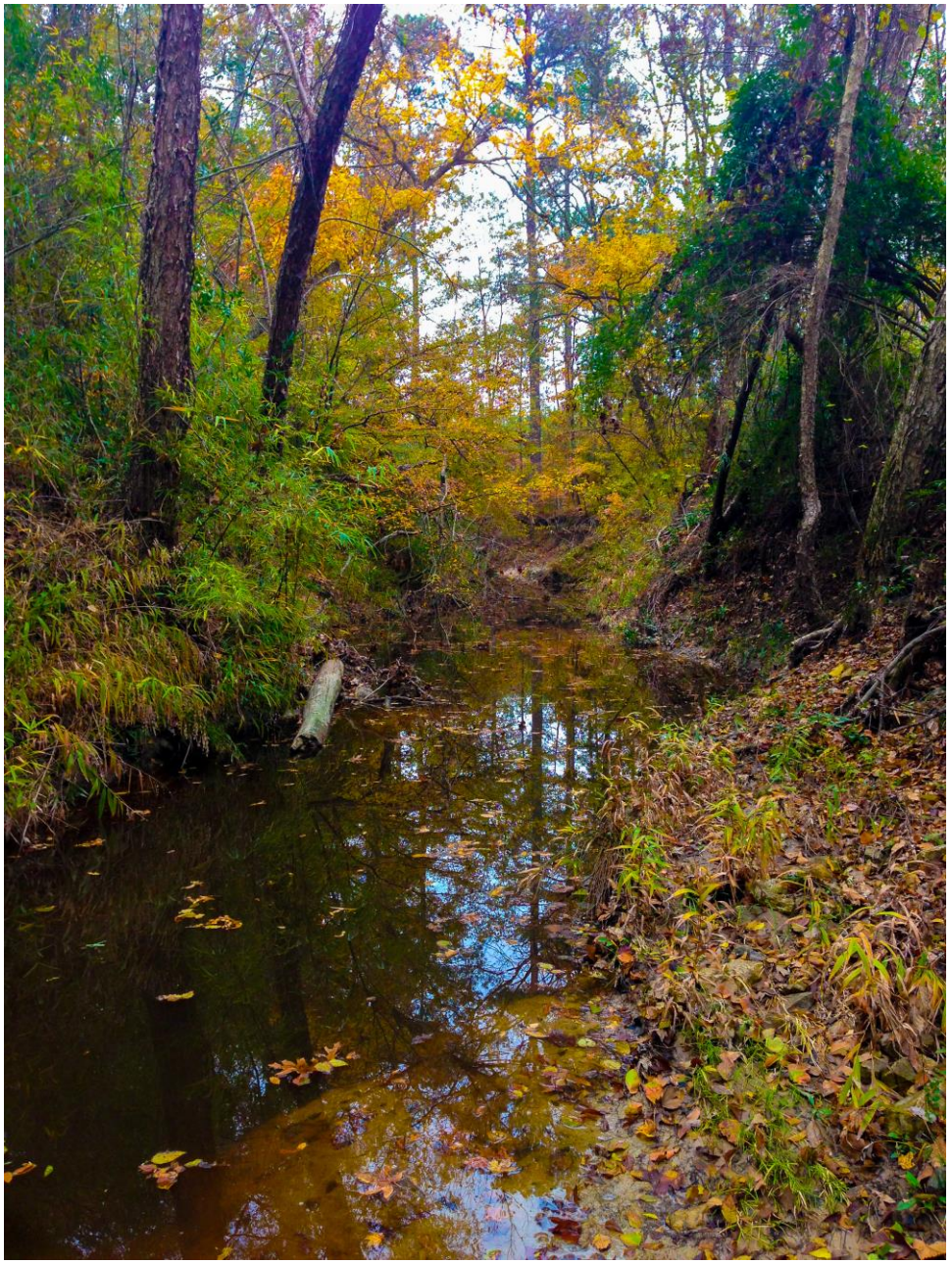

E.coli concentrations at Segment 0611
10000
1000
100
10
1
E.coli MPN/100 mL
2/1/2018
5/12/2018
8/20/2018
11/28/2018
3/8/2019
Date
Station 10627
Station 10630
Station 10633
Station 10635
Criterion

East Texas Projects

- Characterizing Watersheds
  - Develop understanding of the watershed's features
    - Hydrology, Land Use & Land Cover, Water Quality
  - Identify potential sources of impairment
    - Point Sources: look at permits and recent discharge reports

      (wastewater treatment, industrial facilities, regulated stormwater)
    - Nonpoint Sources: estimate potential quantity

      (livestock, wildlife, septic, pets)
  - Collect additional data to characterize the hydrology and present *E. coli* levels
  - Establish needed pollutant reductions
  - Begin stakeholder interactions
    - Inform about issues
    - Discuss options
    - Discuss desired path forward



Jack Creek (Photo Credit: ANRA)

QUESTIONS?

Anna Gitter
Research Assistant
Anna.Gitter@ag.tamu.edu

Lucas Gregory
Sr. Research Scientist
LFGregory@ag.tamu.edu

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ATTOYAC BAYOU WATERSHED PLAN IMPLEMENTATION

Emily Monroe - Texas Water Resources Institute
June 17, 2019
Upper Neches Basin Steering Committee Meeting

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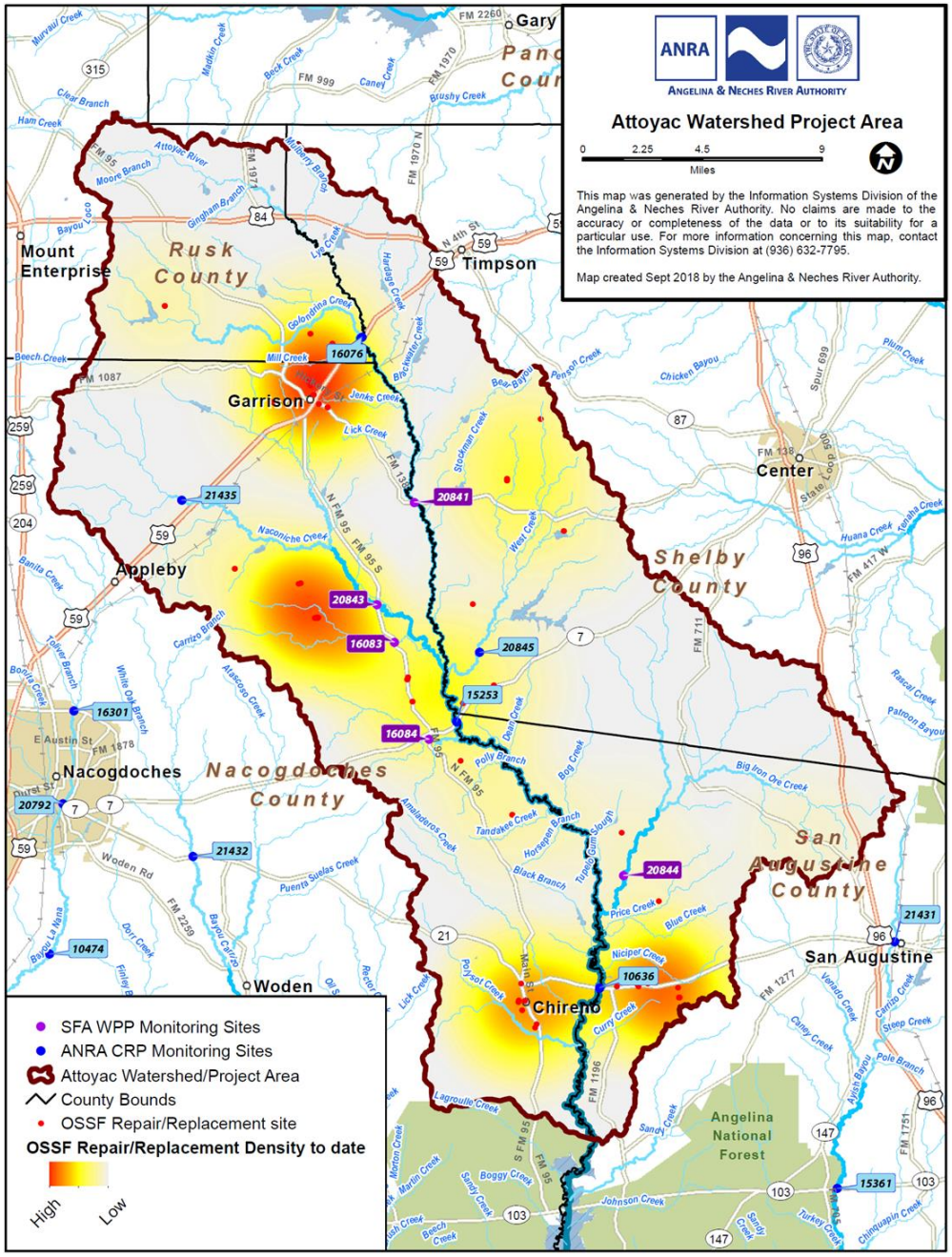
Attoyac Bayou Watershed Programs

- Currently:
  - **Implementation of the Attoyac Bayou Watershed Protection Plan** – Texas State Soil & Water Conservation Board
  - **Identify, Inspect, Repair/Replace Failing Septic Systems** - Texas Commission on Environmental Quality

Watershed Coordinator:

Dylan Coleman
Angelina & Neches River Authority
936-632-7795
dcoleman@anra.org



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Attoyac Bayou Watershed Protection Plan Implementation

Project Partners:

- ANRA
- Dr. Matthew McBroom - SFASU

Goals:

- Engage stakeholders and provide implementation activity updates.
- Evaluate WPP implementation milestones.
  - Monitor water quality in the watershed to show BMP implementation effectiveness and general water quality changes.
  - Develop Water Quality Management Plans for Agricultural Operations
  - Track implementation progress
- Conduct Education and Outreach activities in and around the watershed.

Attoyac Bayou Watershed Partnership

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Work Funded by:

Texas State Soil & Water Conservation Board

United States Environmental Protection Agency

Attoyac Bayou Watershed Protection Plan Implementation

Project Partners:

- ANRA
- Dr. Matthew McBroom - SFASU

Updates:

- Recently sponsored an OSSF Professional CEU program in Lufkin on May 15
- Developing annual newsletter
- Current program was given a no-cost extension; ends in September
- Next project began June 1; end date of May 31, 2021.

Attoyac Bayou Watershed Partnership

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Work Funded by:

Texas State Soil & Water Conservation Board

United States Environmental Protection Agency

OSSF Remediation and Replacement Program

Goals:

- Reduce *E. coli* loadings through OSSF repair and replacements.
- Promote proper OSSF function in the watershed.
- Repair or replace 20+ failing OSSFs
- Propose a plan for tracking and geolocating OSSFs in the area

Partners:

- ANRA
- Pineywoods Resource Conservation & Development, Inc.
  - Ken Awtrey - (936) 568-0414

Measures of Success:

- Number of failing OSSFs in the Attoyac Bayou reduced

Future Programs:

- Next project begins September

Attoyac Bayou Watershed Partnership

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Work Funded by:

TCEQ

United States Environmental Protection Agency

OSSF Remediation and Replacement Program

Updates:

- 36 applicants to date:
  - 16 completed installation / replacements
  - 7 to be completed this summer
  - 7 applicants didn't qualify
  - Remaining applicants are on a waitlist for the next project
- Educational materials for homeowner operation & maintenance available
- Next round of funding begins September

Partners:

- ANRA
- Pineywoods Resource Conservation & Development, Inc.
  - Ken Awtrey - (936) 568-0414

Attoyac Bayou Watershed Partnership

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Work Funded by: TCEQ; United States Environmental Protection Agency

QUESTIONS?

Emily Monroe
Extension Program Specialist
Emily.Monroe@ag.tamu.edu
979-458-3154

Lucas Gregory
Sr. Research Scientist
LFGregory@ag.tamu.edu
979-845-7869

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LA NANA BAYOU CHARACTERIZATION

Lucas Gregory - Texas Water Resources Institute
June 17, 2019
Upper Neches Basin Steering Committee Meeting

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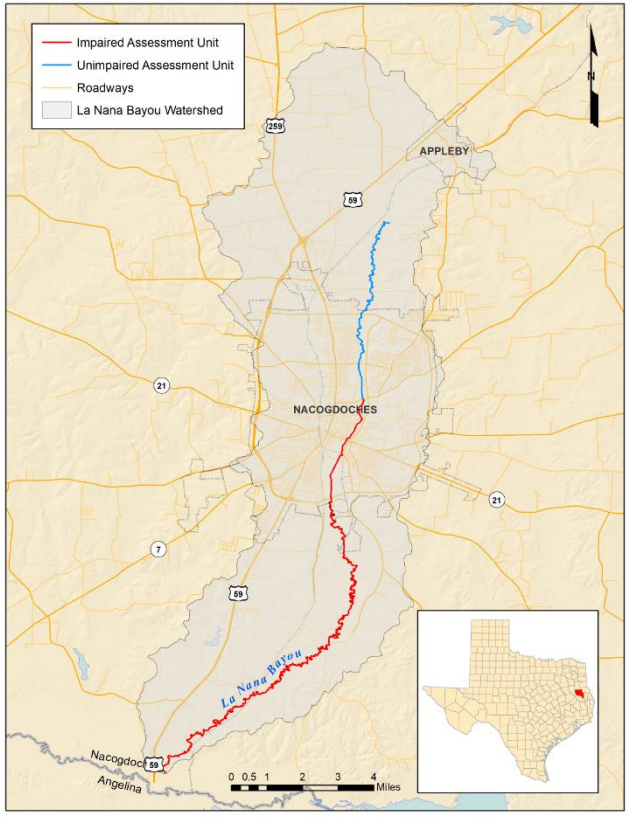
La Nana Bayou Impairment



- Impaired for not meeting the primary contact recreation bacteria standard
- Concerns for elevated ammonia-nitrogen, nitrate-nitrogen, and total phosphorous in the downstream portion of the bayou

Current Project

- Collect additional data in the Angelina River and La Nana Bayou watersheds
  - More accurately characterize the watersheds' hydrology and present *E. coli* levels
  - Evaluate existing *E. coli* sources in the watershed
  - Conduct public education events related to water quality

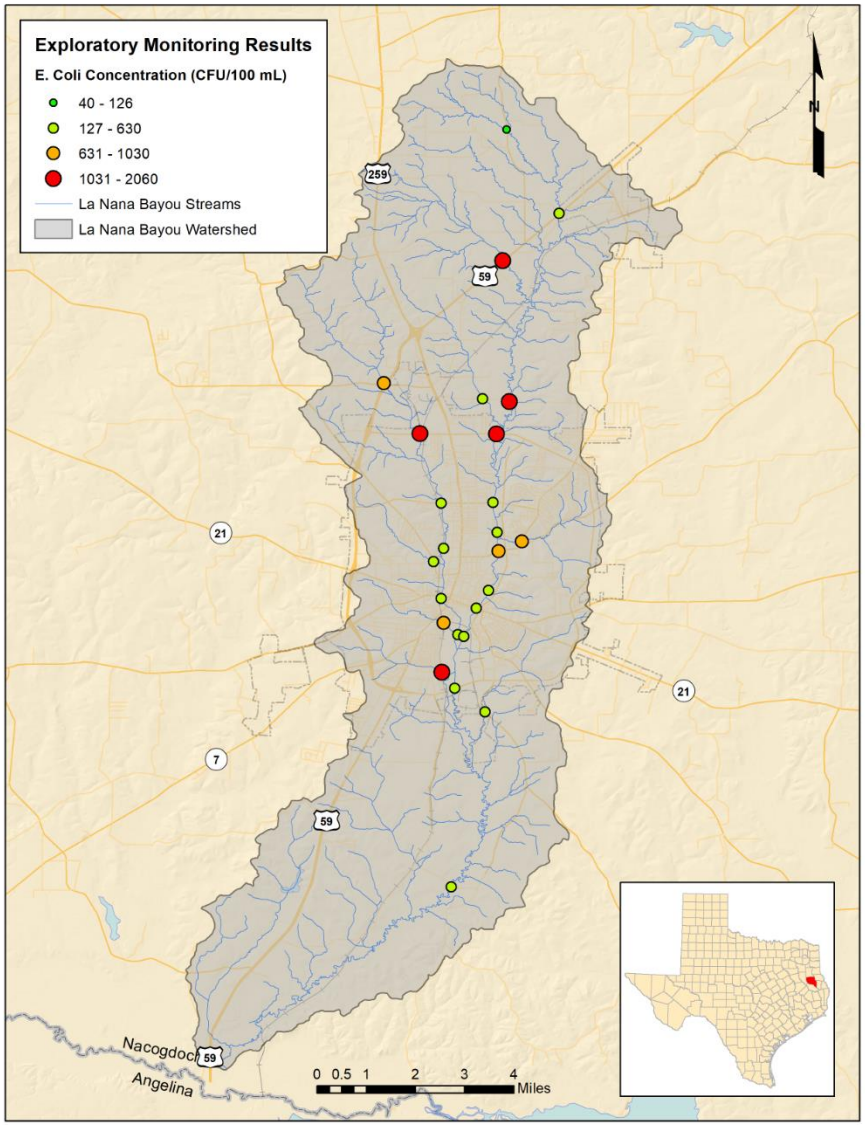
Water Quality: *E. coli*

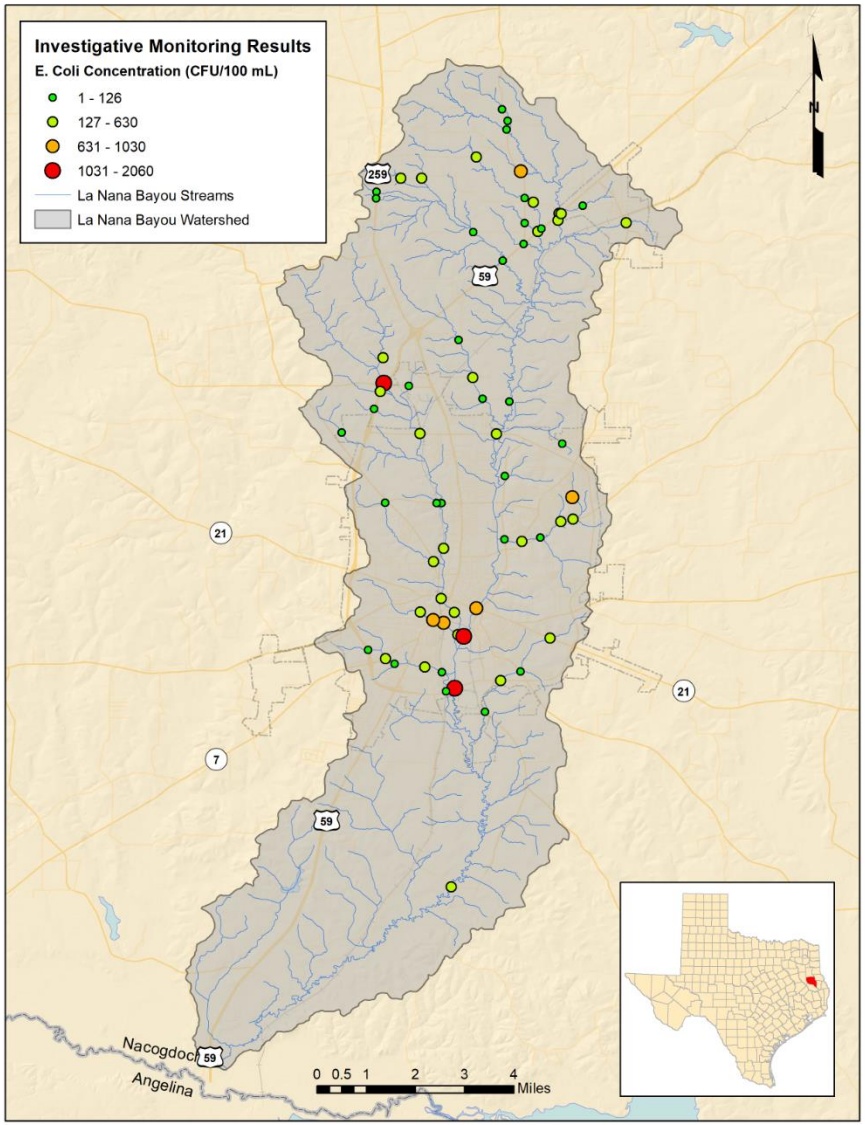
- Monthly Measurements
  - 4 months CRP
  - 8 Months supplemental
  - March 2018 – February 2019

Station	Name	Samples	Geomean
16301	La Nana Bayou at Loop 224 North	12	333.51
20792	La Nana Bayou Upstream of E Main	12	1012.74
10474	La Nana Bayou at CR 526	12	730.41

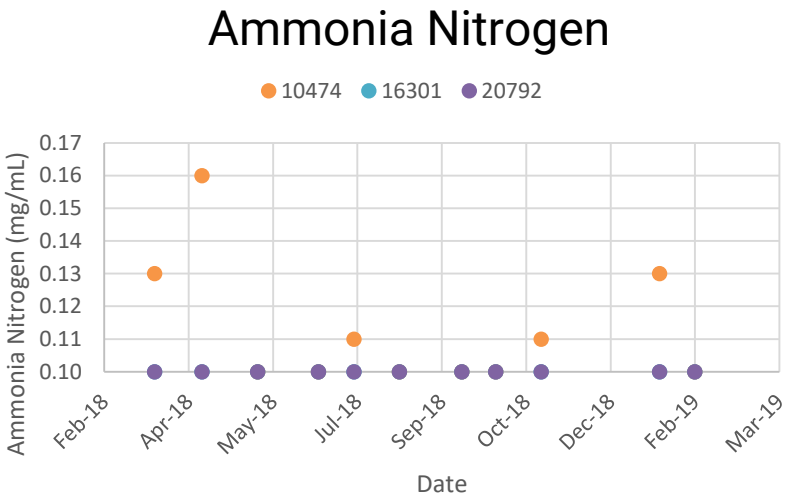
Exploratory and Intensive Monitoring

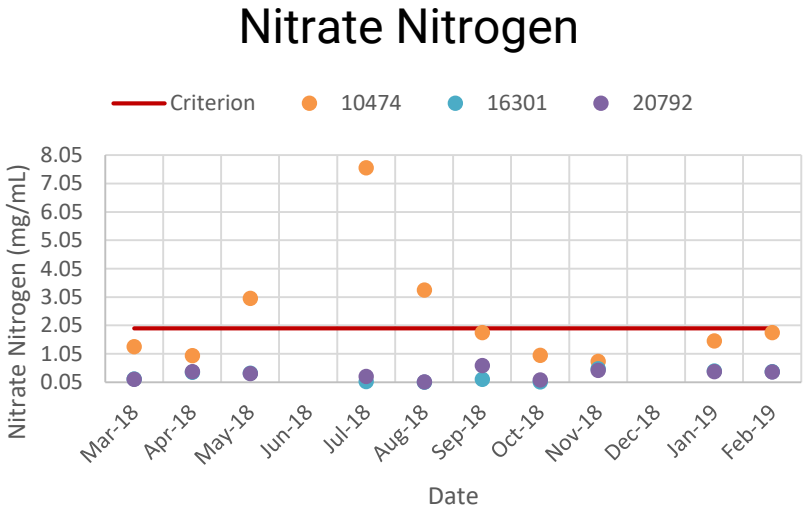
- 1-day snapshot of entire watershed
  - Exploratory monitoring: Coarse assessment of 25 sites
  - Intensive monitoring: Further investigate 75 sites

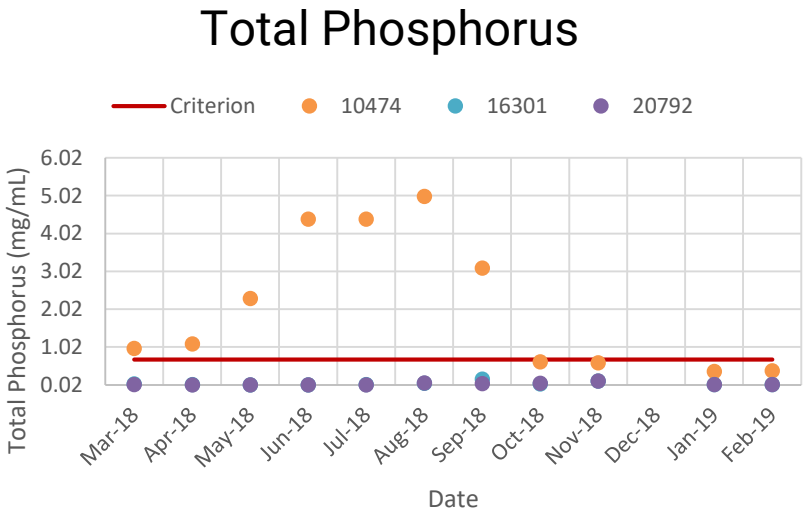




Nutrient Data







Next Steps:

Develop Plan to Address Water Quality Impairments

- Propose development of a watershed protection plan
- Initial stakeholder feedback: positive view of watershed plan development
- Address multiple concerns through planning effort
  - Water quality
  - Flooding in Nacogdoches
- Currently developing project proposal
  - Targeting grant funding from TCEQ
  - Proposal Partners
    - Angelina & Neches River Authority
    - Stephen F. Austin State University
    - Texas Water Resources Institute
- Funding would arrive in Fall of 2020

QUESTIONS ?

Ed Rhodes
Research Associate
Edward.Rhodes@ag.tamu.edu

Lucas Gregory
Sr. Research Scientist
LFGregory@ag.tamu.edu