ANRA

ANGELINA & NECHES RIVER AUTHORITY

CLEAN RIVERS PROGRAM

2018 BASIN HIGHLIGHTS REPORT

THE TEXAS CLEAN RIVERS PROGRAM

ANGELINA & NECHES RIVER AUTHORITY

CLEAN RIVERS PROGRAM
BASIN HIGHLIGHTS REPORT
FY 2018

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ANGELINA & NECHES RIVER AUTHORITY
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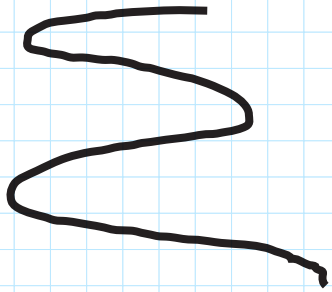
TITLE: BASIN HIGHLIGHTS REPORT PROJECT: CLEAN RIVERS PROGRAM DATE: FY 2018



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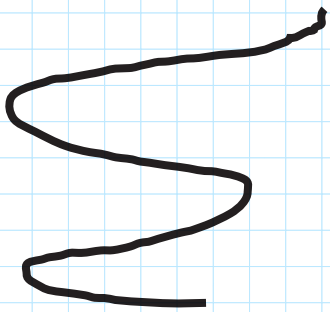


TITLE: Basin Highlights Report PROJECT: Clean Rivers Program DATE: FY 2018

INTRODUCTION

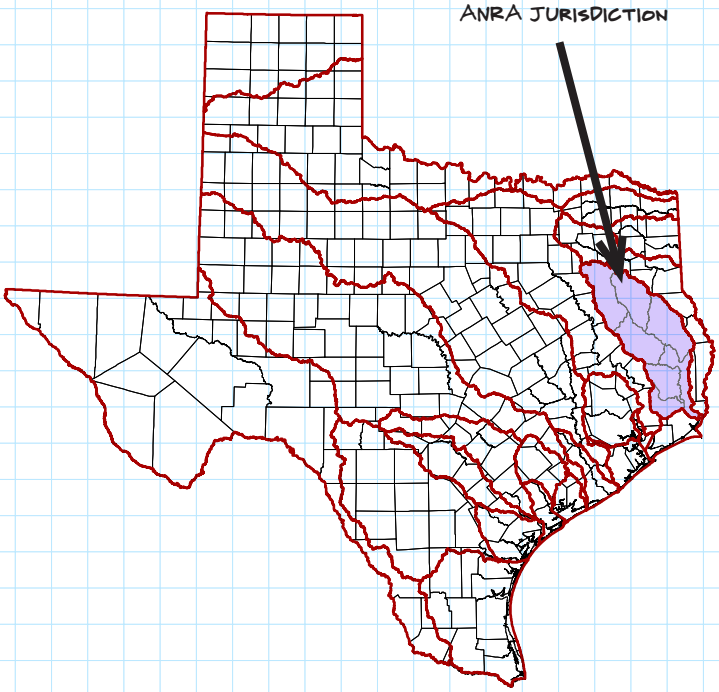
TITLE: Basin Highlights Report PROJECT: Clean Rivers Program DATE: FY 2018

About the Angelina & Neches River Authority

ANRA

Angelina & Neches River Authority

The Angelina & Neches River Authority (ANRA), originally named the Sabine & Neches Conservation District, was created in 1935 by the Texas Legislature as a conservation and reclamation district. The legislature divided the territory of the Sabine & Neches Conservation District into the Sabine River Authority and the Neches River Conservation District in 1949. It was not until 1971 that the Neches River Conservation District was activated and began operating as a water resource agency. In 1977, Senate Bill 125 changed the name of the Neches River Conservation District to the Angelina & Neches River Authority.



ANRA's office is located in Lufkin, Texas. ANRA's territorial jurisdiction consists of 8,500 square miles that lie wholly or in part of the following 17 counties: Van Zandt, Smith, Henderson, Newton, Cherokee, Anderson, Rusk, Houston, Nacogdoches, San Augustine, Shelby, Angelina, Trinity, Sabine, Polk, Jasper, and Orange.

The Angelina & Neches River Authority has the responsibility for monitoring, protecting, and enhancing water resources in the Neches River Basin. ANRA's mission is to conserve, store, control, preserve, use, and distribute the storm water, floodwater, and the water of the rivers and streams of the state in the Neches River Basin for the benefit of the human environment and the natural environment.

About the Basin Highlights Report

This 2018 Basin Highlights Report is intended to provide a brief overview of the previous year's events and ongoing programs in the upper and middle portions of the Neches River Basin that are relevant to the Clean Rivers Program. For a more comprehensive look at the basin, please refer to the 2015 Basin Summary Report. For information regarding the lower portion of the Neches River Basin, please refer to the Lower Neches Valley Authority's Basin Highlights Report, available at http://lnva.dst.tx.us/.

The 2018 Basin Highlights Report was prepared by the Angelina & Neches River Authority in cooperation with the Texas Commission on Environmental Quality under the authorization of the Texas Clean Rivers Act.

TITLE: Basin Highlights Report PROJECT: Clean Rivers Program DATE: FY 2018

About the Clean Rivers Program

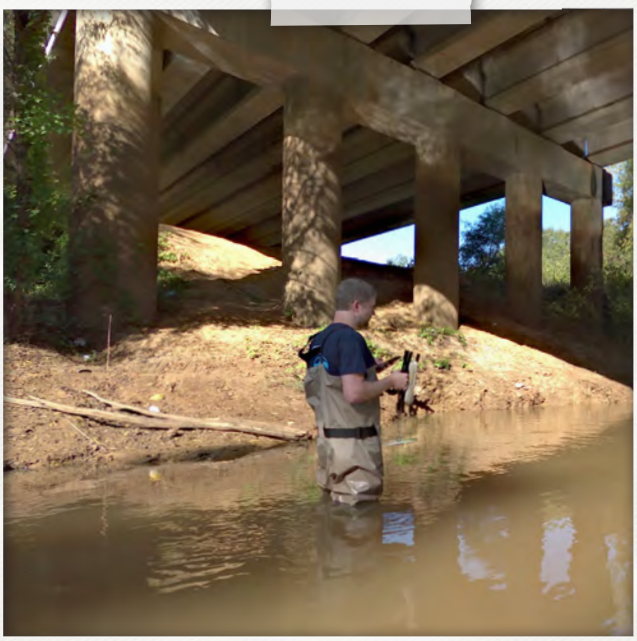
The Texas Clean Rivers Act, enacted in 1991 by the Texas Legislature, requires that each Texas river basin conduct ongoing water quality assessments, integrating water quality issues using a watershed management approach. The Clean Rivers Program (CRP) implements the Clean Rivers Act through water quality monitoring, assessment, and public outreach. Currently, monitoring in the state of Texas includes over 1800 sites and regional water quality assessments within the 23 major river and coastal basins and their sub-watersheds.

The mission of the CRP is to maintain and improve the quality of water within each river basin in Texas through an ongoing partnership involving the Texas Commission on Environmental Quality (TCEQ), river authorities, other agencies, regional entities, local governments, industry, and citizens. The program's watershed management approach is designed to identify and evaluate water quality issues, establish priorities for corrective action, work to implement those actions, and adapt to changing priorities. The CRP Long Term Plan can be found at the following website:

https://www.tceq.texas.gov/assets/public/compliance/monops/crp/crp-longterm-plan06.pdf

ANRA's Clean Rivers Program staff conduct water quality monitoring activities within the basin. The staff also evaluates water quality data and prepares assessment reports related to the water quality in the Neches Basin. ANRA actively coordinates with other entities within the basin, such as TCEQ regional offices, USGS, TPWD, and LNVA, to ensure that monitoring activities are spatially represented throughout the basin and that important water quality concerns are addressed.

In FY 2018, ANRA conducted routine water quality monitoring at 40 monitoring stations on a quarterly basis. All data collected by ANRA was reported to TCEQ for use in water quality assessments, wastewater permitting decisions, and development of water quality standards and nutrient criteria.



Collecting samples at Angelina River at SH 21

Angelina River at SH 204

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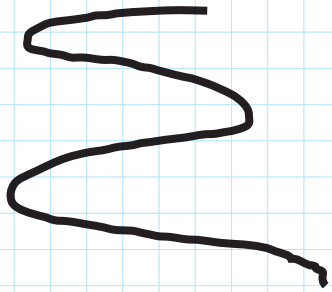

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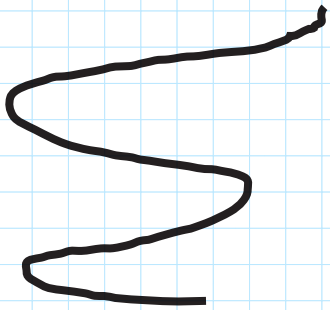

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Update on Basin Activities

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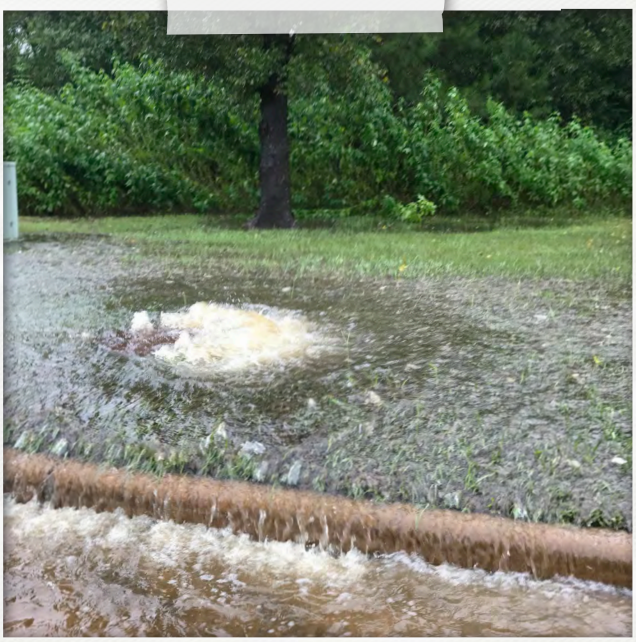
Hurricane Harvey

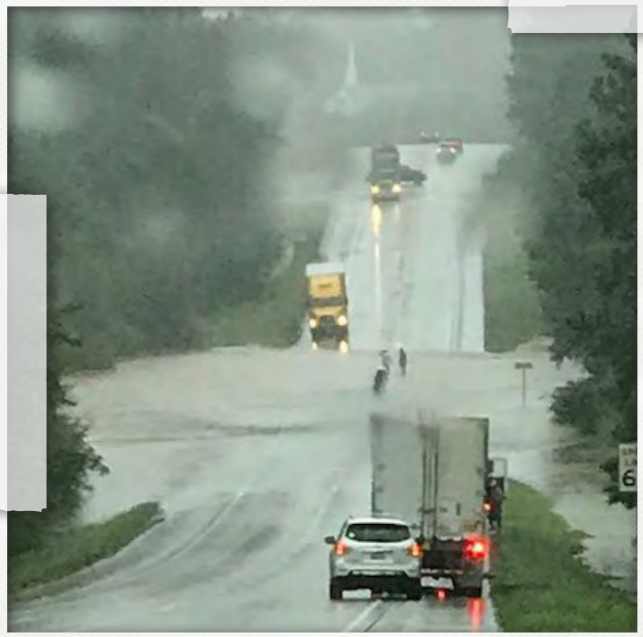
Hurricane Harvey made landfall in Texas on August 25, 2017, as a category 4 storm. Harvey brought record-setting rainfall and flooding to Houston and the surrounding areas.

For the most part, the upper and middle portions of the Neches River Basin did not receive the significant flooding that impacted our neighbors to the south. Our area did receive heavy rainfall, isolated flooding, road closures, and power outages, but did not sustain major damage. In the southern portion of the basin, such as in Beaumont, the damage was much more extensive, with wide-ranging flooding and property damage. The Lower Neches Valley Authority (LNVA), responsible for monitoring in that portion of the Neches River Basin, received significant damage to their saltwater barrier facility and water quality laboratory.

Throughout the upper and middle portions of the Neches Basin, streams were inundated with stormwater runoff and sanitary sewer overflows were commonplace, as the infrastructure simply could not keep up with the amount of rainfall that fell over such a large area.



Sanitary sewer overflow near Cedar Creek at Ellis August 30, 2017



Flooding in Jasper, TX August 30, 2017

Sandy Creek Park in San Augustine August 30, 2017

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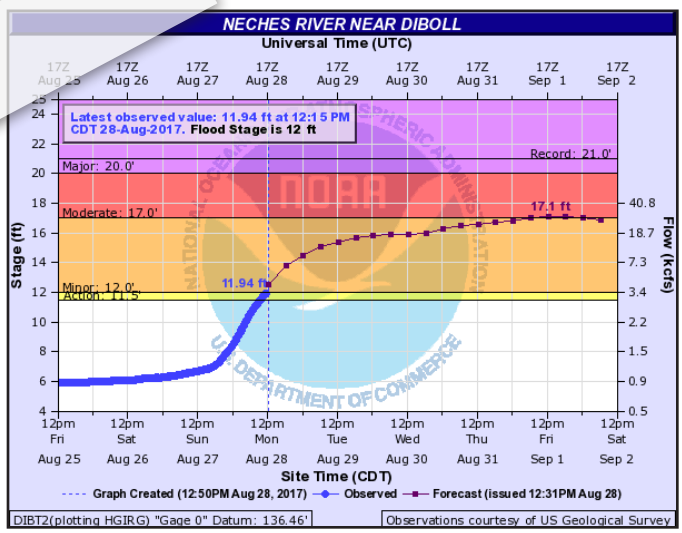
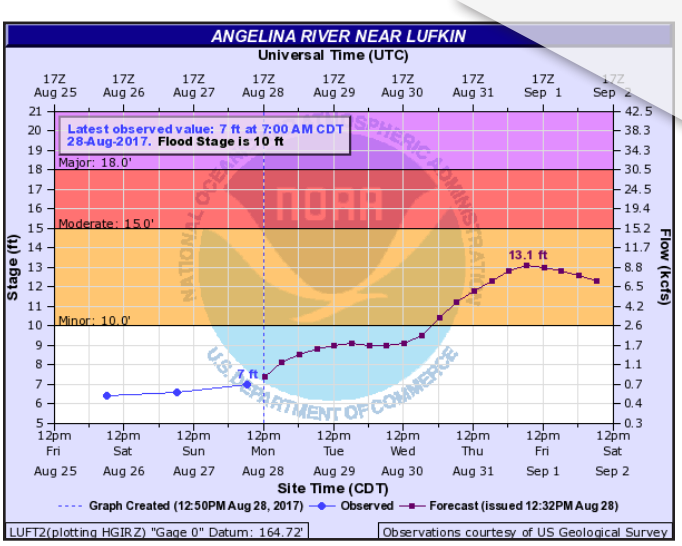
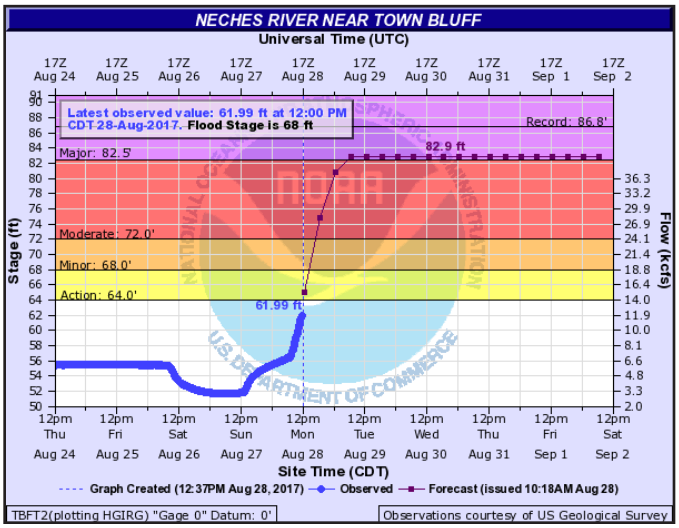
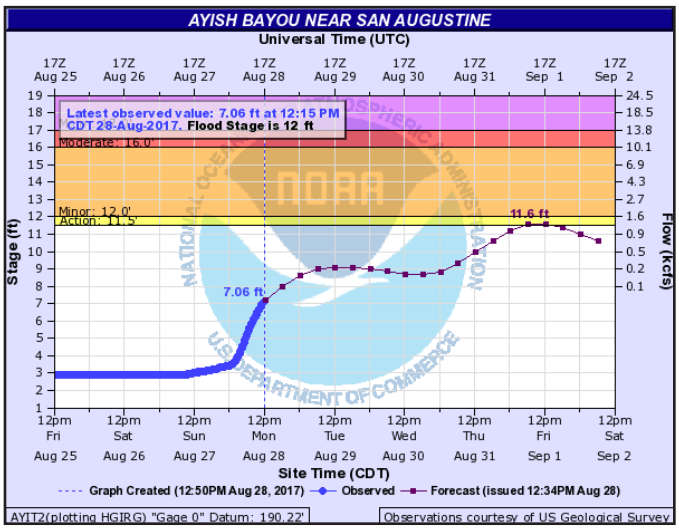
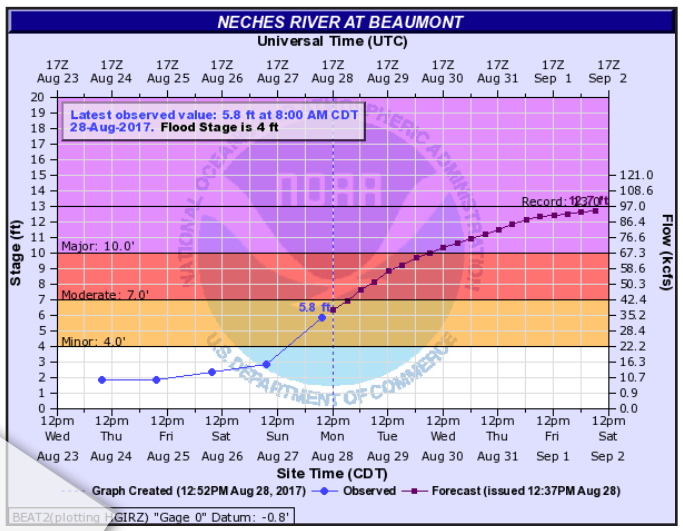
HYDROGRAPHS DURING HURRICANE HARVEY

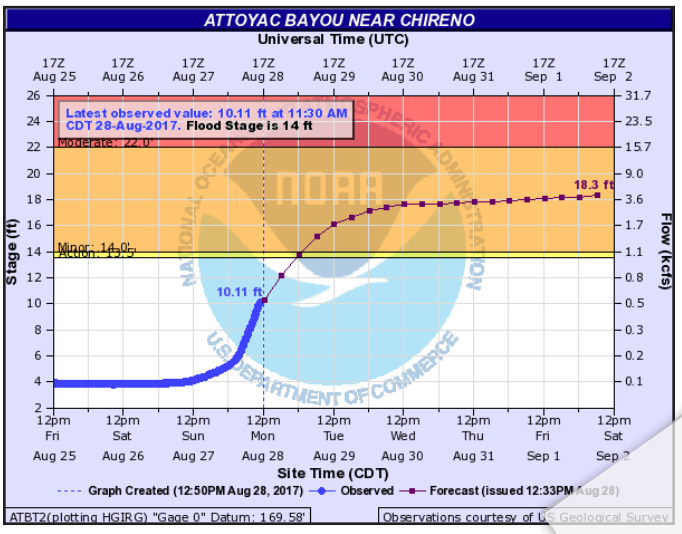












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GIANT SALVINIA SPREADS TO LAKE NACOGDOCHES

ANRA NEWS **February 7, 2018**

LOCAL NEWS

Giant Salvinia Discovered in Lake Nacogdoches

Invasive aquatic plant found in another East Texas lake

NACOGDOCHES, TX - First discovered in Texas on Toledo Bend Reservoir in 1998, the invasive aquatic plant known as giant salvinia continues to spread across East Texas. In February 2018, giant salvinia was discovered in Lake Nacogdoches.

Since 2017, giant salvinia has been found at five Texas lakes - Lake O' the Pines, Lake Palestine, Martin Creek Lake, Lake Fork, and most recently, Lake Nacogdoches. These recent introductions of the plant are in addition to infestations at Toledo Bend, Sam Rayburn, and Caddo Lake.

Giant salvinia is a fast-growing plant, able to cover large areas of a lake in a short period of time. It is estimated that the plant currently covers approximately 30 of the 2,210 acres of the lake. Those areas are to be treated with a combination of contact herbicides and giant salvinia weevils. Containment vegetation, such as torpedo grass and cutgrass, are helping to keep the plant from spreading.

It is believed that the giant salvinia spread to Lake Nacogdoches in the summer of 2017 by way of visiting watercraft. As with other aquatic invasive species, boaters, anglers, and hunters can play a huge role in the spread of these plants if they fail to clean, drain, and dry their equipment when traveling from lake-to-lake.

It is important that all boaters learn to identify giant salvinia and other invasive species, such as zebra mussels, that occur in Texas waters. Boaters need to remember the importance of cleaning their boats and trailers before leaving the boat ramp. Transporting of giant salvina, even if it is unintentional, is prohibited by law and punishable by a fine of up to $500 per violation.

For more information on giant salvinia, as well as other invasive aquatic species, please visit the Texas Parks and Wildlife Department's website at tpwd.texas.gov/giant salvinia.

Giant Salvinia

ADDITIONAL RESOURCES:

- HTTPS://TEXASINVASIVES.ORG/
- HTTPS://TPWD.TEXAS.GOV/HUNTWILD/WILD/SPECIES/EXOTIC/
- HTTP://STOPAQUATICHITCHHIKERS.ORG/

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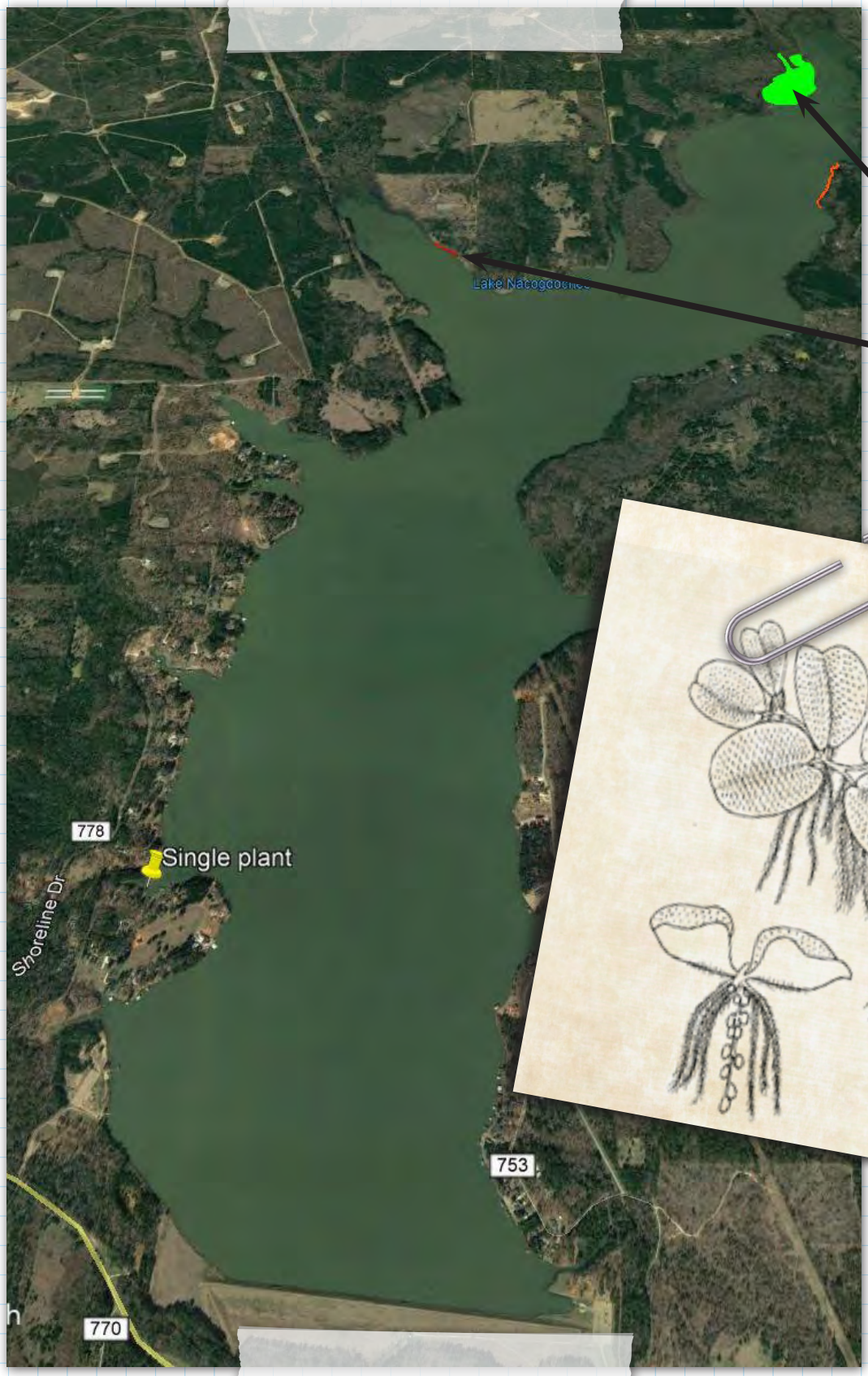


LOCATIONS OF GIANT SALVINIA ON LAKE NACOGDOCHES.

LARGE INFESTATION WHERE LITTLE BAYOU LOCO ENTERS THE RESERVOIR.

1/2 ACRE INFESTATION FOUND AT YELLOW BANK CREEK COVE.

Revisions to the Texas Surface Water Quality Standards

As required by the Clean Water Act, all states must adopt water quality standards for surface water. These standards consist of designated beneficial uses of a water body (or a segment of a water body) and the water quality criteria that are necessary to protect those designated uses. These water quality standards are the basis for:

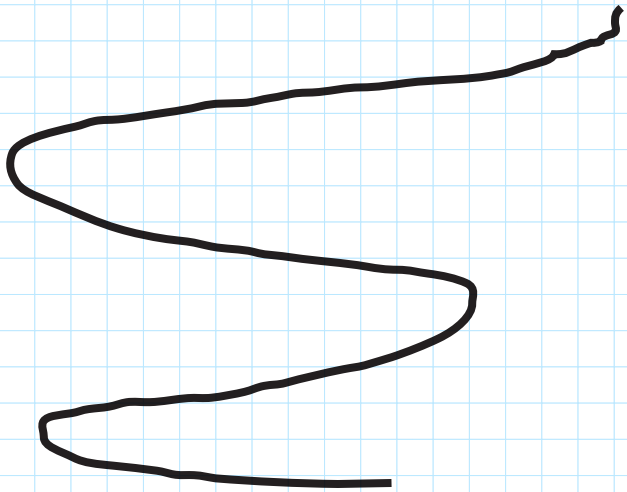
- establishing effluent limits in wastewater permits;
- setting instream water quality goals for total maximum daily loads (TMDLs); and
- providing water quality targets for use in the assessment of water quality monitoring data.

On February 7, 2018, TCEQ commissioners adopted revisions to the Texas Surface Water Quality Standards (TSWQS) [30 Texas Administrative Code, Chapter 307]. The commission adopted the following changes to the TSWQS as part of this triennial revision:

- revisions to statewide toxic criteria to incorporate new data on toxic effects and address revised United States Environmental Protection Agency (EPA) procedures;
- revisions and additions to site-specific toxic criteria to incorporate local water quality data into criteria for selected water bodies;
- revisions and additions to the uses, criteria, and descriptions of individual water bodies based on new data and results of recent use-attainability analyses (UAAs);
- addition of site-specific recreational uses for selected water bodies as a result of recent recreational UAAs; and
- revisions to provisions regarding coastal recreation waters.

The revised rule was published in the Texas Register on February 23, 2018 and became effective on March 1, 2018. The TSWQS were last revised in February 2014, and a portion of the 2014 TSWQS were approved by the EPA in September 2014.

As part of this revision, TCEQ commissioners adopted a recreation use of secondary contact recreation 1 for Prairie Creek (segment 0606A), Mud Creek (segment 0611C) and Paper Mill Creek (segment 0615A). The EPA recommended retaining the primary contact recreation use for Prairie Creek and Mud Creek in Chapter 307.10(7), Appendix G. The commission felt that the designation of secondary contact recreation 1 is appropriate.



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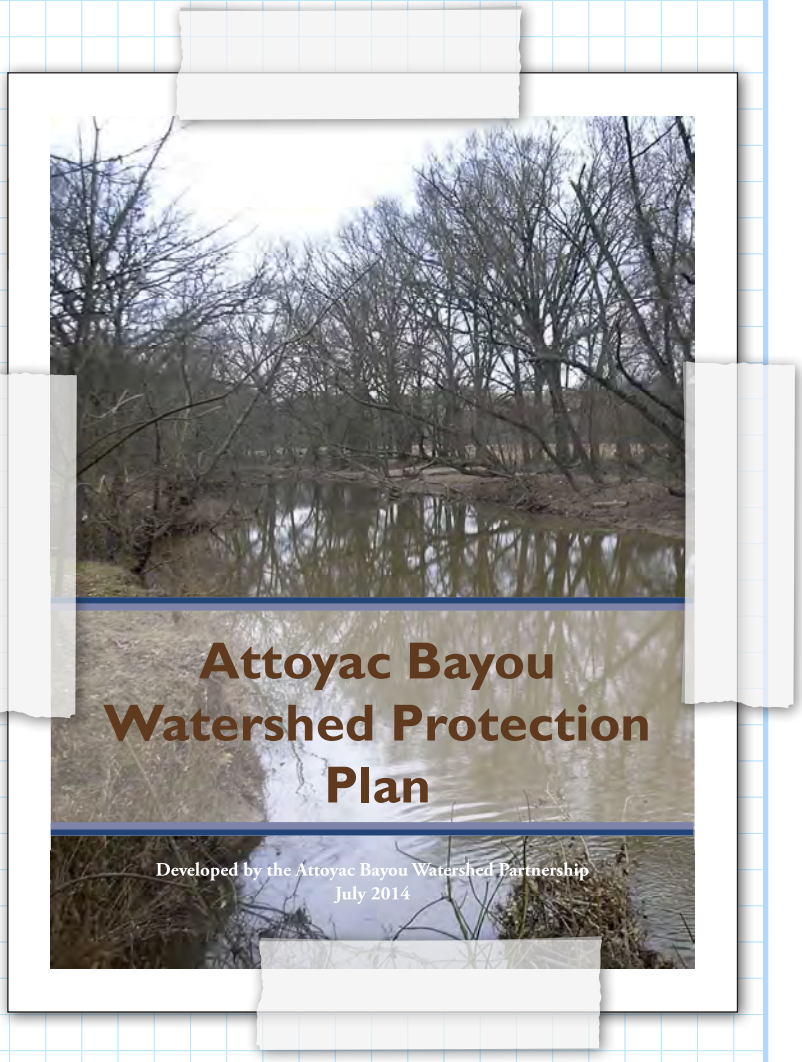
Watershed-Based Projects in the Attoyac Bayou

Although not funded by the Clean Rivers Program, the Attoyac Bayou Watershed Protection Plan has been a conduit for numerous grant programs to help monitor and improve water quality in the basin.

The additional resources provided by these grants (such as lab equipment) are being used for Clean Rivers Program monitoring as well. For example, the Attoyac Bayou Protection Plan grant project allowed ANRA to purchase an ion chromatograph. The increased sample throughput of this automated equipment allowed ANRA to increase its number of CRP monitoring stations from 26 to 40. In turn, the CRP monitoring can be used to satisfy a portion of the in-kind contributions on federal grants.

The benefit to the CRP is an increase in both data quality and quantity, as we are able to have greater precision and reproducibility with the automated equipment, and we have been able to collect at some stations that had not been previously monitored.



On-Going Attoyac Bayou Grant Projects:

OSSF Replacement

- Through a TCEQ-funded Clean Water Act Section 319 grant, Texas Water Resources Institute (TWRI) and Pineywoods Resources Conservation & Development (RC&D) are replacing or repairing failing on-site sewage facilities (OSSFs) within the Attoyac Bayou watershed.
- Failing OSSFs were identified as one of the leading contributors to the E. coli loading in the watershed.
- As part of this project, ANRA is working with Nacogdoches County, Rusk County, and TCEQ Region 10 (Beaumont) to initiate the development of a joint OSSF database for the watershed.

Water Quality Monitoring

- Through a Texas State Soil and Water Conservation Board (TSSWCB) funded project, TWRI, ANRA, and Stephen F Austin State University (SFASU) are conducting additional intensive (monthly) water quality monitoring to supplement Clean Rivers Program data.
- SFASU is collecting monthly samples at 5 previously monitored locations.
- Water samples are submitted to ANRA's Environmental Laboratory for analysis.
- Monitoring will help in determining the effectiveness of implementing best management practices.

Upcoming Projects on Angelina River and La Nana Bayou

ANRA is working with the Texas Water Resources Institute (TWRI) on multiple water quality projects within the basin through the Clean Water Act Section 319 Nonpoint Source Grant Program. Although not funded by CRP, this additional monitoring may provide additional data for assessment. CRP monitoring is being used as an in-kind contribution for both projects.

1. Water Quality and Pollutant Loading Assessment in the Angelina River above Sam Rayburn Watershed

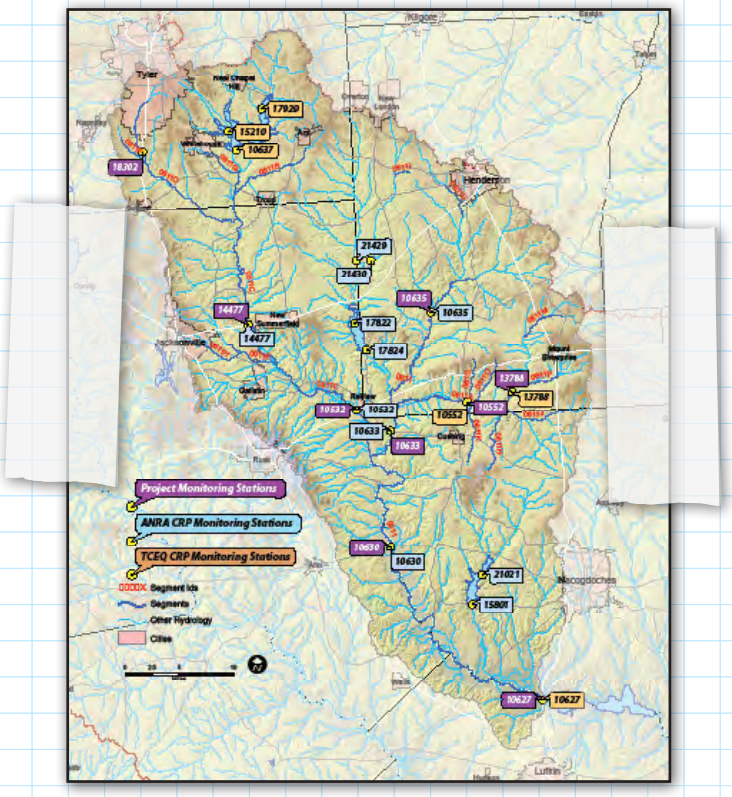
Project Funded by: Texas State Soil and Water Conservation Board (TSSWCB)

Project Goals:

- Evaluate existing data to characterize potential causes and sources of pollution;
- Supplement existing water quality and quantity data through targeted intensive water quality monitoring;
- Develop/maintain a successful public participation program, including a general education campaign and stakeholder group;
- Establish an analytical framework for developing a future watershed-based plan for all or portions of the Angelina River above Sam Rayburn watershed.

This project will allow ANRA to collect additional monitoring data at current CRP stations by supplementing the quarterly CRP monitoring with monthly intensive monitoring.

Upper Angelina River Watershed



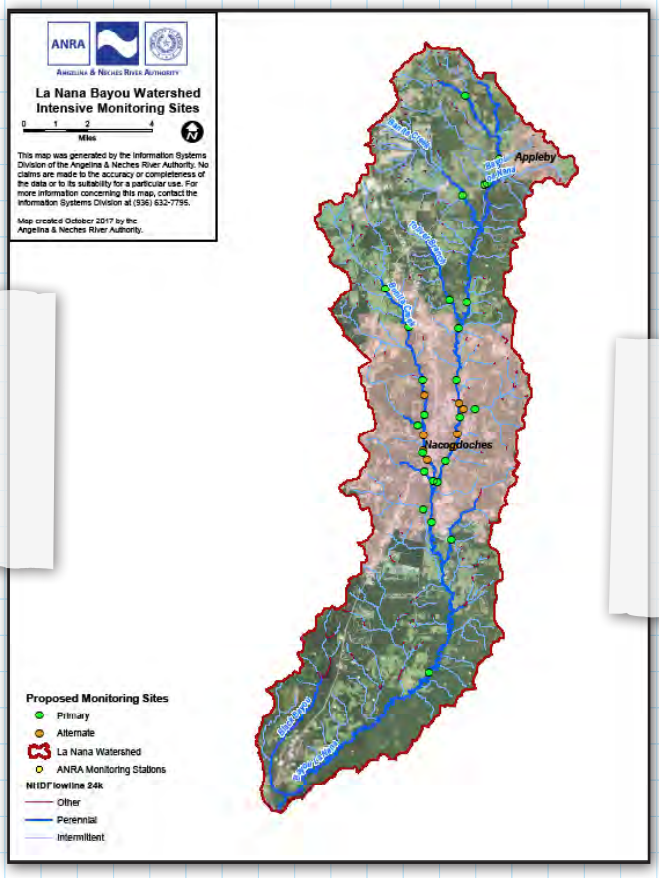
2. LA NANA BAYOU WATER QUALITY AND POLLUTANT LOADING CHARACTERIZATION

PROJECT FUNDED BY: TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ)

PROJECT GOALS:

- IDENTIFY AND GATHER EXISTING WATER QUALITY AND WATERSHED DATA RELATIVE TO POTENTIAL POLLUTANT LOADINGS;
- IDENTIFY DATA GAPS AND ADDITIONAL DATA NEEDS TO FULLY ASSESS CURRENT POLLUTANT LOADING CONDITIONS AND SOURCES OF BACTERIA;
- TO COLLECT INTENSIVE WATER QUALITY DATA AT EXISTING CRP SITES TO BETTER CHARACTERIZE POLLUTANT LOADINGS IN THE WATERSHED TEMPORALLY;
- TO IDENTIFY AREAS IN THE WATERSHED WHERE E. COLI CONCENTRATIONS RAPIDLY INCREASE THROUGH LOW FREQUENCY, HIGH INTENSITY EXPLORATORY AND INVESTIGATIVE SAMPLING;
- ESTABLISH CURRENT POLLUTANT LOADS AND DETERMINE NEEDED POLLUTANT LOADING REDUCTIONS TO MEET APPLICABLE WATER QUALITY STANDARDS;
- ENGAGE LOCAL WATERSHED STAKEHOLDERS IN WATER QUALITY EDUCATION AND EMPOWER THEM TO SELECT AN APPROPRIATE RESTORATION STRATEGY.

LA NANA BAYOU WATERSHED



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TCEQ Region 5 Implements Intensive Bacterial Monitoring

In 2018, field operations staff from TCEQ Region 5 (Tyler) began an extensive bacteria monitoring regimen for 10 stations within the upper and middle portions of the Neches River Basin. As part of this sampling, E. coli and field measurements are beingcollected on a monthly basis, with monitoring planned to continue for approximately 2 years. The stations being collected are as follows:

- Kickapoo @ FM 773
- Neches River @ FM 279
- Neches River Above Lake Palestine @ SH 64
- Prairie Creek @ SH 110
- Prairie Creek @ SH 64
- Black Fork Creek @ CR 26
- Angelina River @ FM 1798
- East Fork Angelina @ CR 4238
- Mud Creek @ US 84
- West Mud Creek @ FM 3052

The purpose of this extensive bacteria monitoring regimen is to provide additional data for water quality assessment purposes. Typically, monitoring stations are sampled on a quarterly basis.

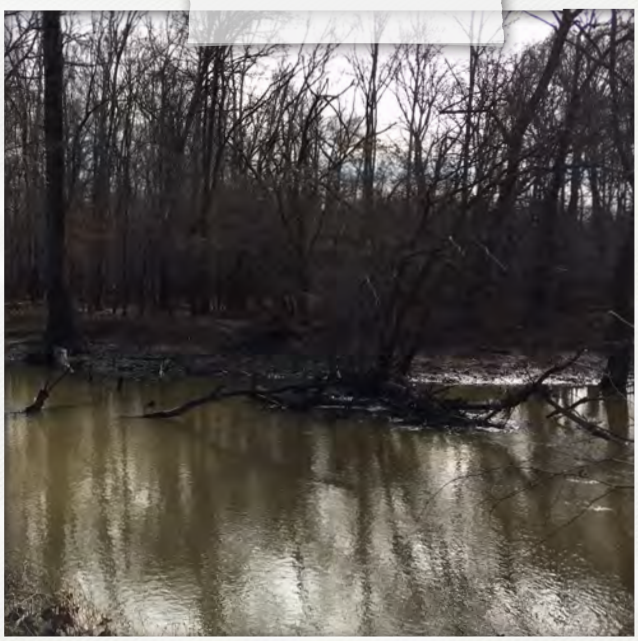
New Texas Stream Team Monitor on Mud Creek

ANRA serves as the Texas Stream Team regional partner for the upper Neches Basin and provides training, monitoring kits, and replacement reagents to the volunteer monitors in the basin. ANRA supports a number of water quality monitors in the basin, with the largest and most active group comprised of members of the Greater Lake Palestine Council (GLPC).

In 2018, Mr. Wayne McGee joined ANRA's Texas Stream Team as a citizen scientist. As a local landowner residing along the banks of Mud Creek, Mr. McGee has a keen interest in the water quality in the area. In the future, Mr. McGee hopes to expand to other sites, and perhaps assist in recruiting other citizen scientists.

For more information on Texas Stream Team, please visit their website at:

http://txstreamteam.rivers.txstate.edu



Stream Team Monitoring Station on Mud Creek
Feb 2, 2018

Jeremiah Poling trains Mr. McGee on pH & DO
Feb 2, 2018

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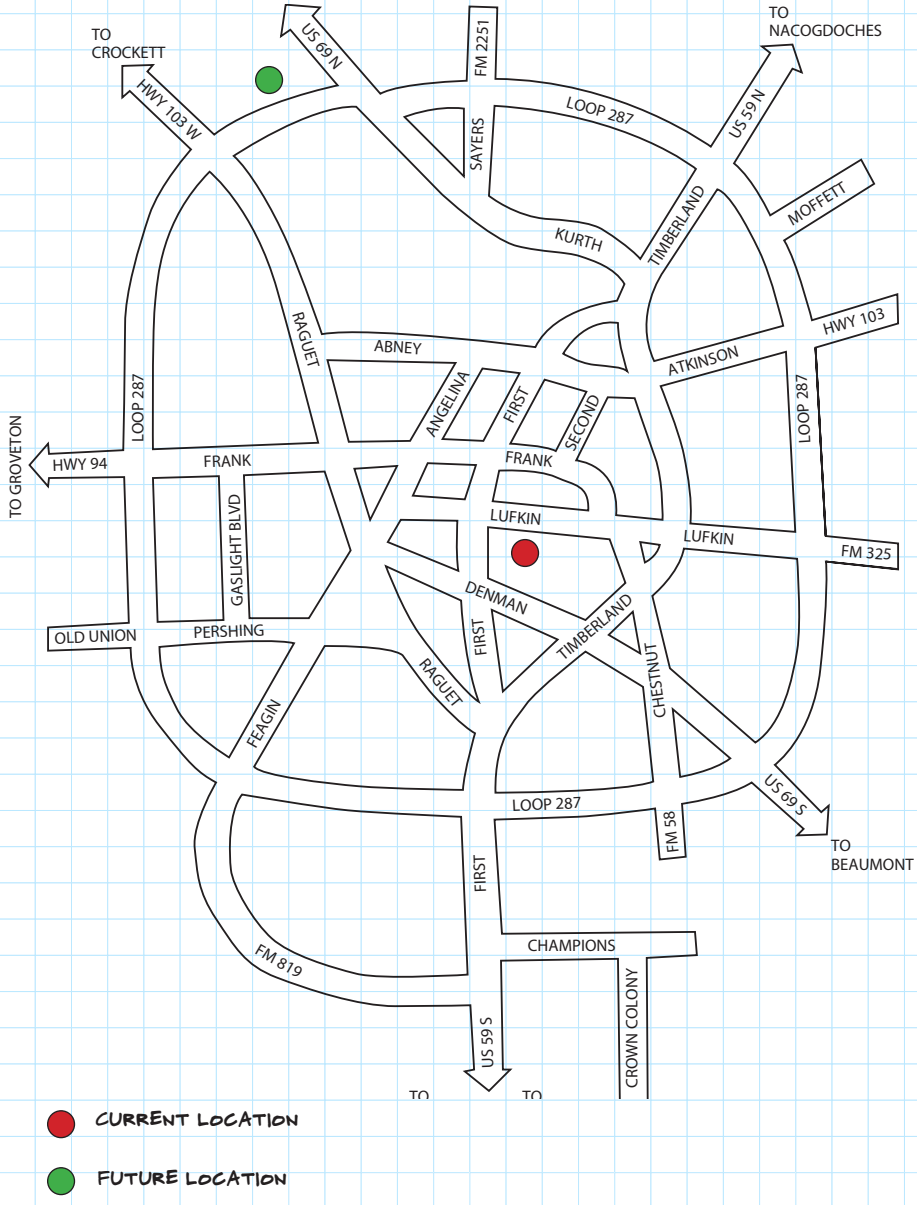
Planning For New Central Office

ANRA is in the process of planning and building a new central office facility and environmental laboratory.

The new environmental laboratory will be approximately 2,300 ft², and will allow for ANRA to expand laboratory services. The enhanced space and infrastructure will allow the laboratory to bring additional Clean Rivers Program testing in-house, such as chlorophyll-a and Total Kjeldahl Nitrogen (TKN) analyses. A dedicated room for calibrating Clean Rivers Program field instrumentation is also included in the floor plan.

ANRA's new central office will include an expanded meeting room/class room with multimedia access. This meeting room will provide a location for holding Basin Steering Committee meetings, educational programs, and other public outreach activities.

ANRA anticipates moving into the new central office facility and environmental laboratory in February 2019.



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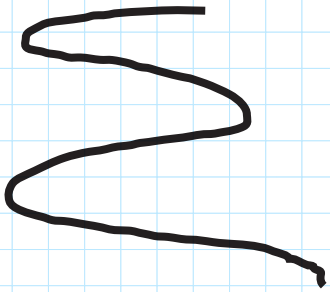

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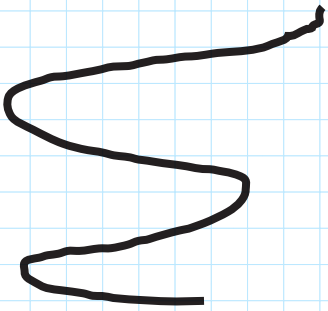

ANRA's Water Quality Monitoring Activities

Water Quality Monitoring Activities

As part of the Clean Rivers Program, ANRA performs routine water quality monitoring at 40 monitoring stations per quarter. Routine water quality monitoring includes analysis of field parameters, conventional parameters, and bacteria. ANRA has an additional station at which only bacteria and field parameters are collected.

ANRA performs monitoring on 4 classified segments*:

SEE MAP PAGES 22 – 23

- Neches River below Lake Palestine (segment 0604)
- Sam Rayburn Reservoir (segment 0610)
- Angelina River above Sam Rayburn Reservoir (segment 0611)
- Attoyac Bayou (segment 0612)

ANRA also monitors water quality on 17 unclassified water bodies*, including:

- Cedar Creek
- Hurricane Creek
- Jack Creek
- Piney Creek
- Biloxi Creek
- Buck Creek
- Lake Ratcliff
- Ayish Bayou
- Bayou Carrizo
- La Nana Bayou
- Mud Creek
- Lake Nacogdoches
- Lake Striker
- Bowles Creek
- Johnson Creek
- West Creek
- Lake Naconiche

* Classified segments are protected by site-specific criteria that are described in the Texas Surface Water Quality Standards. These include most rivers (and their major tributaries) and major reservoirs. Classified segments are listed and described in Appendix A and C of Chapter 307.10 of the Texas Administrative Code.

Unclassified water bodies are those which do not have site-specific water quality standards assigned to them, such as smaller streams. These water bodies are protected by general standards that apply to all water bodies in the state.

La Nana Creek at East Main (Station 20792)

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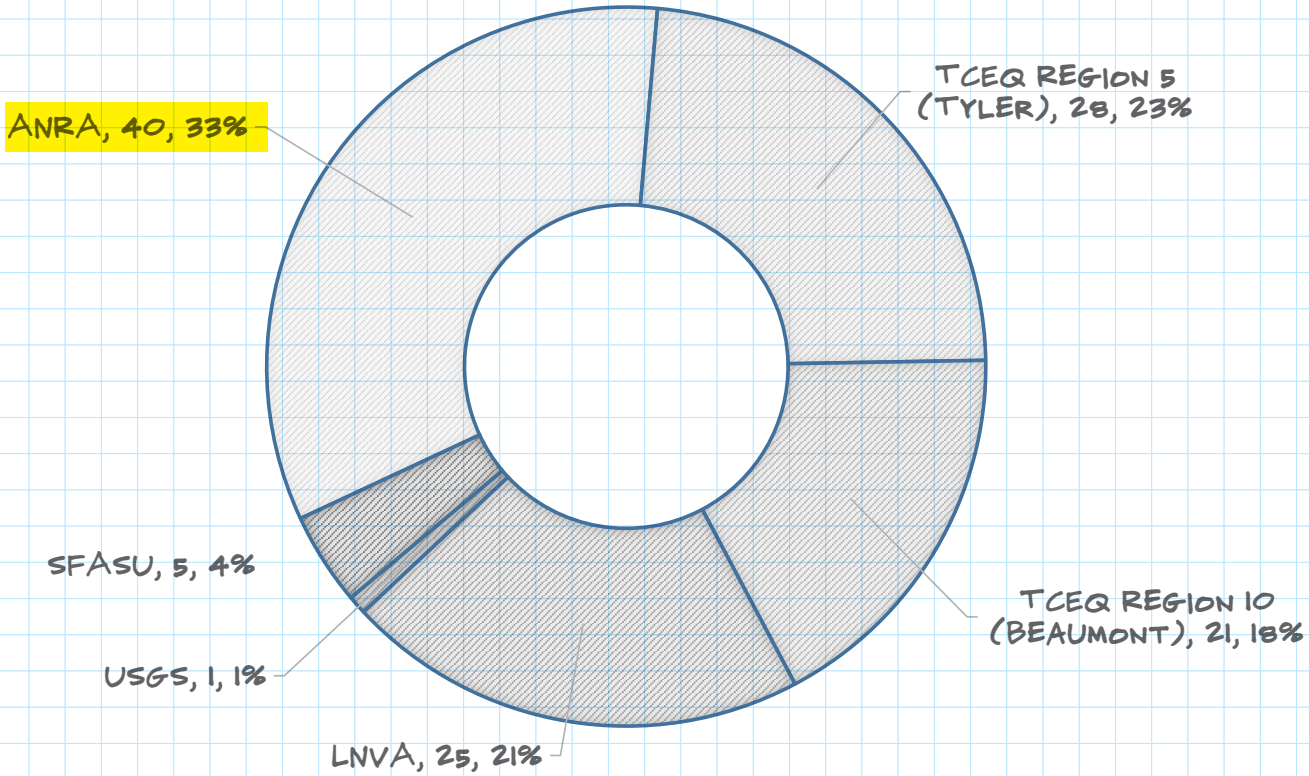
ROUTINE MONITORING STATIONS IN THE NECHES BASIN

SAMPLING ENTITY	FIELD	CONVEN-TIONALS*	BACTERIA	FLOW	NOTES
ANRA	41	40	41	32	1 STATION IS E. COLI AND FIELD PARAMETERS ONLY
TCEQ – R 5 (TYLER)	28	28	33	21	MONTHLY E. COLI MONITORING AT 10 STATIONS
TCEQ – R 10 (BEAUMONT)	20	21	23	8	METALS IN SEDIMENT COLLECTED AT 6 STATIONS
LNVA	25	25	25	20	MONITORING TEMPORARILY HALTED DURING HURRICANE HARVEY RECOVERY
USGS	1	1	0	1	METALS IN WATER COLLECTED AT 1 STATION
SFASU	5	5	5	5	NONPOINT SOURCE GRANT – ATTOYAC BAYOU

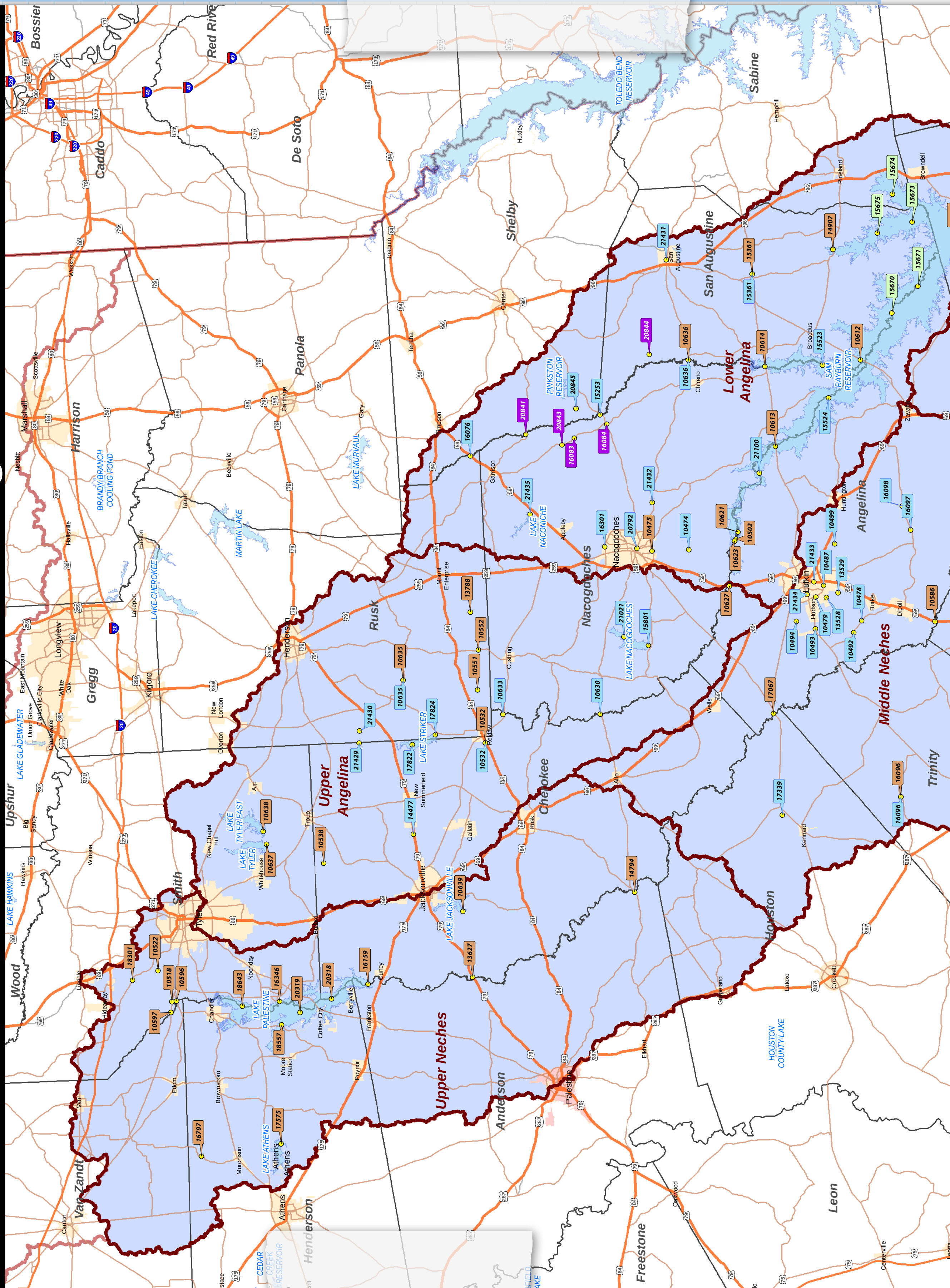
* ANRA'S CONVENTIONAL PARAMETERS INCLUDE AMMONIA-N, NITRATE-N, NITRITE-N, CHLORIDE, SULFATE, TOTAL PHOSPHORUS, TOTAL SUSPENDED SOLIDS, CHLOROPHYLL-A, AND PHEOPHYTIN-A

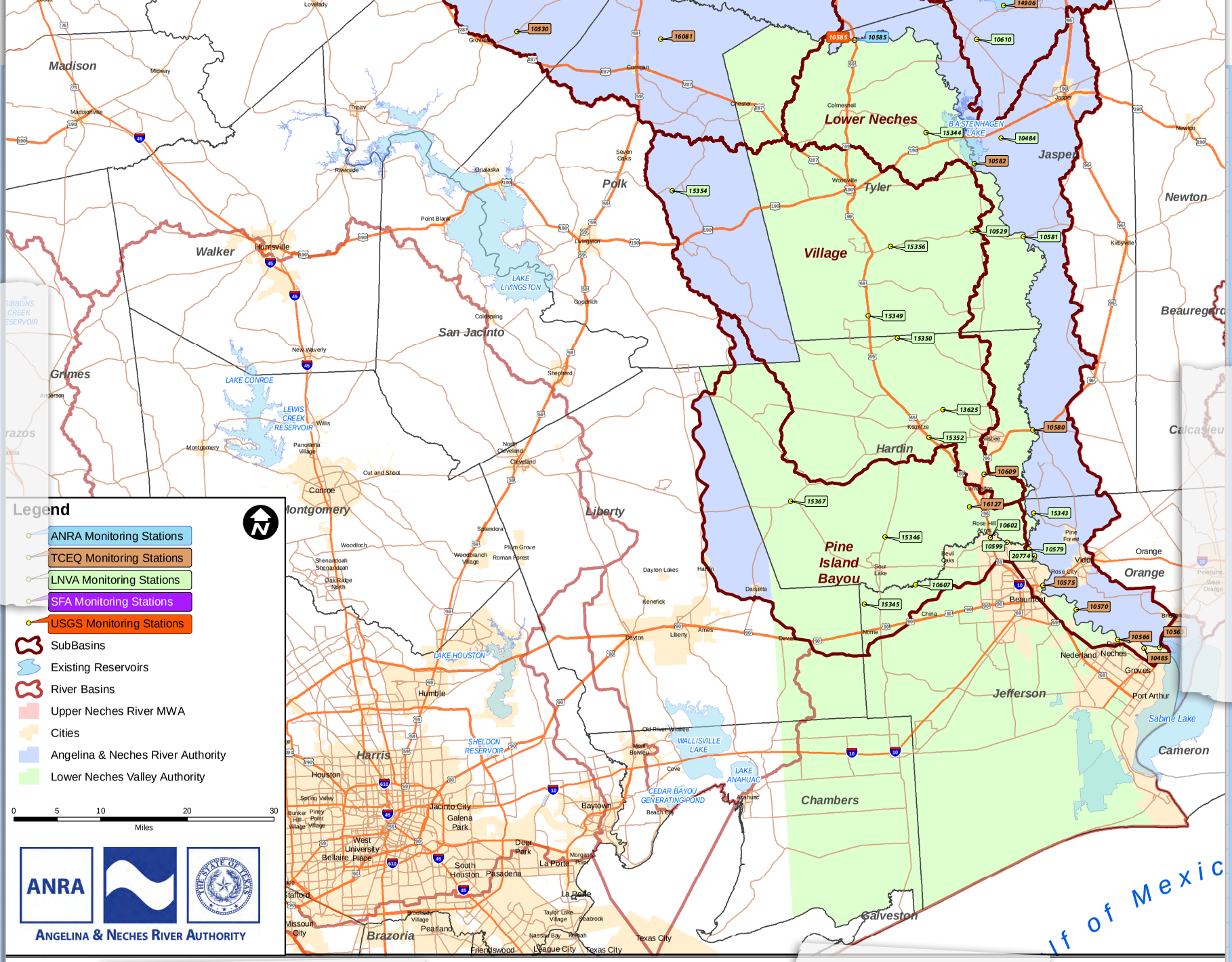
ROUTINE MONITORING STATIONS IN THE NECHES BASIN



TITLE: BASIN HIGHLIGHTS REPORT PROJECT: CLEAN RIVERS PROGRAM DATE: FY 2018

Neches River Basin Monitoring Sites FY 2018





TITLE: BASIN HIGHLIGHTS REPORT
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Water Quality Issues and Concerns

The Texas Integrated Report

The 303(d) List is a listing of impaired water bodies. The state must identify all water bodies where required pollution controls are not sufficient to attain or maintain applicable surface water quality standards.

In Texas, this list is:

- compiled by the TCEQ,
- a part of the Texas Integrated Report for Clean Water Act sections 305(b) and 303(d),
- also known more simply as the Texas Integrated Report,
- submitted to the US Environmental Protection Agency (EPA) every two years in even numbered years.

The Texas Integrated Report describes the condition of all surface water bodies that were evaluated for the assessment period. For the most recent approved assessment (2014), the TCEQ included data collected during a seven-year period (December 1, 2005 – November 30, 2012). The timeframe was extended to ten years, if needed, to attain the minimum number of data points needed for the assessment.

If the measured values for a water body are found to consistently exceed the criteria for its use, then that water body must be listed as impaired.

Impaired = the water body is not supporting its intended use

The most recent version of the Texas Integrated Report, as well as reports from previous years, can be found at the following website:

http://www.tceq.texas.gov/waterquality/assessment/305_303.html

Impairments and Concerns in the Neches River Basin

Bacterial impairments are the most common reason for water bodies in the upper and middle portions of the Neches River Basin to be listed on the 303(d) List.

Three classified segments have a bacterial impairment listed in the 2014 Integrated Report:

- Neches River above Lake Palestine,
- Angelina River above Sam Rayburn Reservoir, and
- Attoyac Bayou.

Thirteen unclassified segments have impairments or concerns for *E. coli* bacteria, with most due to nonpoint sources of pollution. Numerous segments had concerns for nutrients, particularly Ammonia-Nitrogen and Total Phosphorus.

Depressed dissolved oxygen levels were common in the basin. These impairments and concerns are most likely due to a combination of low flows and elevated nutrient levels.

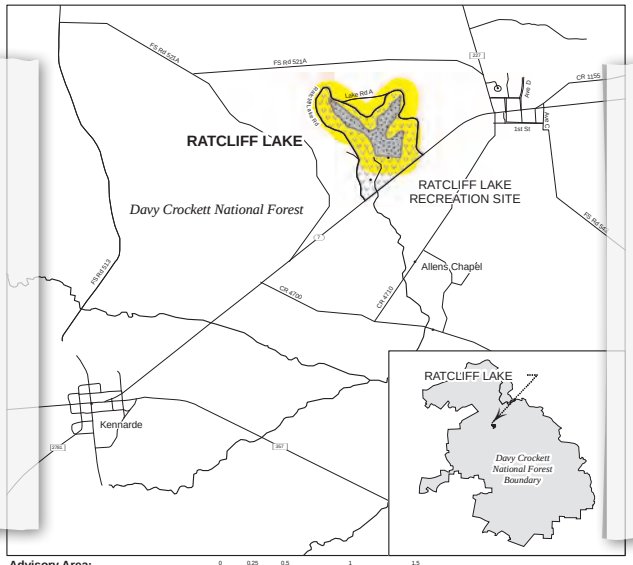
Fish advisories for mercury and dioxins are also present in the basin.

TITLE: BASIN HIGHLIGHTS REPORT PROJECT: CLEAN RIVERS PROGRAM DATE: FY 2018

FISH ADVISORIES IN THE NECHES BASIN

Ratcliff Lake

Houston County
ADV -23 Issued May 10, 2002

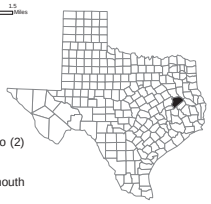


Advisory Area:
Ratcliff Lake

Contaminant of Concern:
Mercury (Hg)

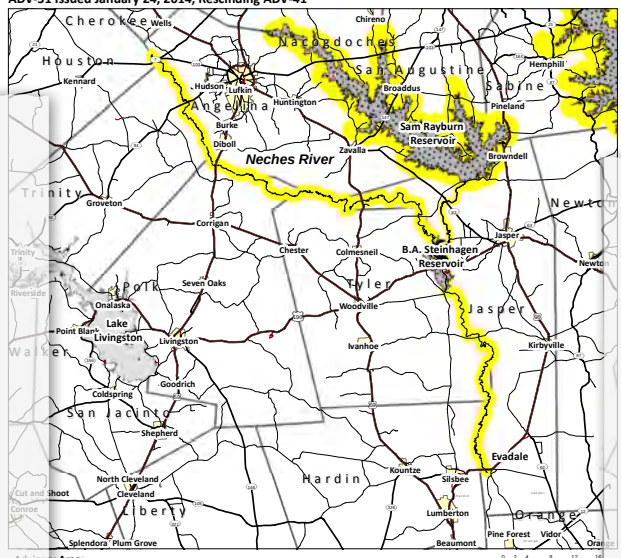
Species Affected:
Largemouth bass

Consumption Advice:
1. Adults should limit consumption of largemouth bass to no more than two (2) eight ounce (8 oz) meals per month
2. Children under twelve (12) years old should limit consumption of largemouth bass to no more than two (2) four ounce (4 oz) meals per month.



Neches River

Angelina, Hardin, Houston, Jasper, Polk, Trinity, and Tyler Counties
ADV-51 Issued January 24, 2014, Rescinding ADV-41

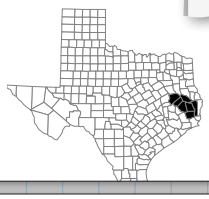


Advisory Area:
The Neches River and all contiguous waters from the State Highway 7 Bridge west of Lufkin downstream to the U.S. Highway 96 Bridge near Evadale

Contaminants of Concern:
Dioxins and Mercury (Hg)

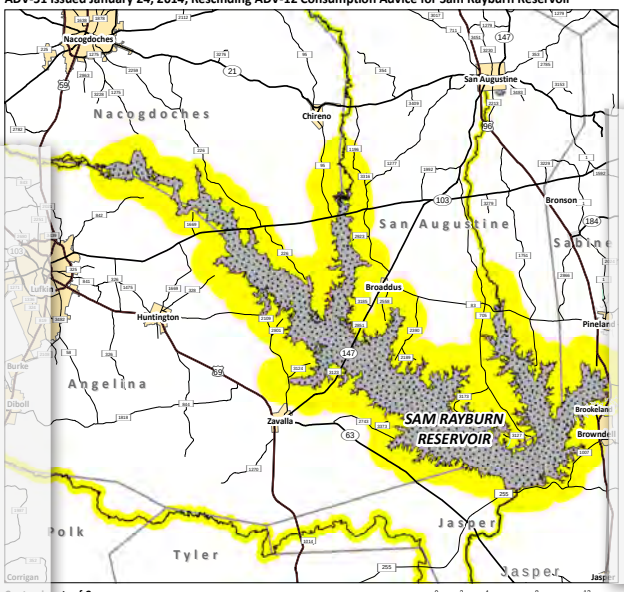
Species Affected	Women of Childbearing Age and Children < 12	Women Past Childbearing Age and Adult Men[1]
Blue catfish > 30 inches	DO NOT EAT	2 meals/month
Flathead catfish	DO NOT EAT	1 meal/month
Gar (all species)	DO NOT EAT	1 meal/month
Largemouth bass > 16 inches	DO NOT EAT	2 meals/month
Smallmouth buffalo	DO NOT EAT	DO NOT EAT
Spotted bass > 16 inches	DO NOT EAT	2 meals/month

[1] A meal is eight ounces of fish.



Sam Rayburn Reservoir

Angelina, Jasper, Nacogdoches, Sabine, and San Augustine Counties
ADV-51 Issued January 24, 2014, Rescinding ADV-12 Consumption Advice for Sam Rayburn Reservoir



Contaminants of Concern:
Dioxins and Mercury (Hg)

Species Affected	Women of Childbearing Age and Children < 12	Women Past Childbearing Age and Adult Men[1]
Blue catfish > 30 inches	DO NOT EAT	2 meals/month
Flathead catfish	DO NOT EAT	1 meal/month
Gar (all species)	DO NOT EAT	1 meal/month
Largemouth bass > 16 inches	DO NOT EAT	2 meals/month
Smallmouth buffalo	DO NOT EAT	DO NOT EAT
Spotted bass > 16 inches	DO NOT EAT	2 meals/month

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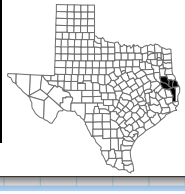
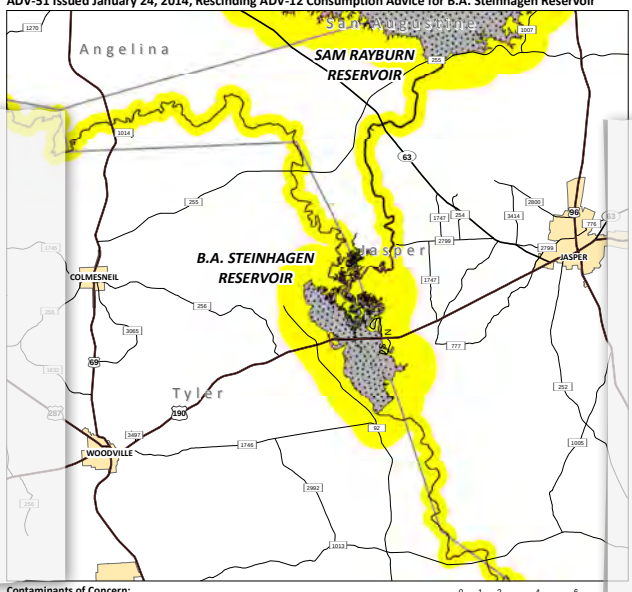


B.A. Steinhagen Reservoir

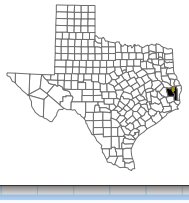
Jasper and Tyler Counties
ADV-51 Issued January 24, 2014, Rescinding ADV-12 Consumption Advice for B.A. Steinhagen Reservoir



Contaminants of Concern:
Dioxins and Mercury (Hg)

Species Affected	Women of Childbearing Age and Children < 12	Women Past Childbearing Age and Adult Men[1]
Blue catfish > 30 inches	DO NOT EAT	2 meals/month
Flathead catfish	DO NOT EAT	1 meal/month
Gar (all species)	DO NOT EAT	1 meal/month
Largemouth bass > 16 inches	DO NOT EAT	2 meals/month
Smallmouth buffalo	DO NOT EAT	DO NOT EAT
Spotted bass > 16 inches	DO NOT EAT	2 meals/month

[1] A meal is eight ounces of fish.



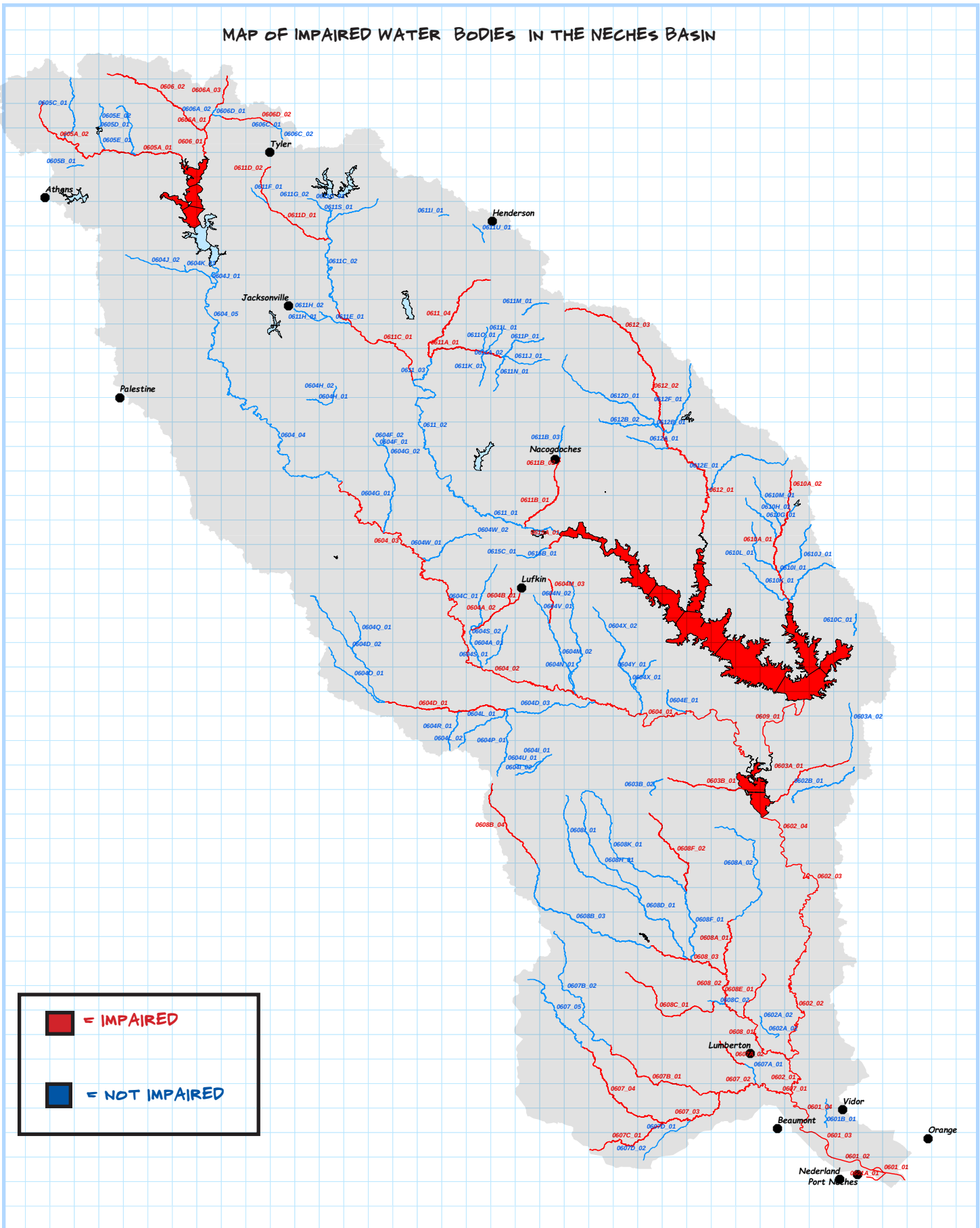
TITLE: Basin Highlights Report PROJECT: Clean Rivers Program DATE: FY 2018

Impairments and Concerns in the Upper Neches Basin

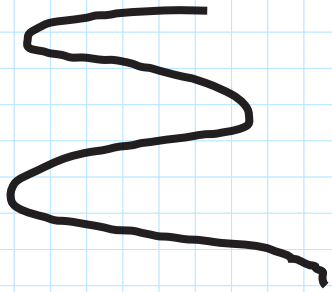
Segment ID	Segment Name	Impairment(s)	Concern(s)
0604	Neches River Below Lake Palestine	Mercury in Edible Tissue Dioxin in Edible Tissue	Chlorophyll-a
0604A	Cedar Creek	E. coli	Ammonia-Nitrogen Nitrate-Nitrogen Total Phosphorus
0604B	Hurricane Creek	E. coli	Ammonia-Nitrogen
0604C	Jack Creek	No Impairments	Depressed Dissolved Oxygen Ammonia-Nitrogen Total Phosphorus
0604D	Piney Creek	Depressed Dissolved Oxygen	Depressed Dissolved Oxygen Ammonia-Nitrogen Chlorophyll-a
0604M	Biloxi Creek	E. coli Depressed Dissolved Oxygen	Depressed Dissolved Oxygen Ammonia-Nitrogen Total Phosphorus
0604N	Buck Creek	No Impairments	No Concerns
0604T	Lake Ratcliff	Mercury in Edible Tissue	No Concerns
0605	Lake Palestine	pH	Depressed Dissolved Oxygen Chlorophyll-a pH (High)
0605A	Kickapoo Creek	E. coli Depressed Dissolved Oxygen	Depressed Dissolved Oxygen Ammonia-Nitrogen
0606	Neches River Above Lake Palestine	E. coli Depressed Dissolved Oxygen pH (Low)	E. coli Depressed Dissolved Oxygen Nitrate-Nitrogen Total Phosphorus Zinc in Water
0606A	Prairie Creek	E. coli	No Concerns
0606D	Black Fork Creek	E. coli	Ammonia-Nitrogen
0609	Angelina River Below Sam Rayburn Reservoir	Mercury in Edible Tissue Dioxin in Edible Tissue	No Concerns
0610	Sam Rayburn Reservoir	Mercury in Edible Tissue Dioxin in Edible Tissue	Depressed Dissolved Oxygen Ammonia-Nitrogen pH Iron in Sediment Manganese in Sediment Mercury in Edible Tissue
0610A	Ayish Bayou	E. coli	No Concerns
0611	Angelina River Above Sam Rayburn Reservoir	E. coli	No Concerns
0611A	East Fork Angelina River	E. coli	E. coli
0611B	La Nana Bayou	E. coli	E. coli Ammonia-Nitrogen Nitrate-Nitrogen Total Phosphorus
0611C	Mud Creek	E. coli	E. coli Depressed Dissolved Oxygen
0611D	West Mud Creek	E. coli	Ammonia-Nitrogen Nitrate-Nitrogen
0611Q	Lake Nacogdoches	No Impairments	Ammonia-Nitrogen
0611R	Lake Striker	No Impairments	Ammonia-Nitrogen
0612	Attoyac Bayou	E. coli	Depressed Dissolved Oxygen Ammonia-Nitrogen
0615	Angelina River/Sam Rayburn Reservoir	Depressed Dissolved Oxygen Impaired Fish Community Mercury in Edible Tissue Dioxin in Edible Tissue	Nitrate-Nitrogen Total Phosphorus
0615A	Paper Mill Creek	E. coli	No Concerns

TITLE: BASIN HIGHLIGHTS REPORT PROJECT: CLEAN RIVERS PROGRAM DATE: FY 2018

MAP OF IMPAIRED WATER BODIES IN THE NECHES BASIN



TITLE: BASIN HIGHLIGHTS REPORT PROJECT: CLEAN RIVERS PROGRAM DATE: FY 2018



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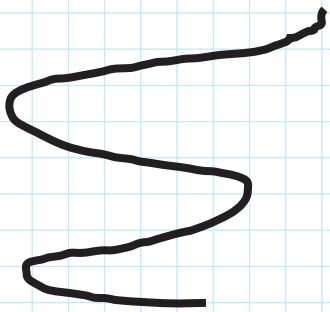

ANRA's Water Quality Monitoring Parameters

TITLE: Basin Highlights Report PROJECT: Clean Rivers Program DATE: FY 2018

Water Quality Monitoring Parameters

As part of ANRA's routine quarterly monitoring, ANRA collects and analyzes for field parameters, conventional parameters, and bacteriological parameters. The parameters listed below are the ones for which ANRA collects and performs analyses. Other agencies may monitor for different parameters depending on their data needs or objectives.

Field Parameters

Field measurements are collected on-site by direct monitoring in the water body using field instrumentation and multiprobe sondes. The list of field parameters includes:

- Dissolved Oxygen
- Days since last significant rainfall
- Flow Severity
- Instantaneous Stream Flow
- pH
- Present Weather
- Secchi Transparency
- Specific Conductance
- Total Water Depth
- Water Temperature

Conventional Parameters

During routine monitoring events, water samples are collected for laboratory analysis of conventional parameters. Conventional parameters include nutrients, minerals, and particulates.

For the conventional parameters, all analyses, with the exception of chlorophyll-a, are conducted in-house by ANRA's Environmental Laboratory. The list of conventional parameters includes:

- Ammonia-N
- Chloride
- Chlorophyll-a
- Nitrate-N
- Nitrite-N
- Pheophytin-a
- Sulfate
- Total Phosphorus
- Total Suspended Solids (TSS)

Bacteriological Parameters

During routine monitoring events, water samples are collected for laboratory analysis of bacteriological parameters to determine if the water is contaminated with fecal material.

For freshwater systems, Escherichia coli (E. coli) is the organism used to assess the level of fecal contamination.

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FIELD PARAMETERS

WATER TEMPERATURE

WHY IS IT MONITORED?

WATER TEMPERATURE AFFECTS THE OXYGEN CONTENT OF THE WATER (DISSOLVED OXYGEN). TEMPERATURE ALSO HAS AN IMPACT ON COLD-BLOODED ANIMALS.

WHAT COULD CAUSE UNUSUAL LEVELS?

WATER TEMPERATURE MAY BE AFFECTED BY ALTERATIONS TO THE RIPARIAN ZONE, CHANGES IN AMBIENT TEMPERATURE, AND DISCHARGES.

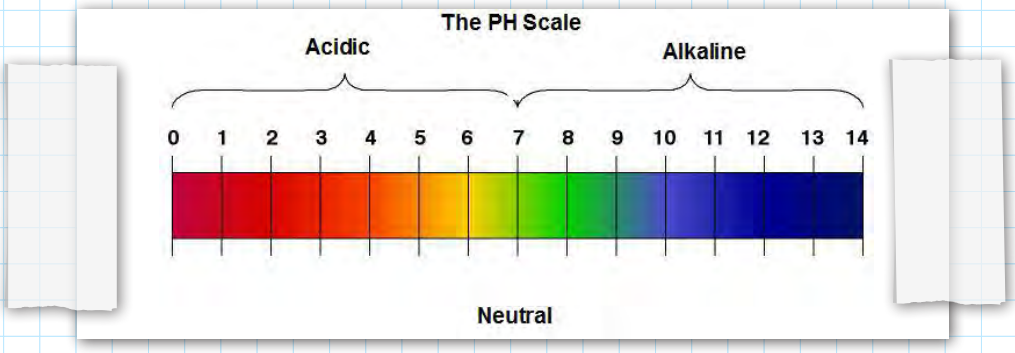
pH

WHY IS IT MONITORED?

PH IS A MEASURE OF WHETHER WATER IS ACIDIC OR BASIC. MOST AQUATIC ORGANISMS ARE ADAPTED TO LIVE WITHIN A SPECIFIC PH RANGE. PH CAN ALSO AFFECT THE TOXICITY OF MANY SUBSTANCES, WHICH GENERALLY INCREASE IN SOLUBILITY AS PH DECREASES. THE ABILITY OF WATER TO RESIST CHANGES IN PH (ITS BUFFERING CAPACITY) IS ESSENTIAL TO AQUATIC LIFE.

WHAT COULD CAUSE UNUSUAL LEVELS?

PH CAN BE AFFECTED BY INDUSTRIAL AND WASTEWATER DISCHARGES, RUNOFF, AND ACCIDENTAL SPILLS. NATURAL VARIATION IN SEASONS MAY ALSO AFFECT PH.



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Dissolved Oxygen (D.O.)

Why is it monitored?

D.O. is a measure of the amount of dissolved oxygen that is available in the water. D.O. is vital for aquatic organisms to live. Where D.O. is too low, aquatic organisms may have insufficient oxygen to live.

What could cause unusual levels?

D.O. is temperature-dependent, with water being able to hold more dissolved oxygen at lower temperatures due to the solubility of gases increasing as the temperature decreases. As a result, D.O. measurements are typically highest during the winter when water temperature is lowest, and lowest during the summer when water temperatures are highest.

Although D.O. concentration decreases as water temperature increases, dissolved oxygen concentrations are actually higher during the day than at night. During the day, aquatic plants release oxygen into the water due to photosynthetic activity. This activity ceases during the night, while oxygen continues to be consumed through respiration by aquatic animals and plants.

The amount of oxygen present usually decreases with depth, rising temperatures, and with the oxidation of organic matter and pollutants. Bacteria and algal blooms may cause D.O. to decrease as decomposition of organic matter consumes oxygen in the water, resulting in hypoxic (low oxygen) areas.

Calibration of the multiprobe sonde

Natural Influences	Human Influences
– Temperature – Season – Time of day – Salinity – Suspended sediments – Water turbulence	– Nutrient pollution – Thermal pollution – Sedimet pollution

Specific Conductance

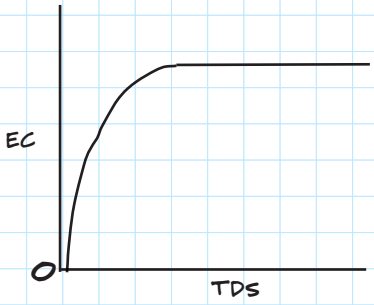
Why is it monitored?

Specific conductance is the measure of the water's capacity to carry an electrical current and is indicative of the amounts of dissolved solids present in a water body.

What could cause unusual levels?

Dissolved salt-forming substances such as sulfate, chloride, and sodium increase the conductivity of the water.

Relationship of Electrical Conductance (EC) to Total Dissolved Solids (TDS)



$$TDS\ (\text{in mg/L}) = KE \times EC$$

KE: correlation factor

EC: electrical conductance

Secchi-Disk Transparency

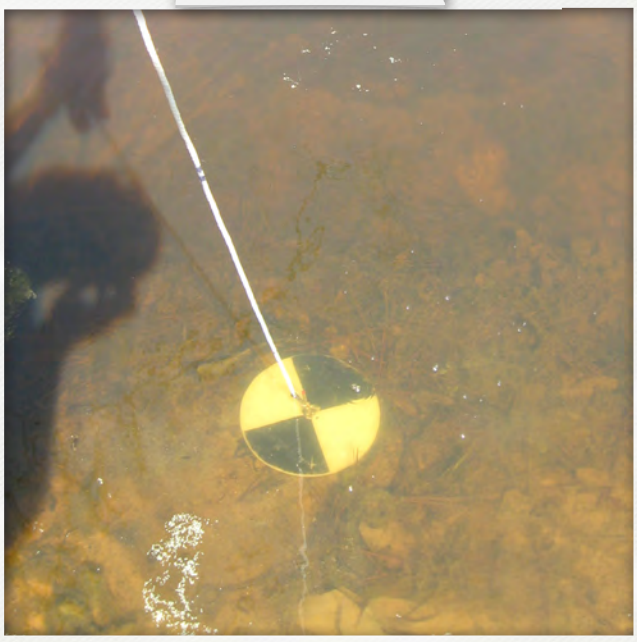
Why is it monitored?

Secchi-disk transparency is important for assessing eutrophication, which is when a lake or body of water contains excessive nutrients (such as phosphates) that stimulate aquatic plant growth, resulting in depletion of dissolved oxygen.

Secchi-disk transparency is also used for determining trends in water clarity.

What could cause unusual levels?

Turbidity will have a direct effect on the Secchi-disk transparency. Wind and waves may make taking measurements difficult.



Secchi-disk transparency
Lake Ratcliff

Flow

Why is it monitored?

Flow is a measurement of the velocity of the water, measured in cubic feet per second (cfs). Aquatic species are adapted to specific flow patterns. If the usual seasonal patterns are disrupted in a water body it can be detrimental to those species. In addition to its use as a standalone parameter, flow is also used as a qualifier for other parameters. An elevated E. coli during a high flow event can indicate a very different source than it would during a low flow event.

What could cause unusual levels?

Flow can be affected by both natural sources such as heavy rainfall, beaver dams, fallen trees, and man-made sources such as wastewater discharges, broken water lines, debris, or even runoff from washing cars and watering lawns.

Flow measurement at Cedar Creek at FM 2497

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CONVENTIONAL PARAMETERS

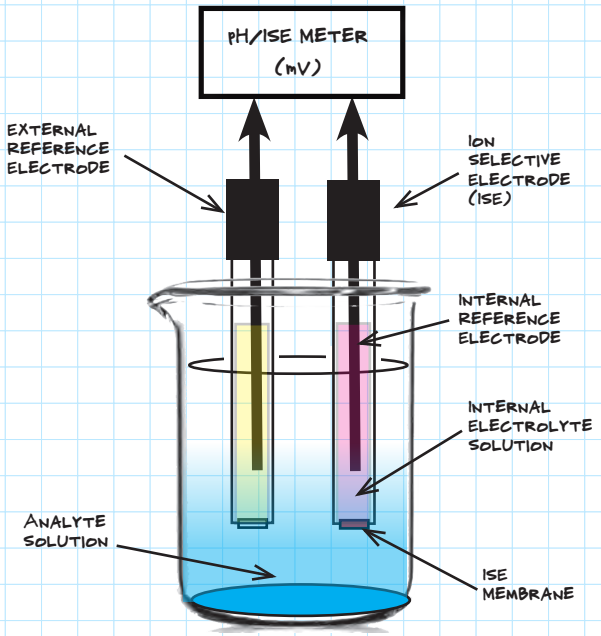
AMMONIA-N (NH_3-N)

WHY IS IT MONITORED?

AMMONIA, WHICH IS PRODUCED FROM THE BREAKDOWN OF NITROGEN-CONTAINING COMPOUNDS, IS FOUND NATURALLY IN WATERS. IN EXCESS, ALGAL BLOOMS MAY OCCUR. ELEVATED AMMONIA LEVELS ARE INDICATIVE OF ORGANIC POLLUTION. THESE ELEVATED LEVELS CAN CAUSE STRESS ON AQUATIC ORGANISMS, AS WELL AS DAMAGE TO TISSUE AND GILLS.

WHAT COULD CAUSE UNUSUAL LEVELS?

AMMONIA ENTERS INTO A BODY OF WATER VIA EXCRETION OF NITROGENOUS WASTES, DECOMPOSITION OF PLANTS AND ANIMALS, AND RUNOFF. AMMONIA IS AN INGREDIENT IN MANY FERTILIZERS. IT IS ALSO PRESENT IN SEWAGE, WASTEWATER DISCHARGES, AND STORMWATER RUNOFF.



DETERMINATION BY ION SELECTIVE ELECTRODE

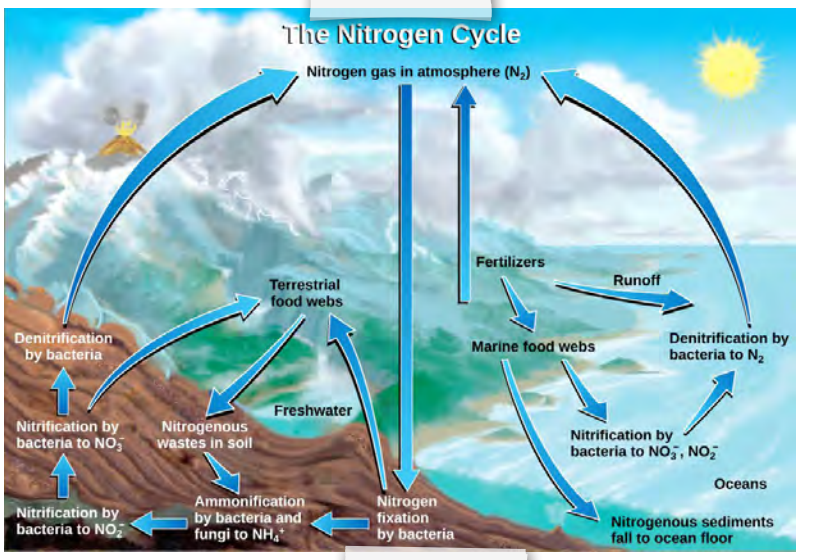
NITRATE-N (NO_3-N) & NITRITE-N (NO_2-N)

WHY IS IT MONITORED?

ELEVATED LEVELS OF NITRITE AND NITRATE CAN PRODUCE NITRITE TOXICITY IN FISH ("BROWN BLOOD DISEASE") AND METHEMOGLOBINEMIA ("BLUE BABY SYNDROME") IN INFANTS BY REDUCING THE OXYGEN-CARRYING CAPACITY OF BLOOD. IN SURFACE WATER, HIGH LEVELS OF NITRATES CAN LEAD TO EXCESSIVE GROWTH OF AQUATIC PLANTS. HIGH LEVELS OF NITRATES ARE ALSO INDICATIVE OF HUMAN-CAUSED POLLUTION.

WHAT COULD CAUSE UNUSUAL LEVELS?

AS PART OF THE NITROGEN CYCLE, NITROGENOUS COMPOUNDS ARE CONVERTED FROM AMMONIA TO NITRITE AND THEN TO NITRATE BY BACTERIAL AND CHEMICAL PROCESSES. POTENTIAL SOURCES INCLUDE EFFLUENT DISCHARGES FROM WASTEWATER TREATMENT PLANTS, FERTILIZERS, AND AGRICULTURAL RUNOFF.



NITROGEN CYCLE (SOURCE: USGS)

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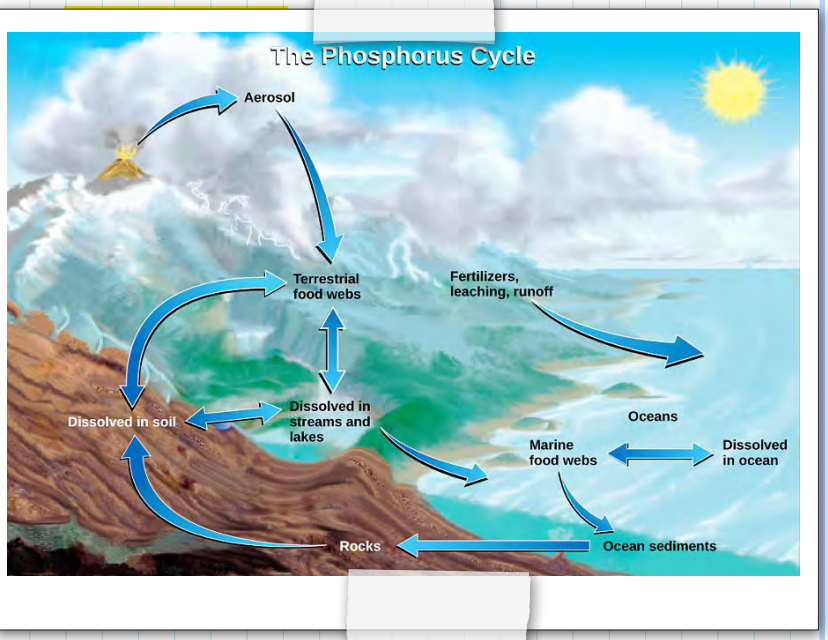
Total Phosphorus (TP)

Why is it monitored?

Phosphorus is essential to the growth of organisms, and is considered a **growth-limiting nutrient.** In the absence of phosphorus, plant growth in a water body is limited. However, elevated levels in water may stimulate the growth of photosynthetic aquatic plants and algae. Elevated phosphorus levels contribute to **eutrophication** and may cause algal blooms.

What could cause unusual levels?

Phosphorus is commonly known as a **man-made pollutant.** It is present in industrial and domestic wastewater discharges, as well as agricultural and storm water runoff. It is an ingredient in soaps and detergents, and is used extensively in the treatment of industrial waters (such as boiling towers). Phosphates are sometimes also added by some drinking water supplies during treatment in order to prevent corrosion.



Phosphorus cycle (source: USGS)

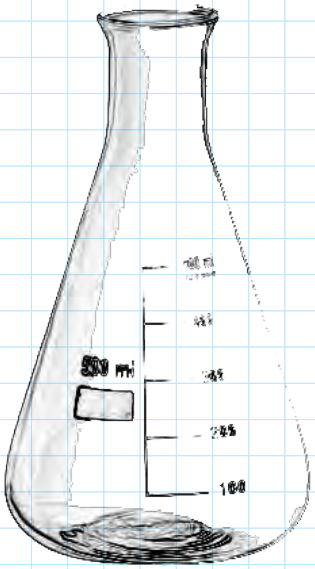
Chloride (Cl^-)

Why is it monitored?

Chloride is one of the major inorganic ions in water and wastewater. It is an **essential element** for maintaining normal **physiological functions** in all organisms. Elevated chloride concentrations can adversely affect survival, growth, and/or reproduction of aquatic organisms.

What could cause unusual levels?

An elevated chloride concentration can be indicative of **natural or man-made pollution.** Natural sources of chloride include the **weathering and leaching** of sedimentary rocks, soils, and salt deposits. Other possible sources include **oil exploration and storage, sewage and industrial discharges,** and **landfill runoff.**



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Sulfate (SO_4^{3-})

Why is it monitored?

Sulfate is essential for plant growth, and low levels (under 0.5 mg/L) can be detrimental to algal growth. Excessive levels of sulfate can form strong acids and change the pH of the water. Excessively high levels may be toxic to cattle and other animals. Sulfate can also affect drinking water.

What could cause unusual levels?

Sulfate occurs in almost all natural waters due to an abundance of elemental and organic sulfur in the environment. It usually enters into water bodies by water passing over rock or soil containing minerals like gypsum, as well as runoff from agricultural lands, industrial discharges, and wastewater treatment plant discharges. Sulfate can also enter water bodies from atmospheric deposition from such sources as burning fossil fuels and volcanos.

Total Dissolved Solids (TDS) & Total Suspended Solids (TSS)

Why is it monitored?

TDS, reported in mg/L, is a measure of the total dissolved particles in water. Typically, it is comprised of chlorides, sulfates, and other salt-forming anions. TDS is an important measure of drinking water quality. These are particles that you cannot see that affect water quality.

TSS, also reported in mg/L, is a measure of the total suspended particles in water. These are particles that you can see that affect water quality. High levels of TSS increase the turbidity of the water, reducing light penetration which subsequently decreases oxygen production by plants.

What could cause unusual levels?

TDS can occur naturally from dissolution of carbonate and salt deposits in rocks and soils. Other sources include agricultural and storm water runoff, effluent discharges from industrial and domestic wastewater treatment plants, and oil exploration.

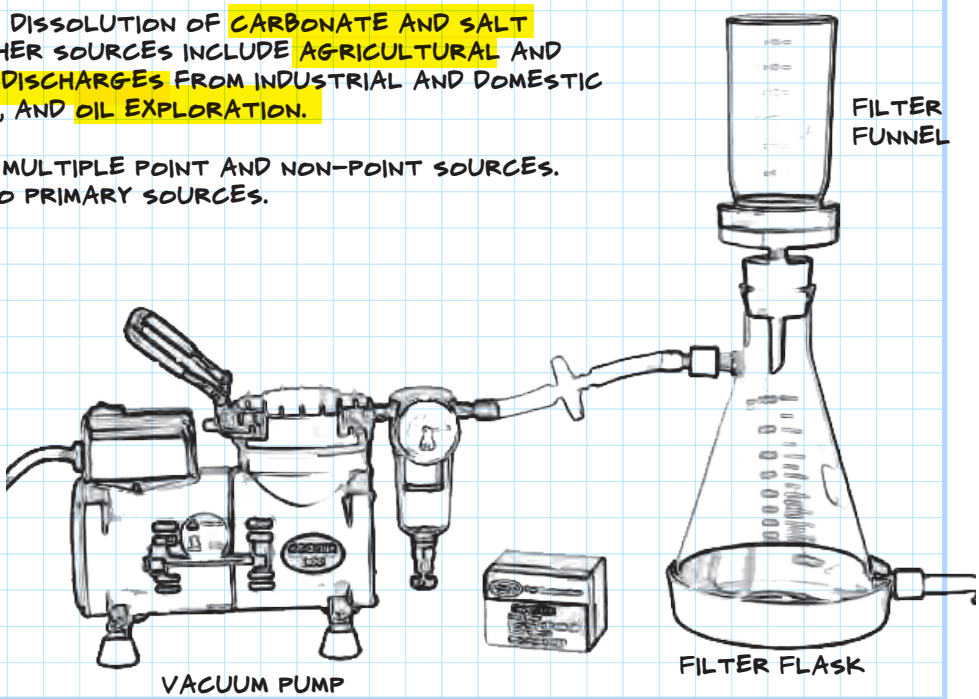
Elevated TSS can result from multiple point and non-point sources. Soil erosion and runoff are two primary sources.

Filtration Apparatus for TDS and TSS.

A sample is filtered through a glass fiber filter.

Suspended solids remain on the filter, which is dried and weighed to determine TSS.

Dissolved solids pass through the filter. A portion of the filtrate is dried to determine TDS.



TITLE: BASIN HIGHLIGHTS REPORT PROJECT: CLEAN RIVERS PROGRAM DATE: FY 2018

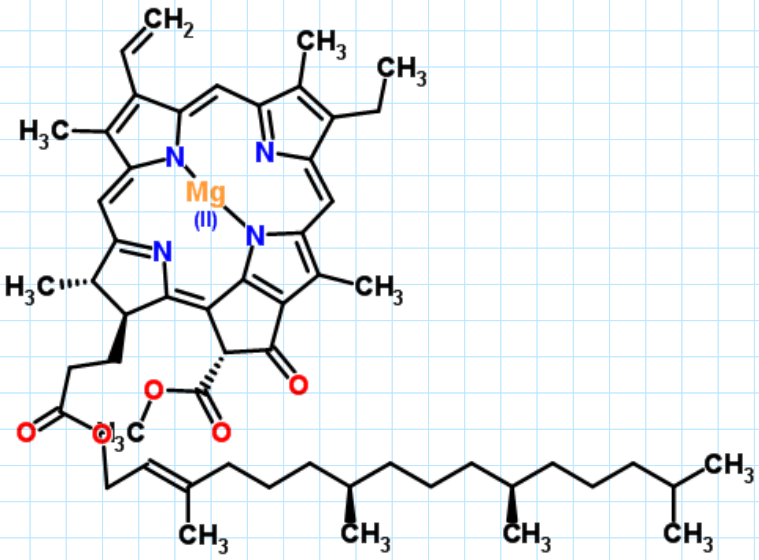
CHLOROPHYLL-A (CHL-A)

WHY IS IT MONITORED?

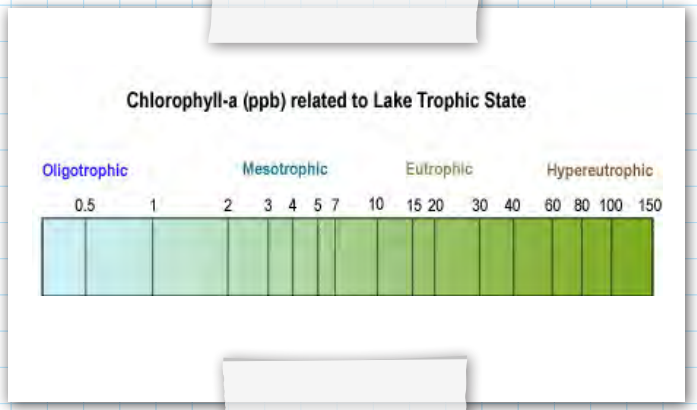
CHLOROPHYLL-A IS AN INDICATOR OF ALGAL BIOMASS IN A WATER BODY. INCREASED CONCENTRATIONS INDICATE POTENTIAL EUTROPHICATION OR NUTRIENT LOADING. DIURNAL SHIFTS IN DO AND PH RESULTING FROM INCREASED PHOTOSYNTHESIS AND RESPIRATION CAN CAUSE STRESS TO AQUATIC ORGANISMS.

WHAT COULD CAUSE UNUSUAL LEVELS?

CHLOROPHYLL-A IS A PHOTOSYNTHETIC PIGMENT THAT PLAYS A VITAL ROLE IN PHOTOSYNTHESIS. IT IS FOUND IN MOST PLANTS, CYANOBACTERIA, AND ALGAE. WHEN CHLOROPHYLL-A LEVELS ARE CONSISTENTLY HIGH OR VARIABLE, THIS MAY BE INDICATIVE OF ALGAL BLOOMS.



CHEMICAL STRUCTURE FOR CHLOROPHYLL-A ($C_{55}H_{72}MgN_4O_5$)



ALGAE BLOOM ON CREEK NEAR BALD HILL 8/19/2016

TITLE: BASIN HIGHLIGHTS REPORT PROJECT: CLEAN RIVERS PROGRAM DATE: FY 2018

BACTERIOLOGICAL PARAMETERS

ESCHERICHIA COLI (E. COLI)

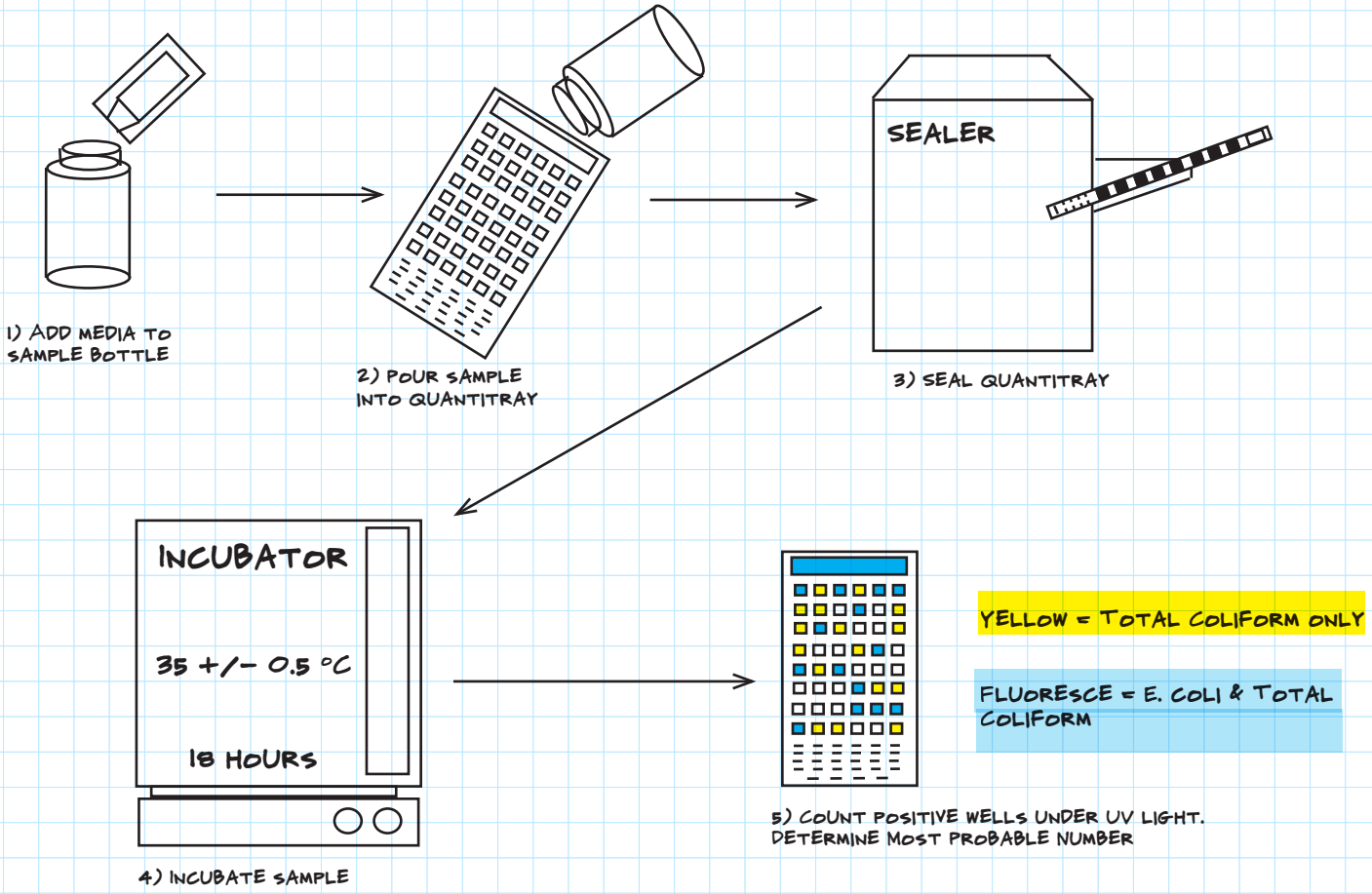
WHY IS IT MONITORED?

E. COLI IS AN INDICATOR OF FECAL CONTAMINATION. FECAL CONTAMINATION IS A HEALTH CONCERN TO THE GENERAL PUBLIC, AND ITS PRESENCE INDICATES A RISK FOR CONTACT RECREATION. THE PRESENCE OF E. COLI IN THE WATER INDICATES THAT PATHOGENIC ORGANISMS MAY BE PRESENT.

WHAT COULD CAUSE UNUSUAL LEVELS?

E. COLI IS ABUNDANT IN THE GASTROINTESTINAL TRACT OF WARM-BLOODED ANIMALS. ELEVATED BACTERIAL LEVELS ARE INDICATIVE OF A POTENTIAL POLLUTION PROBLEM. REASONS FOR THE PRESENCE OF FECAL COLIFORMS SUCH AS E. COLI INCLUDE FAILING SEPTIC SYSTEMS, ANIMAL WASTES, AND INADEQUATELY TREATED SEWAGE.

ENUMERATION OF E. COLI USING IDEXX COLILERT-18 MEDIA



1) ADD MEDIA TO SAMPLE BOTTLE

2) POUR SAMPLE INTO QUANTITRAY

3) SEAL QUANTITRAY

4) INCUBATE SAMPLE

5) COUNT POSITIVE WELLS UNDER UV LIGHT. DETERMINE MOST PROBABLE NUMBER

ANRA Environmental Laboratory

Location

ANRA's Environmental Laboratory comprises the first floor of ANRA's central office, located at 210 E. Lufkin Avenue in downtown Lufkin.

In February 2019, the ANRA central office will be relocating to 2901 N. John Redditt Drive in Lufkin. As part of this new facility, a state-of-the-art 2,300-ft² laboratory is being built.

Mission

It is the mission of the ANRA Environmental Laboratory to produce scientifically valid and defensible data for its clients in a timely and efficient manner. The laboratory operates under a NELAP-approved quality system to maintain the highest level of data integrity.

Accreditation

ANRA's Environmental Laboratory is accredited by the National Environmental Laboratory Accreditation Program (NELAP) in the state of Texas through the Texas Commission on Environmental Quality. The laboratory is NELAP-accredited for the chemical and microbiological analysis of surface water, wastewater, and drinking water.

Experience

Combined, the laboratory staff has nearly 50 years of experience with the analysis of environmental samples. ANRA's Environmental Laboratory staff is available to consult on sampling procedures, analytical methodology, quality control procedures, regulatory requirements, well disinfection, and other needs of our clients.

Texas Commission on Environmental Quality

NELAP-Recognized Laboratory Accreditation is hereby awarded to

Angelina and Neches River Authority Environmental Laboratory
210 Lufkin Avenue
Lufkin, TX 75901-0310

in accordance with Texas Water Code Chapter 5, Subchapter R, Title 30 Texas Administrative Code Chapter 25, and the National Environmental Laboratory Accreditation Program.

The laboratory's scope of accreditation includes the fields of accreditation that accompany this certificate. Continued accreditation depends upon successful ongoing participation in the program. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current location(s) and accreditation status for particular methods and analyses (www.tceq.texas.gov/goto/lab). Accreditation does not imply that a product, process, system or person is approved by the Texas Commission on Environmental Quality.

Certificate Number: T104704292-16-13
Effective Date: 11/1/2016
Expiration Date: 10/31/2017

Executive Director Texas Commission on Environmental Quality

Laboratory Services

The Environmental Laboratory operations include the chemical and microbiological analyses of drinking water, wastewater, and surface water. This includes analysis of municipal and industrial wastewater, lake and stream water quality, and public and private drinking water samples.

The laboratory utilizes state-of-the-art instrumentation, including an ion chromatograph and a flow-injection analyzer. This equipment allows for automated analysis, higher throughput, greater reproducibility, improved quality control, and lower detection limits.

ANRA's Environmental Laboratory provides environmental testing services to numerous clients throughout the East Texas area. These clients include municipalities (such as the City of Lufkin), industrial facilities, government agencies, water supply corporations, and private individuals. The Environmental Laboratory also provides analytical services and project support for other ANRA programs and contract utilities, such as the Clean Rivers Program, On-site Sewage Facilities Program, North Angelina County Regional Wastewater Facility, Holmwood Utilities, Angelina County Freshwater Supply District No. 1, and the Neches Compost Facility.

Contact Information

For more information about the services offered by the ANRA Environmental Laboratory, please contact one of the following:

ANRA

ANGELINA & NECHES RIVER AUTHORITY
P.O. Box 387 • 210 E. Lufkin Ave., Lufkin, Texas 75902
(936) 632-7795 • FAX (936) 632-2564

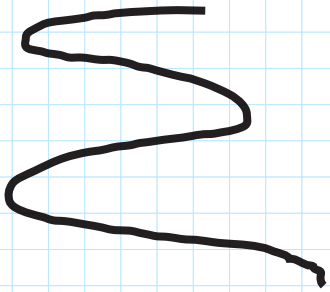
TREY REEVES Phone: (936) 633-7542
Laboratory Manager
Email: treeves@anra.org

ANRA

ANGELINA & NECHES RIVER AUTHORITY
P.O. Box 387 • 210 E. Lufkin Ave., Lufkin, Texas 75902
(936) 632-7795 • FAX (936) 632-2564

HANNAH LUCIA Phone: (936) 633-0063
Quality Assurance Officer
Email: hlucia@anra.org

TITLE: BASIN HIGHLIGHTS REPORT PROJECT: CLEAN RIVERS PROGRAM DATE: FY 2018



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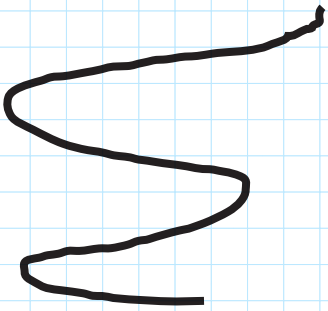

Stakeholder Participation and Public Outreach

Clean Rivers Program Steering Committee Meeting

Through the Clean Rivers Program, ANRA has established a **steering committee** of stakeholders to guide us in our monitoring activities. The steering committee's role is advisory in nature and involves assistance with the **review of local issues** and **creation of priorities** for the Upper Neches River Basin. Committee members assist with the review and development of **work plans, reports, basin monitoring plans, allocation of resources, and basin action plans.** CRP steering committee meetings are held annually, typically in the spring. The committee is made up from a diverse group of stakeholders, including:

- private citizens
- fee-payers (identified in Texas Water Code TWC 26.0135(h))
- political subdivisions (including local, regional, and state officials)
- Texas State Soil and Water Conservation Board
- other appropriate state agencies including: Texas Parks and Wildlife Department, Texas Water Development Board, Texas General Land Office, Texas Department of State Health Services, Texas Department of Agriculture, Texas Railroad Commission, and Texas Department of Transportation.
- other entities interested in water quality matters including: Texas Commission on Environmental Quality regional staff, business and industry, agriculture, environmental and other public interest groups.

One of the objectives of the CRP long-term plan is to **engage and inform stakeholders**. The steering committee process gives stakeholders an opportunity to contribute their ideas and concerns through steering committee meetings, public meetings, and other forums. The process also allows for the communication of issues related to water quality so that **priorities may be set** which consider local, regional, state, and federal needs. The steering committee aids in increasing opportunities for citizens to **identify pressing issues** and concerns, **contribute ideas** to the CRP process, and functions to expand the public's role in **water quality management issues**.

Contact Information

For more information on the Clean Rivers Program, including how to participate in the steering committee process, please contact:

ANRA

ANGELINA & NECHES RIVER AUTHORITY
P.O. Box 387 • 210 E. Lufkin Ave., Lufkin, Texas 75902
(936) 632-7795 • FAX (936) 632-2564

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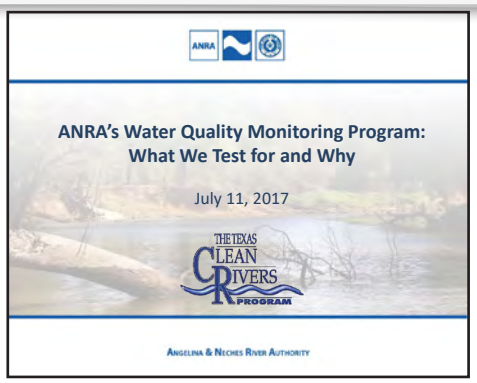
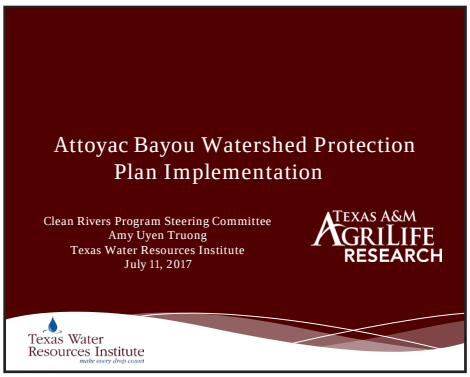
JEREMIAH POLING Phone: (936) 633-7551
Information Systems Coordinator
Email: jpoling@anra.org

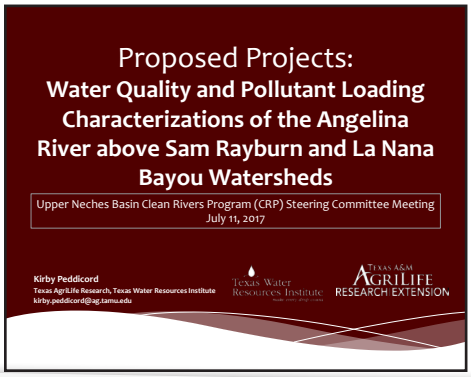
TITLE: Basin Highlights Report PROJECT: Clean Rivers Program DATE: FY 2018

ANRA's Clean Rivers Program Steering Committee last met on July 11, 2017 at the Texas Forestry Association office in Lufkin. The meeting had an excellent turnout, with representatives from: ANRA, Upper Neches Municipal Water Authority, The Sentinels, the Texas Commission on Environmental Quality, Texas Parks and Wildlife Department, the Texas Forestry Association, the Texas Forest Service, Campbell Global, the Texas Water Resources Institute, Stephen F. Austin State University Department of Forestry, Nacogdoches County, the U.S. Army Corps of Engineers, and private citizens.

Presentations at the meeting included a discussion on ANRA's water quality monitoring activities, a photographic tour of the Neches River, the Interagency Flood Risk Management program, the U.S. Army Corps of Engineers' Sam Rayburn Reservoir Master Plan revision, Forestry Best Management Practices, and an update on water quality projects in the Attoyac Bayou, La Nana Creek, and Angelina River watersheds.







THE TEXAS CLEAN RIVERS PROGRAM

ANRA Outreach

ANRA Operations

The Angelina & Neches River Authority promotes public involvement in the Upper Neches Basin through numerous operations and departments. In addition to monitoring water quality through the Clean Rivers Program, ANRA operates and maintains numerous public drinking water and municipal wastewater facilities, maintains the on-site septic system program for Sam Rayburn Reservoir, San Augustine County, and Angelina County, and operates an environmental laboratory offering services to the public. Additionally, ANRA produces and sells biosolids compost through our Neches Compost Facility.

Informational Literature

Numerous pamphlets, brochures, and other educational and informational literature on such topics as water quality, conservation, and on-site septic facilities are available to the public at ANRA's offices. ANRA supports the TPWD invasive species awareness campaign "Hello Giant Salvinia, Goodbye Texas Lakes" by making informational pamphlets available to the public.

ANRA Publications

Every year, ANRA's Clean Rivers Program produces either a Basin Highlights Report or Basin Summary Report (every five years) that discusses water quality in the Neches River Basin. These reports are distributed to our Steering Committee members, interested stakeholders, and other interested parties.

ANRA Website

The Angelina & Neches River Authority provides the public with information concerning water quality issues on our website, which is updated frequently. The ANRA website provides public access to information on the Clean Rivers Program, current and historical Basin Summary and Basin Highlights reports, meeting agendas and minutes, maps, and water quality data.

Please visit us online at http://www.anra.org.

Additional Resources

More information can be found online at the following websites:

- The Texas Clean Rivers Program
  www.texascleanrivers.org

- Coordinated Monitoring Schedule
  cms.lcra.org

- 2014 Texas Integrated Report
  www.tceq.texas.gov/waterquality/assessment/14twqi/14txir

- Texas Surface Water Quality Standards
  www.tceq.texas.gov/waterquality/standards/eq_swqs.html

- Clean Rivers Program Map Tool
  https://www80.tceq.texas.gov/swqmisweb/public/crpmap.html

- Clean Rivers Program Data Tool
  https://www80.tceq.texas.gov/swqmisweb/public/crpweb.faces

- Surface Water Quality Monitoring Procedures
  www.tceq.texas.gov/waterquality/monitoring/swqm_guides.html

- Attoyac Bayou Watershed Protection Plan (WPP) Project
  attoyac.tamu.edu

- Texas Stream Team
  txstreamteam.rivers.txstate.edu

- Texas Invasives
  www.texasinvasives.org

- EPA's Surf Your Watershed
  cfpub.epa.gov/surf/locate/index.cfm

- USGS The National Map – Topographic Information
  nationalmap.gov

- US Drought Monitor
  droughtmonitor.unl.edu/

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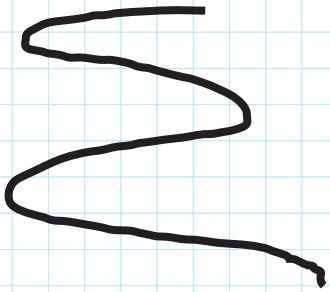

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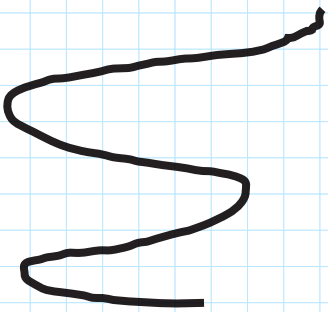

The 2018 Basin Highlights Report was prepared by the Angelina & Neches River Authority in cooperation with the Texas Commission on Environmental Quality under the authorization of the Texas Clean Rivers Act.

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