BASIN HIGHLIGHTS REPORT

2025

For the Upper & Middle Portions of the Neches River Basin

Angelina & Neches River Authority

ANRA

Angelina & Neches River Authority

Cover Photos:
Front: Diamondback Water Snake on the Riverine portion of Sam Rayburn Reservoir/Angelina River, Feb 2025
Back: Yellow-bellied Slider in Sandy Creek at FM-705, May 2025

EXECUTIVE SUMMARY

This document is an annual publication by the Angelina & Neches River Authority (ANRA) in cooperation with the Texas Commission on Environmental Quality (TCEQ) under the authorization of the Texas Clean Rivers Act. It discusses surface water quality in the upper and middle portions of the Neches River Basin.

ANRA is one of the 15 program partners for the Texas Clean Rivers Program (CRP), which involves working directly with the TCEQ to conduct water quality monitoring, assessment, and stakeholder outreach in the 23 major river and coastal basins of Texas.

In the Neches River Basin specifically, CRP surface water quality monitoring is routinely performed by the TCEQ regional offices in Tyler and Beaumont, ANRA, and the Lower Neches Valley Authority (LNVA).

Within the Texas Surface Water Quality Standards, the TCEQ sets and implements standards for surface water quality to improve and maintain the quality of water in the state. Examples of some designated uses are aquatic life, recreation, and drinking water use. Each of these uses has associated criteria. Impaired water bodies are bodies of water that are failing to meet the criteria for their designated uses.

In even-numbered years, the TCEQ compiles the data collected in the preceding seven years and assesses the surface water quality across the entire state. This assessment is called the Texas Integrated Report, and it includes a list of water bodies that are not meeting their assigned standards. These water bodies are considered to be impaired. The most recent Integrated Report was published in 2024, and data compilation is currently underway for the 2026 Integrated Report.

The TCEQ, CRP partners, and federal agencies, such as the Environmental Protection Agency (EPA), work together with local stakeholders to address these impaired water bodies through a variety of programs that can provide education, technical assistance, and sometimes financial assistance to entities or individuals that help solve or mitigate the causes of these impairments.

As part of its responsibility as a CRP Partner, ANRA publishes an annual report of CRP and related water quality activities in the upper half of the Neches River Basin. Most years, a highlights/update report is published, but every sixth year, the report is a comprehensive summary report of water quality throughout the entire upper portion of the basin. ANRA's most recent summary report was published in 2020.

This year's Basin Highlights Report provides an overview of changes since the previous year's report was published, an overview of water quality in the Upper and Middle Neches Basin, as well as items of interest to basin stakeholders.

Like most of the state, the most common water quality issue in the Upper and Middle Neches River Basin is elevated bacteria levels, with 34 out of 72 assessment units having impairments for bacteria in water. Of those 34 impaired assessment units, 20 have special projects active or recently completed to begin addressing the impairments, and the remainder are in the early planning stages.

In 2024 and 2025, special projects to address elevated bacteria levels were underway in the Attoyac, Ayish, Biloxi, Carrizo, Hurricane, Jack, La Nana, Sandy, and West Mud Creek Watersheds. These projects include activities such as data collection, water quality monitoring, modeling, as well as education and outreach efforts.

Outside of special water quality projects, ANRA continues to be active in communitywide efforts to improve awareness and engagement in environmental stewardship with presentations to local schools, training events for volunteer water quality monitoring via the Texas Stream Team, partnering with local Keep Texas Beautiful affiliates to create and distribute litter collection bags, and holding outdoor appreciation events such as the annual Neches River Rendezvous.

ANGELINA & NECHES RIVER AUTHORITY

2025 Basin Highlights Report

for the Upper and Middle Portions of the Neches River Basin

TABLE OF CONTENTS

GLOSSARY

ALU – Aquatic Life Use
ANRA – Angelina & Neches River Authority
AU – Assessment Unit
BMP – Best Management Practice
CFS – Cubic Feet Per Second
CR – County Road
CRP – Clean Rivers Program
CWA – Clean Water Act
DEM – Digital Elevation Model
DO – Dissolved Oxygen
DSHS – Department of State Health Services
ENSO – El Niño/Southern Oscillation
FM – Farm-to-Market
FY – Fiscal Year
HWY – Highway
I/I – Inflow and Infiltration
LNVA – Lower Neches Valley Authority
mg/L – Milligrams Per Liter
MGD – Million Gallons per Day
NOAA – National Oceanic and Atmospheric Administration
NLCD – National Land Cover Data
NPDES – National Pollution Discharge Elimination System
NPS – Non-point Source
OSSF – On-site Sewage Facility
RUAA – Recreational Use Attainability Analysis
SFASU (SFA) – Stephen F. Austin State University
SU – Standard Units
SWQM – Surface Water Quality Monitoring
SQ. MI – Square Miles
TCEQ – Texas Commission on Environmental Quality
TFS – Texas A&M Forest Services
TIAER – Texas Institute for Applied Environmental Research
TIR – Texas Integrated Report
TKN – Total Kjeldhal Nitrogen
TMDL – Total Maximum Daily Load
TPDES – Texas Pollutant Discharge Elimination System
TPWD – Texas Parks and Wildlife Department
TSI – Trophic Status Index
TSSWCB – Texas State Soil and Water Conservation Board
TSWQS – Texas Surface Water Quality Standards
TRA – Trinity River Authority
TWRI – Texas Water Resources Institute
USGS – United States Geologic Survey
UAA – Use-Attainability Analysis
WPP – Watershed Protection Plan
WQMP – Water Quality Management Plan
WWTF – Wastewater Treatment Facility
WWTP – Wastewater Treatment Plant

INTRODUCTION

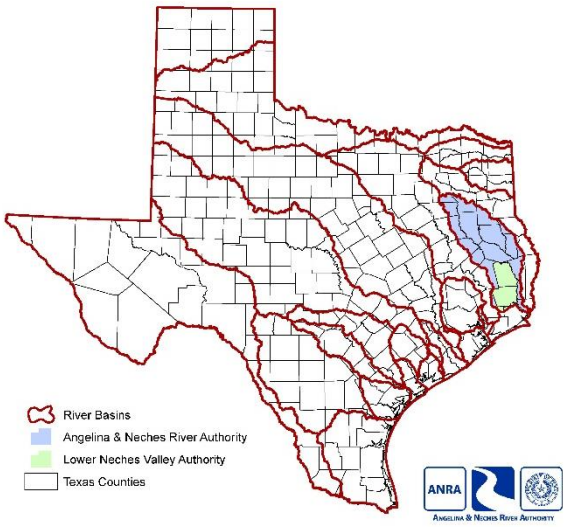
ABOUT THE CLEAN RIVERS PROGRAM

The Texas Clean Rivers Program (CRP) commenced in 1991 following the enactment of the Texas Clean Rivers Act by state legislators, mandating continuous water quality monitoring and evaluations in all principal river basins in Texas. In the Neches River Basin, the responsibility for monitoring and assessment was initially divided among the Angelina & Neches River Authority (ANRA), the Lower Neches Valley Authority (LNVA), and the Upper Neches Municipal Water Authority (UNRMWA).

A PHOTO SHOWING AN ANRA STAFF MEMBER IN THE 1990S CONDUCTING A BIOLOGICAL SURVEY

The Texas Commission on Environmental Quality (TCEQ) and 15 partner agencies collect water quality data at more than 1,800 sites across the state's 23 major river and coastal basins, as well as their sub-watersheds. The CRP's objective is to sustain and enhance water quality in each Texas river basin through continuous partnership involving TCEQ, river authorities, other agencies, regional entities, local governments, industry, and the public. The program's watershed management strategy aims to detect and asses water quality concerns, prioritize remedial actions, execute those actions, and adjust to evolving priorities. The process prioritizes the engagement of the public and local entities. The public's input is essential, as conditions vary in each watershed, necessitating tailored watershed planning to address those specificities.

ABOUT THE ANGELINA & NECHES RIVER AUTHORITY



The Angelina & Neches River Authority started as part of the Sabine-Neches Conservation District (SNCD), which was formed in 1935 by the Texas Legislature. In 1949, the SNCD was split by the legislature into the Sabine River Authority of Texas, and the Neches River Conservation District (NRCD). Following their reorganization in 1950, activity fluctuated over the next two decades, with little activity recorded after 1966. However, in 1971, Texas Governor Preston Smith appointed nine members to the NRCD Board of Directors. Following this, the NRCD became consistently active. The NRCD soon began offering water and wastewater utility operational assistance, sample collection, and lab testing services. Later, in 1977, the NRCD was renamed the Angelina & Neches River Authority. Despite all of the name changes, the mission of the authority has remained the same: **to conserve, store, control, preserve, utilize, and distribute the water, floodwater, and the waters of the rivers and streams of the state in the Neches Basin for the benefit of the human environment and the natural environment**.

THE AUTHORITY TODAY

ANRA operates multiple water and wastewater utilities, a National Environmental Laboratory Accreditation Program (NELAP) certified environmental laboratory, a biosolids composting facility, and an On-Site Sewage Facility (OSSF) permitting and licensing program. The Authority also participates in multiple Clean Water Act (CWA) projects and is the Clean Rivers Program partner for the Upper and Middle Neches River Basin. ANRA's central office and environmental laboratory are located in Lufkin, Texas. The Authority's 8,500 square mile jurisdiction lies wholly or partially in these counties: Van Zandt, Smith, Henderson, Newton, Cherokee, Anderson, Rusk, Houston, Nacogdoches, San Augustine, Shelby, Angelina, Trinity, Sabine, Polk, Jasper, and Orange.

ABOUT THE REPORT

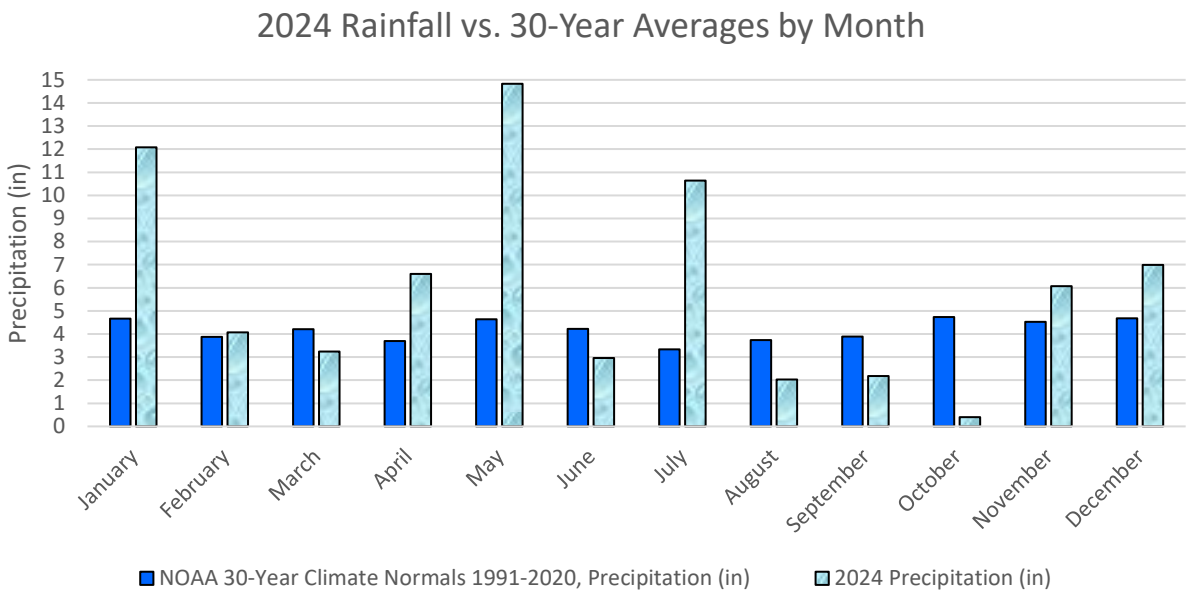
As part of its CRP responsibilities, every year, ANRA produces a Basin Highlights Report. To limit redundancy, the style of the report changes each year on a six-year revolving cycle. Last years' report was in the Watershed Characterization Report format, while this year's report follows the Standard Report format. The Standard Report format provides updates on water quality as well as happenings in the basin since the previous report.

The report covers information about recent events pertaining to water quality such as updates to the TCEQ's Integrated Report (IR), unusual weather that could affect water quality, updates on recreation, education, and outreach, special projects related to water quality, and other topics of interest to watershed stakeholders.

THIS YEAR'S HIGHLIGHTS

A WET YEAR

RECORD RAINFALL



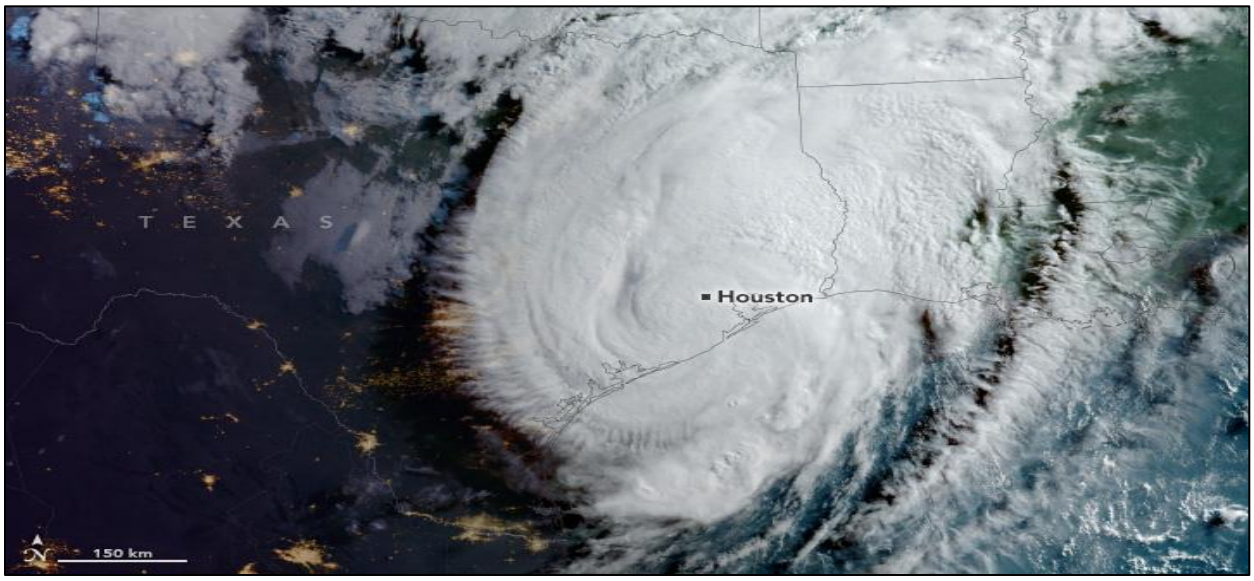
2024 was an exceptionally wet year in East Texas. By the end of July, the yearly rainfall total for the City of Lufkin had already exceeded the 30-year average of 50.2 inches, and by the end of the year, the total had reached 72.1 inches - the highest recorded since 2004. This can likely be attributed, at least in part, to the transition from the El Nino (warm phase) to La Nina (cool phase) of the Southern Oscillation (ENSO). The ENSO is a climate pattern occurring in the Pacific Ocean, in which sea surface temperatures alternate every few years. These oceanic temperature transitions often disrupt normal wind and rainfall patterns, resulting in warmer and drier conditions during El Nino, and cooler and wetter conditions during La Nina. In April of 2025, after just a few months of La Nina conditions, the NOAA reported that the tropical Pacific is now ENSO-neutral, and forecasted the neutral state to continue through the Northern Hemisphere summer, with a greater than 50% chance of also persisting through the fall.

See https://www.climate.gov/news-features/blogs/enso/april-2025-enso-update-la-nina-has-ended for more info about ENSO.

Flood conditions can significantly impact water quality in numerous ways for both the public and ecosystems. Water bodies and groundwater have a natural capacity to assimilate and dilute pollutants, but that capacity has limits. In addition to the physical damages that we typically associate with flooding, stormwater can have two major impacts in relation to water quality. First, stormwater picks up pollutants and debris from the land surface and moves those into our waterways. Examples of these pollutants can include, but are not limited to: pet and animal waste, petroleum products, litter, fertilizers, and debris. Secondly, when stormwaters rise beyond a certain point, they can overflow into both home and municipal sewer systems and overwhelm the system's capacity– often flushing untreated sewage into the environment.

However, we can mitigate these pollution sources to a large degree with only a few major focuses: keeping the land surface as clean as possible by picking up pet waste, spills, and litter; retaining riparian buffer zones around waterways to filter stormwaters; maintaining sewer infrastructure by making sure that customer side cleanouts are intact and capped, and by keeping clogging materials such fats, oils and grease out of our sewers.

HURRICANE BERYL



HURRICANE BERYL MAKES LANDFALL AT MATAGORDA BAY ON JULY 8, 2024. PICTURE BY NASA EARTH OBSERVATORY

Hurricane Beryl made landfall in Texas at Matagorda Bay on July 8, 2024, as a category 1 hurricane. Beryl brought rainfall of up to 13.45" in the Greater Houston area, and sustained winds of 73 mph with peak gust as high as 82 mph recorded in Galveston. Traveling further inland, Beryl weakened into a tropical depression northwest of Shreveport, Louisiana.

While the upper and middle portions of the Neches River Basin did not receive the significant widespread flooding that impacted areas such as Houston, Brazoria, and Galveston, our area did receive heavy rainfall, some isolated flooding, road closures, and power outages. All portions of the basin sustained moderate-to-severe damage such as downed trees and power lines, and some level of flooding due to sustained wind strengths brought by Beryl. Across East Texas, fourteen tornadoes ranging from EF 0 to EF 2 were reported in Nacogdoches, Jasper, Sabine, Shelby, Panola, Rusk, Harrison, Cass, and Gregg counties. Beryl produced a total of 113 tornado warnings and 65 confirmed tornadoes - breaking records set by tropical storm Cindy in 2005.

RECREATION, EDUCATION & OUTREACH

In FY 2024, ANRA created a new department dedicated to Recreation, Education, and Outreach. The new department is intended to help focus our efforts to promote environmental stewardship in the basin. This has led to new partnerships, programs, and opportunities that benefit the mission of the Clean Rivers Program and Clean Water Activities. ANRA continues to be active in communitywide efforts to improve awareness and engagement in environmental stewardship with presentations to local schools, training events for volunteer water quality monitoring via the Texas Stream Team, ongoing partnerships with local Keep Texas Beautiful affiliates to create and distribute litter collection bags, and hosting and participating in outdoor appreciation events such as the annual Neches River Rendezvous and stream cleanups. For more details ANRA's recreation, education, and outreach activities, please see the Recreation, Education & Outreach section of this report.

SURFACE WATER QUALITY IN THE NECHES RIVER BASIN

INTRODUCTION

Multiple organizations and agencies work together to collect and analyze water quality data in the Neches River Basin. A coordinated monitoring meeting is held annually in the spring to allow all parties collecting water quality data in the basin to discuss monitoring priorities and plans and the avoid duplication of effort. Data collected is then used to evaluate the quality of the surface water within the basin.

This portion of the Basin Highlights Report discusses the criteria used to evaluate water quality, the assessment protocols and reporting frequency, the results of the most recent assessment, and lists the monitoring planned or already underway for FY 2025 in the Neches River Basin.

TEXAS SURFACE WATER QUALITY STANDARDS

TEXAS SURFACE WATER QUALITY STANDARDS

The Texas Surface Water Quality Standards (TSWQS) establish explicit goals for the quality of streams, rivers, lakes, and bays throughout the state. TCEQ develops Water Quality Standards to maintain the quality of surface waters in Texas so that it supports public health and enjoyment and protects aquatic life, consistent with the sustainable economic development of the state.

The TSWQS are reviewed and revised regularly. The most recent revision was completed in 2022 and work has already begun on the 2026 revision.

Current as well as historic versions of the Texas Surface Water Quality Standards can be found here: https://www.tceq.texas.gov/waterquality/standards

CLASSIFIED SEGMENTS

In the TSWQS, most major water bodies in the state have been subdivided into areas called "*classified segments*." These classified segments are water bodies or portion of a water body that are individually defined in the TSWQS. A segment is intended to have relatively homogeneous chemical, physical, and hydrological characteristics. A segment provides a basic unit for assigning site-specific standards and for applying water quality management programs of the agency. Classified segments may include streams, rivers, bays, estuaries, wetlands, lakes, or reservoirs. The classified segments are assigned four-digit numbers. The first two digits correspond to the major basin in which they are located. The last two digits distinguish individual segments within the particular basin. For example, the Neches River Basins is basin "06" and the Neches River below Lake Palestine is classified segment "0604."

UNCLASSIFIED SEGMENTS

Because of the great extent of waters of the state, not all bodies of water are classified in the TSWQS. Unclassified waters are those smaller water bodies that do not have site-specific water quality standards assigned to them, but instead are protected by general standards that apply to all surface waters in the state. For example, when managing a classified segment of the Neches River, we may want to examine water quality in the tributaries that flow into that segment. Some of these tributaries may not be part of the classified segment system. When that happens, for management purposes, the tributary is referred to as an unclassified segment. This unclassified tributary will be designated with the number of the classified segment in the watershed in which it is located, along with a letter. For instance, tributaries of Segment 0604 would be 0604A, 0604B, etc. The same numbering system applies to unclassified lakes. In management activities, both classified and unclassified segments can be generically referred to as *segments*. The term *water body* is most commonly used to refer to *entire* rivers, reservoirs, lakes, or estuaries.

ASSESSMENT UNITS

When examining the water quality in a segment, we further divided the segment into Assessment Units (AUs) to provide a more detailed picture of water quality. A segment may consist of one or more AUs. For example, Sam Rayburn Reservoir (Segment 0610) is broken down into 10 separate AUs. AUs are typically represented with a number appended to the Segment ID with an underscore. E.g., AU 01 of segment 0604A would be represented as AU 0604A_01. Generally, the lower numbered AUs are more downstream.

DESIGNATED USES

Designated uses are specific uses assigned to water bodies or by the TCEQ. These designated uses are associated with sets of water quality standards, which usually end up being more stringent than general criteria. Designated uses include things like recreation, aquatic life, and domestic water supply. Most of these uses involve consuming water, consuming things from the water, or having the possibility of consuming water which is why standards for water bodies with designated uses are generally higher than normal. The Aquatic Life, Recreation, and Domestic Water Supply uses are specifically listed in the Texas Surface Water Quality Standards (TSWQS) Chapter 307, §307.7. In this section, there are also additional criteria and uses listed, which are more general in nature.

AQUATIC LIFE USE

Aquatic Life Use is based on the habitat the water body provides and the amount of ecologic diversity it has. These are defined in the TSWQS Ch. 307, §307.7

Aquatic Life Use Categories

Category	Mean/Min. DO (mg/L)	Mean/Min. DO (mg/L) (Spring)	Habitat Characteristics	Species Assemblage	Sensitive Species	Diversity	Species Richness	Trophic Structure
Exceptional	6.0/4.0	6.0/5.0	Outstanding natural variability	Exceptional or unusual	Abundant	Exceptionally high	Exceptionally high	Balanced
High	5.0/3.0	5.5/4.5	Highly diverse	Usual association of regionally expected species	Present	High	High	Balanced to slightly imbalanced
Intermediate	4.0/3.0	5.0/4.0	Moderately diverse	Some expected species	Very low in abundance	Moderate	Moderate	Moderately imbalanced
Limited	3.0/2.0	4.0/3.0	Uniform	Most regionally expected species	Absent	Low	Low	Severely imbalanced
Minimal	2.0/1.5	-	-	-	-	-	-	-

DOMESTIC WATER SUPPLY USE

Domestic water supply use is for municipalities or other entities to take water from water bodies to treat and use for drinking water. These are defined in the TSWQS Ch. 307, §307.7.

The categories are:

- Public Supply
- Sole Source Supply
- Aquifer Protection

These three categories have drinking water standards for radioactivity associated with dissolved minerals, toxic material concentrations, and chemical and microbiological quality of surface waters defined in Ch. 290 of the TSWQS.

RECREATION USE

Recreation involves many of the typical things one would think of when going in the water, such as swimming, wading, or boating. There are multiple classes of recreation that are based on how likely a person is to ingest water while recreating. These are defined in the TSWQS Ch. 307, §307.7.

Recreation Use Categories

Category	TCEQ Descriptions for Recreation Use Categories	Geometric Mean Criterion: *E. Coli* per 100mL	Single Sample Criterion: *E. Coli* per 100mL
Primary Contact Recreation 1 (PCR 1)	Activities that are presumed to involve a significant risk of ingestion of water (e.g., wading by children, swimming, water skiing, diving, tubing, surfing, handfishing as defined by Texas Parks and Wildlife Code, §66.115, and the following whitewater activities: kayaking, canoeing, and rafting).	126	399
Primary Contact Recreation 2 (PCR 2)	Water recreation activities, such as wading by children, swimming, water skiing, diving, tubing, surfing, handfishing as defined by Texas Parks and Wildlife Code, §66.115, and whitewater kayaking, canoeing, and rafting, that involve a significant risk of ingestion of water but that occur less frequently than for primary contact recreation 1 due to: (A) physical characteristics of the water body; or (B) limited public access.	206	-
Secondary Contact Recreation 1 (SCR 1)	Activities that commonly occur but have limited body contact incidental to shoreline activity (e.g. fishing, canoeing, kayaking, rafting, and motor boating). These activities are presumed to pose a less significant risk of water ingestion than primary contact recreation 1 or 2 but more than secondary contact recreation 2.	630	-
Secondary Contact Recreation 2 (SCR 2)	Activities with limited body contact incidental to shoreline activity (e.g. fishing, canoeing, kayaking, rafting, and motor boating) that are presumed to pose a less significant risk of water ingestion than secondary contact recreation 1. These activities occur less frequently than secondary contact recreation 1 due to the physical characteristics of the water body or limited public access.	1,030	-
Non-Contact Recreation (NCR)	Activities that do not involve a significant risk of water ingestion, such as those with limited body contact incidental to shoreline activity, including, birding, hiking, and biking. Noncontact recreation may also be assigned where primary and secondary contact recreation activities should not occur because of unsafe conditions, such as ship and barge traffic.	2,060	-

ADDITIONAL CRITERIA

These are the additional criteria outlined in the TSWQS:

- Chemical Parameters: Site-specific criteria for chloride, sulfate, and total dissolved solids based on averages over an annual period
- pH: Site-specific numerical criteria based on absolute minima and maxima
- Temperature: Site-specific criteria based on an absolute maxima
- Toxic Materials: Criteria based on values established in §307.6 of the TSWQS
- Nutrients: Site-specific numeric and narrative criteria for reservoirs are established in §307.10, Appendix F

ADDITIONAL USES

These uses are somewhat broader in scope, for things like navigation, agricultural/industrial water supply, wetlands, etc. which should be maintained and protected as well according to the TSWQS.

THE TEXAS INTEGRATED REPORT

TEXAS INTEGRATED REPORT

Much of the data referenced and discussed in this report comes from the latest release of the Texas Integrated Report (IR).

Produced every two years by the Texas Commission on Environmental Quality (TCEQ), The IR describes the status of Texas' natural waters based on historical data and the extent to which they attain the TSWQS. Each IR utilizes surface water quality data collected during the most recent seven years by TCEQ field staff, Clean Rivers Program partners, and Clean Water Act project partners from all across the state. TCEQ Data Analysts use the data to assess Texas waterbodies to determine if they meet their respective water quality standards.

During the assessment, water quality parameters are evaluated against criteria designated in the TWQS. As a result, one of five categories is assigned to each parameter by AU to assist with the development of management strategies.

Water Quality Categories in the IR

Category	Description
1	All designated uses are supported, no use is threatened.
2	Available data and/or information indicate that some, but not all of the designated uses are supported.
3	There is insufficient or unreliable available data and/or information to make a use support determination.
4	Available data and/or information indicate that at least one designated use is not being supported or is threatened, but a TMDL is not needed.
4a	A state developed TMDL has been approved by EPA or a TMDL has been established by EPA for any water-pollutant combination.
4b	Other required control measures are expected to result in the attainment of an applicable water quality standard in a reasonable period of time.
4c	The impairment or threat is not caused by a pollutant.
5	Available data and/or information indicate that at least one designated use is not being supported or is threatened, and a TMDL is needed.
5a	A TMDL is underway, scheduled, or will be scheduled.
5b	A review of the water quality standards for the water body will be conducted before a management strategy is selected.
5c	Additional data and information will be collected before a TMDL is scheduled.
5n	Water body does not meet its applicable Chl α criterion, but additional study is needed to verify whether exceedance is associated with causal nutrient parameters or impacts to response variables.
5r*	A WPP covering this region is being developed or has been approved by the EPA.

**Category 5r is new for 2024*

If an AU has not met its specified standards, it is considered **impaired** and is placed on the IR's 303(d) List.

If an AU is not considered impaired, but data indicate that pollutant levels are elevated or exceed specific screening thresholds, then it may be assigned a level of concern for the parameter in question.

Concern Levels

Level of Concern	Description
CN	Concern for near non-attainment of the parameter based on numeric criteria.
CS	Concern for water quality based on screening levels.

Current as well as historic versions of the Texas Integrated Report can be found here: https://www.tceq.texas.gov/waterquality/assessment

FUTURE CHANGES TO THE PERIOD OF RECORD FOR THE IR

The Integrated Report includes assessments of water bodies in Texas using the most recent seven years' worth of data. This window of data is being shifted back three months to allow TCEQ to conduct more quality checks and have more time to process data corrections before submitting the IR to the EPA each cycle.

2028 Integrated Report Data Window	
Previous	12/01/2020 to 11/30/2026
New	09/01/2020 to 08/31/2026

IMPAIRMENTS AND CONCERNS IN THE NECHES BASIN

Bacteria 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 state's list of impaired water bodies (303(d) List). Three classified segments have a bacterial impairment listed in the 2024 Texas Integrated Report. Additionally, fifteen unclassified segments have impairments or concerns for *E. Coli* bacteria. When it comes to water quality, most organizations test specifically for *E. Coli* in water samples. *E. Coli* is essentially a 'baseline' bacteria strain. If there are elevated levels of *E. Coli* in a sample, then there are likely other harmful bacteria present as well. Water bodies in Texas can be assigned recreation uses, which come with a set of standards based on how much *E. Coli* is acceptable/safe for each type of recreation. More information about the different types of recreational uses can be found in the "Designated Uses" section of this report.

Depressed Dissolved Oxygen levels have been observed in two of the classified segments and five of the unclassified segments in the Basin. These impairments and concerns are most likely due to a combination of low flows and elevated nutrient levels. Dissolved oxygen monitoring is important for two main reasons: dissolved oxygen is essential to aquatic life such as fish and it is also an indicator of a serious ecologic issue known as eutrophication. Eutrophication is an ecological chain reaction when a water body receives too many nutrients. With a large input of nutrients, algae grows and spreads incredibly fast across a body of water. Initially, this will lead to a spike in dissolved oxygen, as algae generates oxygen through photosynthesis. Eventually, the algae will begin to die, forming large mats. These mats of dead algae block light to other plants, cutting off a significant amount of dissolved oxygen production. The levels of dissolved oxygen will plummet, leading to fish and other plants dying.

Nutrients are a concern for multiple segments, particularly ammonia, nitrate, and total phosphorus. Nine segments have concerns for ammonia, chlorophyll-a, nitrates, and total phosphorus. Nutrients play a major role in eutrophication, so they are important to monitor. When nutrients are naturally occurring, their presence in waters are generally not harmful. However, most nutrient problems we see in Texas water bodies come from agricultural runoff containing fertilizer, which is incredibly dense with nutrients. Chlorophyll-a is an indicator of algae levels in water, and in turn an indicator of eutrophication.

Mercury and Dioxins in Edible Fish Tissue: Fish consumption advisories issued by the Texas Department of State Health Services (DSHS) cover several water bodies in the Neches Basin. Lake Ratcliff has a fish consumption advisory issued in 2012 due to mercury found in fish tissue. An advisory for mercury and dioxin in fish tissue, issued in 2014, covers the Neches River Below Lake Palestine, Sam Rayburn Reservoir, and B.A. Steinhagen Lake. Mercury ends up in fish tissue through a process called bioaccumulation. This is where increasing amounts of mercury are consumed during each step up in the food chain, accumulating in the tissues of organisms. This results in the larger predator fish such as largemouth bass having elevated levels of mercury. This mercury can be passed onto humans if consumed. Dioxins are a group of toxic chemical compounds that also accumulate in fish similar to mercury. Both mercury and dioxins are toxic to humans.

SEGMENTS WITH IMPAIRMENTS

Segment ID	Segment Name	Impairments	Category (AU ID)
0604	Neches River Below Lake Palestine	Dioxin in edible tissue Mercury in edible tissue	5c (01, 02, 03) 5c (01, 02, 03)
0604A	Cedar Creek	Bacteria in water (Recreation Use) Depressed dissolved oxygen in water	5c (03), 4a (02) 5c (03)
0604B	Hurricane Creek	Bacteria in water (Recreation Use)	5a (02), 4a (01)
0604C	Jack Creek	Bacteria in water (Recreation Use)	4a (01)
0604D	Piney Creek	Depressed dissolved oxygen in water	5b (01)
0604M	Biloxi Creek	Bacteria in water (Recreation Use) Depressed dissolved oxygen in water	5a (02), 4a (03) 5c (03)
0604T	Lake Ratcliff	Mercury in edible tissue	5c (01)
0605	Lake Palestine	pH	5b (01, 02, 03, 09, 10, 11)
0605A	Kickapoo Creek in Henderson County	Bacteria in water (Recreation Use) Depressed dissolved oxygen in water	5r (01, 02) 5r (01)
0606	Neches River Above Lake Palestine	Bacteria in water (Recreation Use) Depressed dissolved oxygen in water	5c (01, 02) 5b (02)
0606A	Prairie Creek	Bacteria in water (Recreation Use)	5b (01, 03)
0606D	Black Fork Creek	Bacteria in water (Recreation Use)	5b (02)
0609	Angelina River Below Sam Rayburn Reservoir	Dioxin in edible tissue Mercury in edible tissue	5c (01) 5c (01)
0610	Sam Rayburn Reservoir	Dioxin in edible tissue Excessive algal growth in water Mercury in edible tissue pH	5a (01 - 10) 5c (01 - 10) 5c (01 - 10) 5c (05)
0610A	Ayish Bayou	Bacteria in water (Recreation Use)	5a (01, 02)
0610P	Bayou Carrizo	Bacteria in water (Recreation Use)	5c (01)
0611	Angelina River Above Sam Rayburn Reservoir	Bacteria in water (Recreation Use)	5c (01, 03, 04)
0611A	East Fork Angelina River	Bacteria in water (Recreation Use)	5c (01, 02)
0611B	La Nana Bayou	Bacteria in water (Recreation Use)	5r (01, 02, 03)
0611C	Mud Creek	Bacteria in water (Recreation Use)	5b (01, 02)
0611D	West Mud Creek	Bacteria in water (Recreation Use)	5c (01)
0612	Attoyac Bayou	Bacteria in water (Recreation Use)	5r (01, 02, 03)
0612F	West Creek	Bacteria in water (Recreation Use)	5b (01)
0613	Lake Tyler/Lake Tyler East	Excessive algal growth in water	5c (02, 03, 04)
0615	Angelina River/Sam Rayburn Reservoir	Bacteria in water (Recreation Use) Depressed dissolved oxygen in water Dioxin in edible tissue Mercury in edible tissue pH	5c (01) 5c (01) 5c (01) 5c (01) 5c (01)
0615A	Paper Mill Creek	Bacteria in water (Recreation Use)	5b (01)

SEGMENTS WITH CONCERNS FOR USE ATTAINMENT AND SCREENING LEVELS

SEGMENT ID	SEGMENT NAME	CONCERNS	LEVEL OF CONCERN (AU ID)
0604	Neches River Below Lake Palestine	Bacteria Chlorophyll-a in water	CN (02) CS (05)
0604A	Cedar Creek	Nitrate in water Total Phosphorus in water Depressed dissolved oxygen in water	CS (02) CS (02) CS (03)
0604B	Hurricane Creek	Depressed dissolved oxygen in water	CS (02)
0604C	Jack Creek	Total Phosphorus in water	CS (01)
0604D	Piney Creek	Ammonia in water Depressed dissolved oxygen in water	CS (01) CS (02)
0604N	Buck Creek	Bacteria in water (Recreation Use)	CN (01)
0605	Lake Palestine	Depressed dissolved oxygen in water Manganese in Sediment	CS (01) CS (01, 02, 03, 09, 10, 11)
0605A	Kickapoo Creek	Chlorophyll-a in water	CS (01)
0606	Neches River Above Lake Palestine	Depressed dissolved oxygen in water Zinc in Water	CN (02) CN (02)
0606A	Prairie Creek	Ammonia in water Nitrate in water	CS (01) CS (01)
0610	Sam Rayburn Reservoir	Mercury in Edible Tissue Iron in Sediment	CS (01-10) CS (01-10)
0611	Angelina River Above Sam Rayburn Reservoir	Total Phosphorus in water	CS (04)
0611B	La Nana Bayou	Nitrate in water Total Phosphorus in water	CS (01) CS (01)
0611D	West Mud Creek	Ammonia in water Nitrate in water	CS (01) CS (01)
0611V	Bowles Creek	Dissolved Oxygen	CS (01)
0611W	Johnson Creek	Bacteria in water (Recreation Use)	CN (01)
0613	Lake Tyler/Lake Tyler East	Arsenic in edible tissue	CS (01-04)

WHAT DATA DO WE COLLECT? HOW DO WE COLLECT IT?

As a part of its routine quarterly monitoring, ANRA collects and analyzes field, conventional, and bacteriological parameters, as well as flow. Other agencies and organizations may monitor for different parameters depending on their data needs or objectives. ANRA collects and performs the following analyses:

Field Parameters are collected on-site by direct monitoring in the water body using field instrumentation, multiprobe sondes, and doppler surveying equipment.

- Dissolved Oxygen
- pH
- Specific Conductance
- Water Temperature
- Secchi Depth
- Total Water Depth
- Instantaneous Stream Flow*
- Flow Severity
- Present Weather
- Days Since Last Significant Rainfall

*Instantaneous stream flow is only measured at sites with flowing/moving water. For example, lakes are not measured for instantaneous stream flow.

Conventional Parameters are analyzed for water samples collected during routine water quality monitoring events. These parameters include nutrients, minerals, and particulates. ANRA's Environmental Laboratory conducts all analyses of conventional parameters, with the exception of Nitrate-plus-Nitrite which is only analyzed as a fallback parameter in instances where the individual Nitrate and Nitrite analyses cannot be performed for some reason.

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

Bacteriological Parameters are also collected for laboratory analysis during routine water quality monitoring events to determine if the water is contaminated with fecal material. In freshwater systems, *Escherichia Coli* (*E. Coli*) is the organism used to assess the level of fecal contamination.

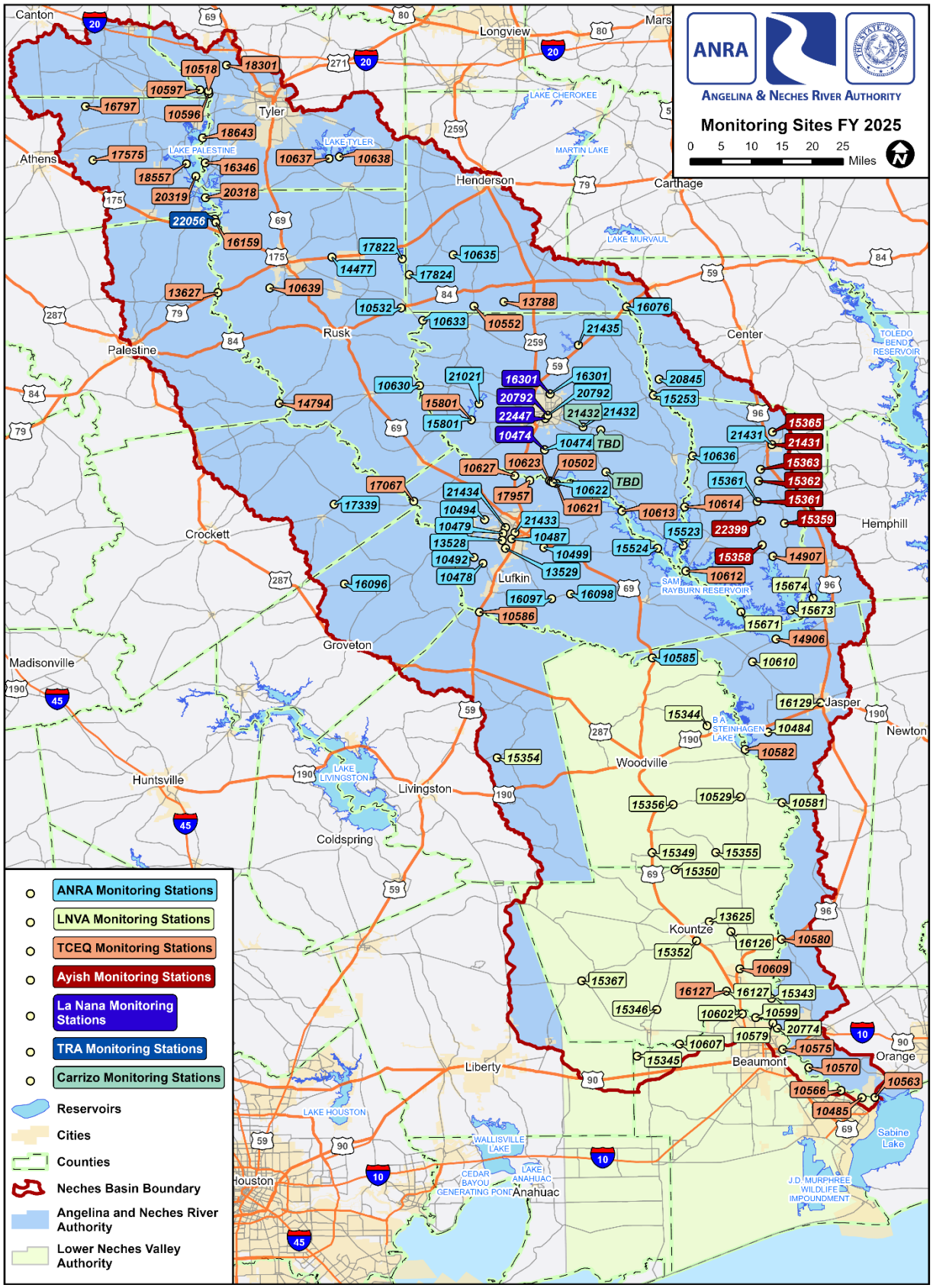
For more information regarding current monitoring sites and water quality data, please visit: https://www.anra.org/conservation-recreation/water-quality-activities/monitoring-sites-water-quality-data/

WHERE IS WATER QUALITY DATA BEING COLLECTED?

MONITORING THE NECHES BASIN BY ENTITY FOR FY 2025

Monitoring Entity	Field	Conventional	Bacteria	Flow	Notes
ANRA	46	46	46	36	For CRP in FY 2025 ANRA is monitoring 37 sites quarterly for routine parameters, and two sites five times yearly for 24-hour parameters. For other projects*, monthly monitoring is planned or occurring at 8 sites in Ayish Bayou, 4 in La Nana Bayou, and 3 in Carrizo Bayou. **Several of the special project sites are also CRP sites to which the projects are adding additional monitoring, which does not add to the total count of unique sites shown in this summary table. See the full table of monitoring sites for more details.*
TCEQ Region 5 (Tyler)	19	19	19	8	
TCEQ Region 10 (Beaumont)	22	20	20	5	Metals in Sediment at 6 of these sites
LNVA	23	23	23	20	24 hr. D.O. at 3 of these sites
Tarrant Regional Water District	1	1	1	-	TRA out of basin site Intake for Lake Palestine water supply. Metals in Water also collected at this site.

MAP OF MONITORING SITES IN THE NECHES BASIN FOR FY 2025



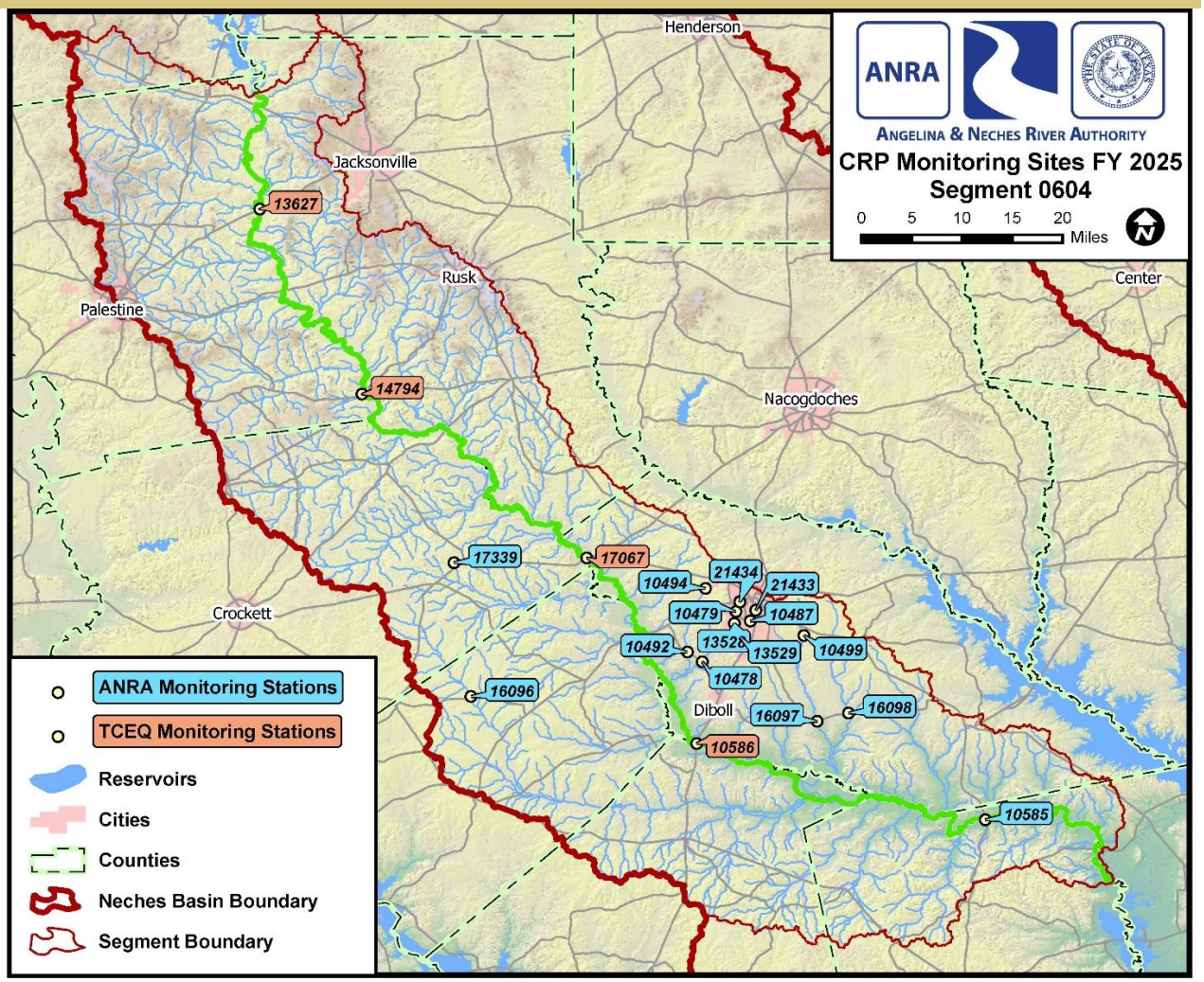
LIST OF MONITORING SITES IN THE UPPER NECHES RIVER BASIN FOR FY 2025

ID	SEG.	DESCRIPTION	COLLECTED BY	NOTES
10585	0604	Neches River at US 69	ANRA	
10586	0604	Neches River at US 59	TCEQ	
13627	0604	Neches River at US 79	TCEQ	
14794	0604	Neches River at SH 294	TCEQ	
17067	0604	Neches River at SH 7	TCEQ	
10478	0604A	Cedar Creek at FM 2497	ANRA	
10479	0604A	Cedar Creek at Loop 287	ANRA	CRP RT, CRP 24hr DO
13528	0604A	Cedar Creek at FM 1336	ANRA	
21434	0604A	Cedar Creek at Ellis Ave	ANRA	
10487	0604B	Hurricane Creek at Loop 287	ANRA	
13529	0604B	Hurricane Creek at FM 324	ANRA	
21433	0604B	Hurricane Creek at Kiwanis Park	ANRA	
10492	0604C	Jack Creek at FM 2497	ANRA	
10494	0604C	Jack Creek at FM 3150	ANRA	
16096	0604D	Piney Creek at FM 358	ANRA	
10499	0604M	Biloxi Creek at CR 216	ANRA	
16097	0604M	Biloxi Creek at FM 1818	ANRA	
16098	0604N	Buck Creek at FM 1818	ANRA	
17339	0604T	Lake Ratcliff	ANRA	
16159	0605	Lake Palestine at Dam	TCEQ	
16346	0605	Lake Palestine at Raw Water Intake	TCEQ	
18557	0605	Lake Palestine in Flat Bay	TCEQ	
18643	0605	Lake Palestine Upper Lake East Shore	TCEQ	
20318	0605	Lake Palestine Midlake Near Ledbetter Bay	TCEQ	
20319	0605	Lake Palestine near Cape Tranquility Drive	TCEQ	
22056	0605	Lake Palestine in Blackburn Bay	TRA	TRA Intake Sampling
16797	0605A	Kickapoo Creek at FM 773	TCEQ	
17575	0605F	Lake Athens	TCEQ	
10596	0606	Neches River at FM 279	TCEQ	
10597	0606	Neches River Upstream Lake Palestine at SH 64	TCEQ	
10518	0606A	Prairie Creek at SH 64	TCEQ	
18301	0606A	Prairie Creek at SH 110	TCEQ	
10610	0609	Angelina River at SH 63	LNVA	
10612	0610	Sam Rayburn Reservoir at SH 147	TCEQ	
10613	0610	Sam Rayburn Reservoir at SH 103	TCEQ	
10614	0610	Sam Rayburn Reservoir West Shore at SH 103	TCEQ	
14906	0610	Sam Rayburn Reservoir at Main Pool	TCEQ	
14907	0610	Sam Rayburn Reservoir at FM 83	TCEQ	
15523	0610	Sam Rayburn Reservoir Alligator Cove	ANRA	
15524	0610	Sam Rayburn Reservoir Near Shirley Creek	ANRA	
15671	0610	Sam Rayburn Reservoir USGS Site FC	LNVA	
15673	0610	Sam Rayburn Reservoir USGS Site AC	LNVA	
15674	0610	Sam Rayburn Reservoir USGS Site LC	LNVA	
15361	0610A	Ayish Bayou at SH 103	ANRA	CRP RT, Ayish project
15365	0610A	Ayish Bayou at FM 3230	ANRA	Ayish project
21431	0610A	Ayish Bayou at West Columbia	ANRA	CRP RT, Ayish project
22399	0610A	Ayish Bayou at San Augustine CR 313	ANRA	Ayish project
15362	0610G	Caney Creek at SH 147	ANRA	Ayish project
15359	0610I	Chiamon Bayou at FM 1751	ANRA	Ayish project
15358	0610K	Sandy Creek at FM 705	ANRA	Ayish project
15363	0610M	Venado Creek at SH 147	ANRA	Ayish project
21432	0610P	Bayou Carrizo at SH 21	ANRA	CRP RT, Carrizo project
TBD	0610P	Atascoso Creek at SH 21	ANRA	Carrizo project
TBD	0610P	Puenta Suelas at FM 226	ANRA	Carrizo project
10623	0611	Angelina River 1.16 Km Upstream of Paper Mill Creek	TCEQ	
10627	0611	Angelina River at US 59	TCEQ	

10630	0611	Angelina River at SH 21	ANRA	
10633	0611	Angelina River Upstream of SH 204	ANRA	
10635	0611	Angelina River Above Sam Rayburn at FM 1798	ANRA	
10552	0611A	East Fork Angelina River at FM 225	TCEQ	
13788	0611A	East Fork Angelina River at CR 3218	TCEQ	
10474	0611B	La Nana Bayou at CR 526	ANRA	CRP RT, La Nana project
16301	0611B	La Nana Bayou at Loop 224	ANRA	CRP RT, La Nana project
20792	0611B	La Nana Bayou at East Main	ANRA	CRP RT, La Nana project
22447	0611B	Banita at Mlk Jr Blvd in Nacogdoches	ANRA	La Nana project
10532	0611C	Mud Creek at US 84	ANRA	
14477	0611C	Mud Creek at US 79	ANRA	
15801	0611Q	Lake Nacogdoches in Main Pool	ANRA, TCEQ	CRP RT, Fish Tissue
21021	0611Q	Lake Nacogdoches Upper Lake	ANRA	
17822	0611R	Lake Striker Upper Lake	ANRA	
17824	0611R	Lake Striker Near Dam	ANRA	
17957	0611T	Lake Kurth Main Pool	TCEQ	Fish Tissue
10636	0612	Attoyac Bayou at SH 21	ANRA	
15253	0612	Attoyac Bayou at SH 7	ANRA	
16076	0612	Attoyac Bayou at US 59	ANRA	
20845	0612F	West Creek at FM 2913	ANRA	
21435	0612G	Naconiche Lake Near Dam	ANRA	
10637	0613	Lake Tyler Midlake at Dam	TCEQ	
10638	0613	Lake Tyler East at Dam	TCEQ	
10639	0614	Southwest Corner of Lake Jacksonville	TCEQ	
10621	0615	Sam Rayburn Below Paper Mill Creek Lower Channel	TCEQ	
10622	0615	Riverine Portion of Sam Rayburn Reservoir	ANRA	CRP 24hr DO
10502	0615A	Paper Mill Creek Upper Bifurcation Channel	TCEQ	

RED EARED SLIDER IN HURRICANE CREEK AT LOOP 284 IN LUFKIN, MARCH 2025

SEGMENT 0604 – NECHES RIVER BELOW LAKE PALESTINE

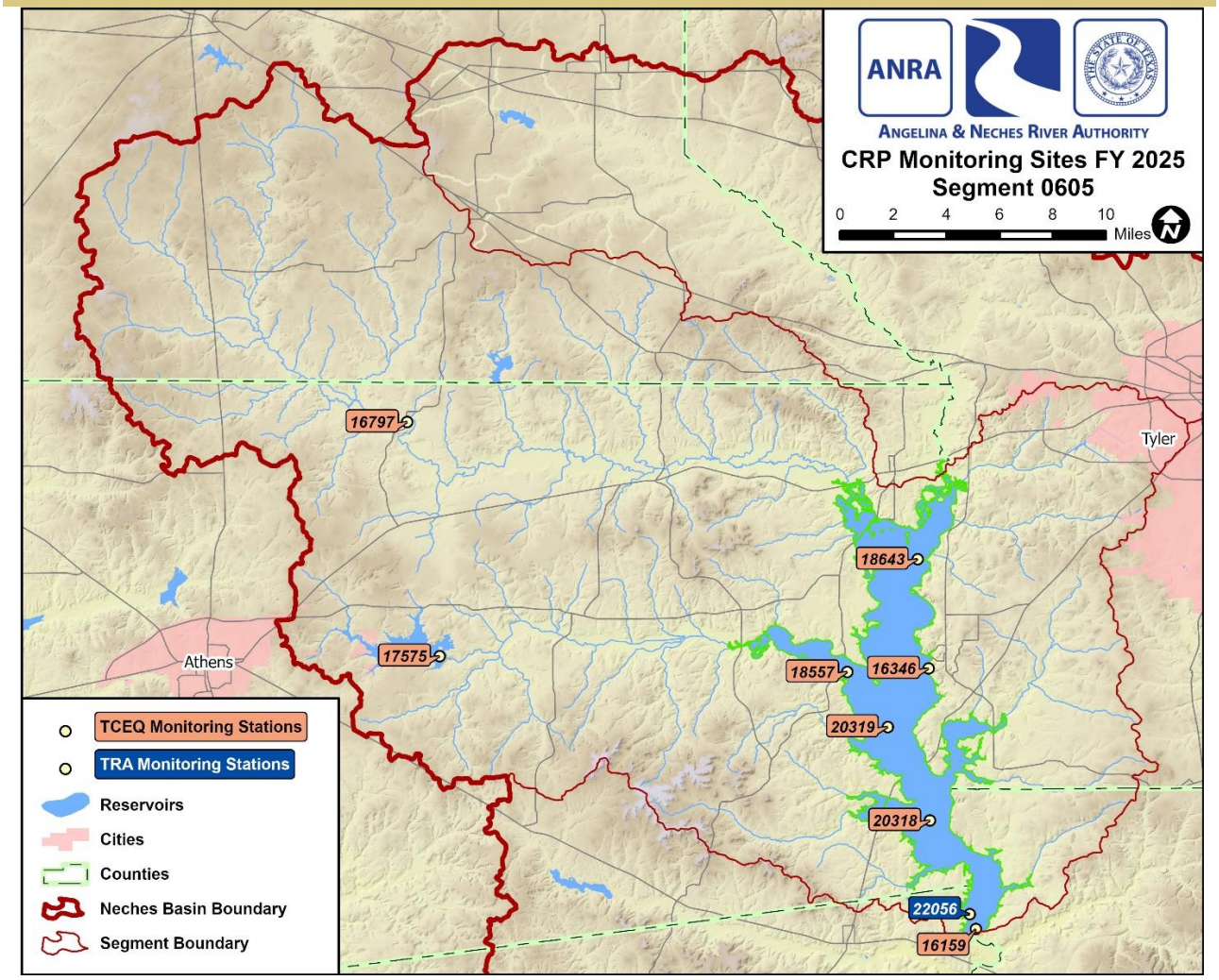


Segment 0604 is a 231-mile-long freshwater stream portion that extends from a point immediately upstream of the confluence of Hopson Mill Creek in Jasper/Tyler County to Blackburn Crossing Dam in Anderson/Cherokee County. Designated uses for this segment are general, primary contact recreation 1, aquatic life (high), domestic water supply, and fish consumption.

According to the 2024 IR, three AUs on the Neches River (0604) have impairments for mercury and dioxin in edible tissue. Several unclassified stream segments are associated with segment 0604, and five of them currently have impairments:

- 0604A – Cedar Creek: Bacteria and depressed dissolved oxygen.
- 0604B – Hurricane Creek: Bacteria.
- 0604C – Jack Creek: Bacteria.
- 0604D – Piney Creek: depressed dissolved oxygen.
- 0604M – Biloxi Creek: Bacteria and depressed dissolved oxygen.
- 0604T – Lake Ratcliff: Mercury in edible tissue.

SEGMENT 0605 – LAKE PALESTINE



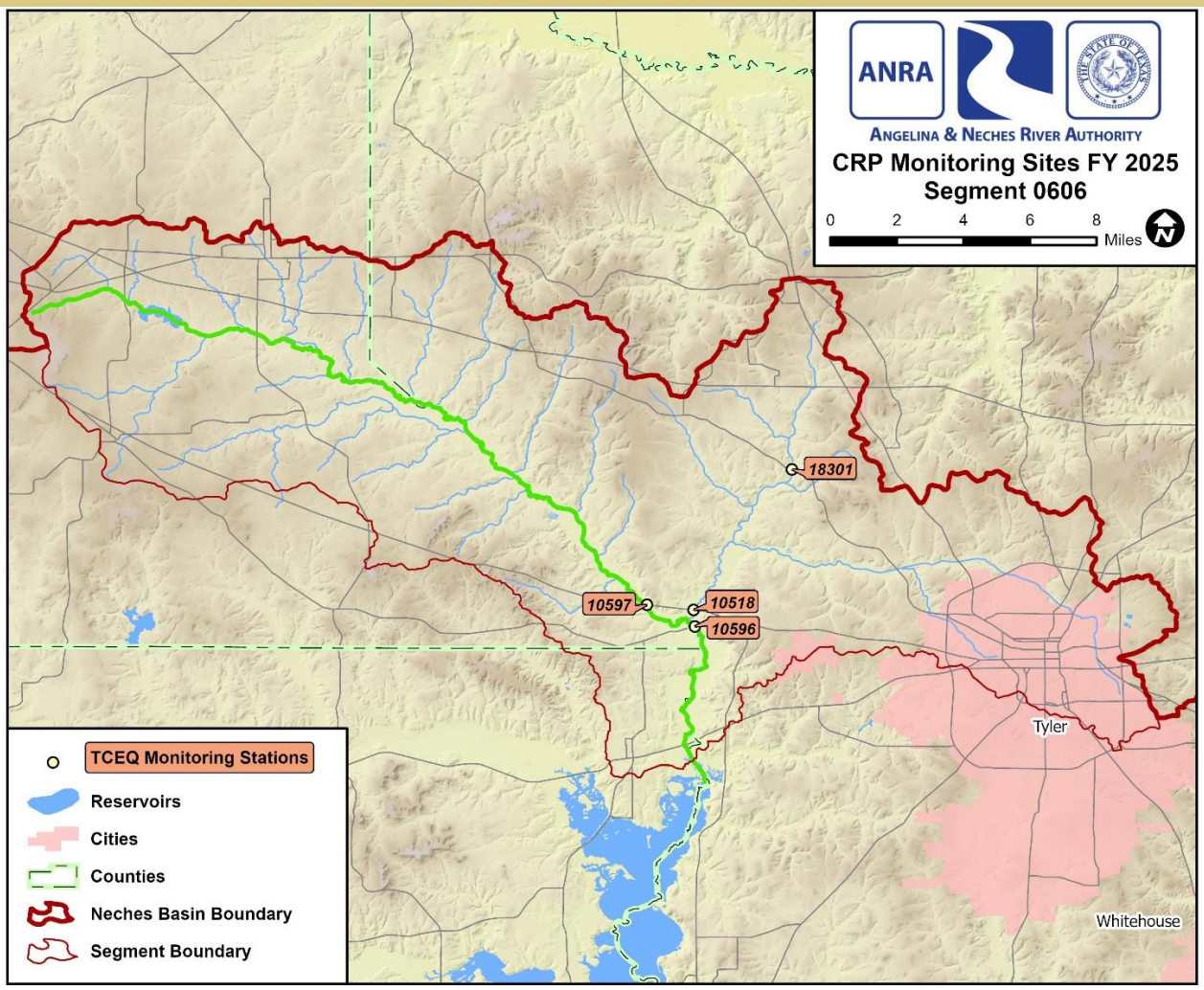
Segment 0605 is a 23,500-acre reservoir, an impoundment of the Neches River, from the Blackburn Crossing Dam in Anderson/Cherokee County to a point 6.7 km (4.2 miles) downstream of FM 279 in Henderson/Smith County, up to normal pool elevation of 345 feet. It was impounded in 1962. Designated uses for this segment are general, primary contact recreation 1, aquatic life (high), and domestic water supply.

According to the 2024 IR, six AUs on Lake Palestine (0605) have impairments for pH. Multiple unclassified stream segments are associated with Segment 0605. Only one is listed as impaired:

- 0605A – Kickapoo Creek in Henderson County: Bacteria and depressed dissolved oxygen.

Kickapoo Creek had a WPP completed recently. Details can be found in the water quality remediation efforts section of this report.

SEGMENT 0606 – NECHES RIVER ABOVE LAKE PALESTINE

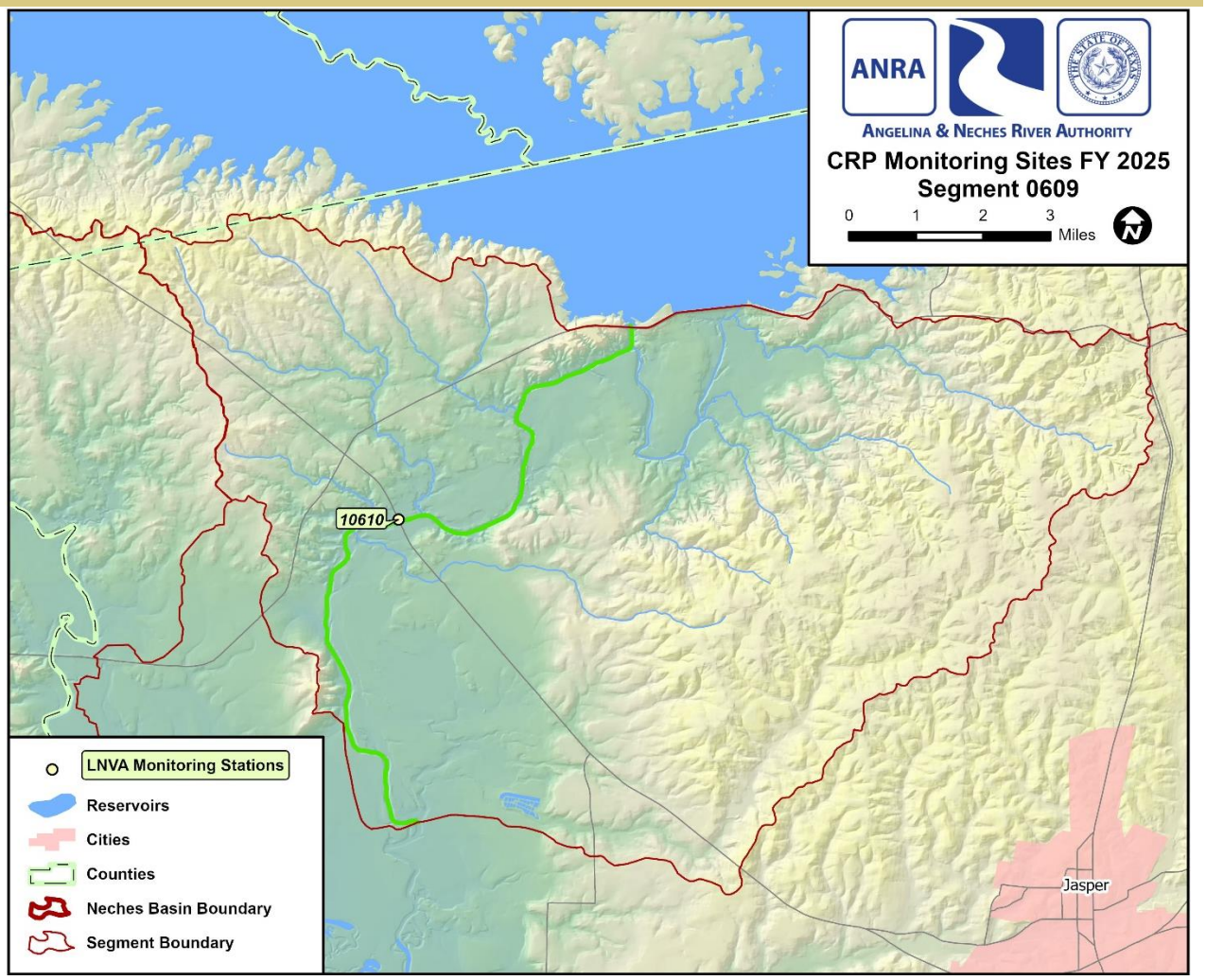


Segment 0606 is a 27 mile stretch of freshwater stream between a point 6.7 km (4.2 miles) downstream of FM 279 in Henderson/Smith County to Rhines Lake Dam in Van Zandt County. Designated uses for this segment are general, primary contact recreation 1, aquatic life (intermediate), and domestic water supply.

According to the 2024 IR, two AUs on the Neches River Above Lake Palestine (0606) have impairments for bacteria in the water and one for depressed dissolved oxygen in the water. Three unclassified stream segments are associated with Segment 0606. Two of them currently have impairments:

- 0606A – Prairie Creek: Bacteria.
- 0606D – Black Fork Creek: Bacteria.

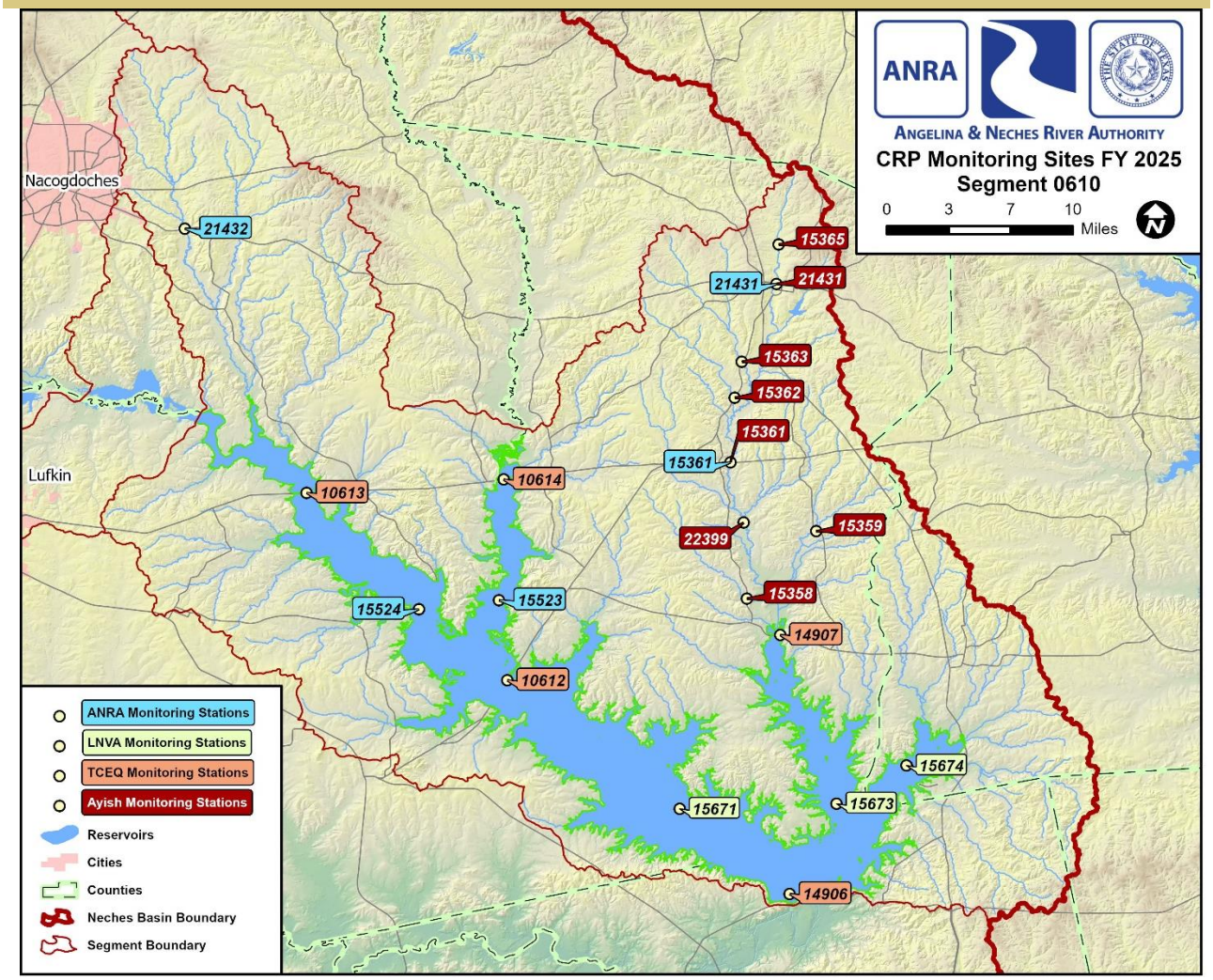
SEGMENT 0609 – ANGELINA RIVER BELOW SAM RAYBURN RESERVOIR



Segment 0609 is an 18-mile section of freshwater stream between the Sam Rayburn Reservoir dam in Jasper County and a point immediately upstream of the confluence of Indian Creek in Jasper County. Designated uses for this segment are general, primary contact recreation 1, aquatic life (high), domestic water supply, and fish consumption.

According to the 2024 IR, one AU on the Angelina River Below Sam Rayburn Reservoir (0609) has impairments for dioxin and mercury in edible tissue. There are no unclassified stream segments are associated with Segment 0609.

SEGMENT 0610 – SAM RAYBURN RESERVOIR



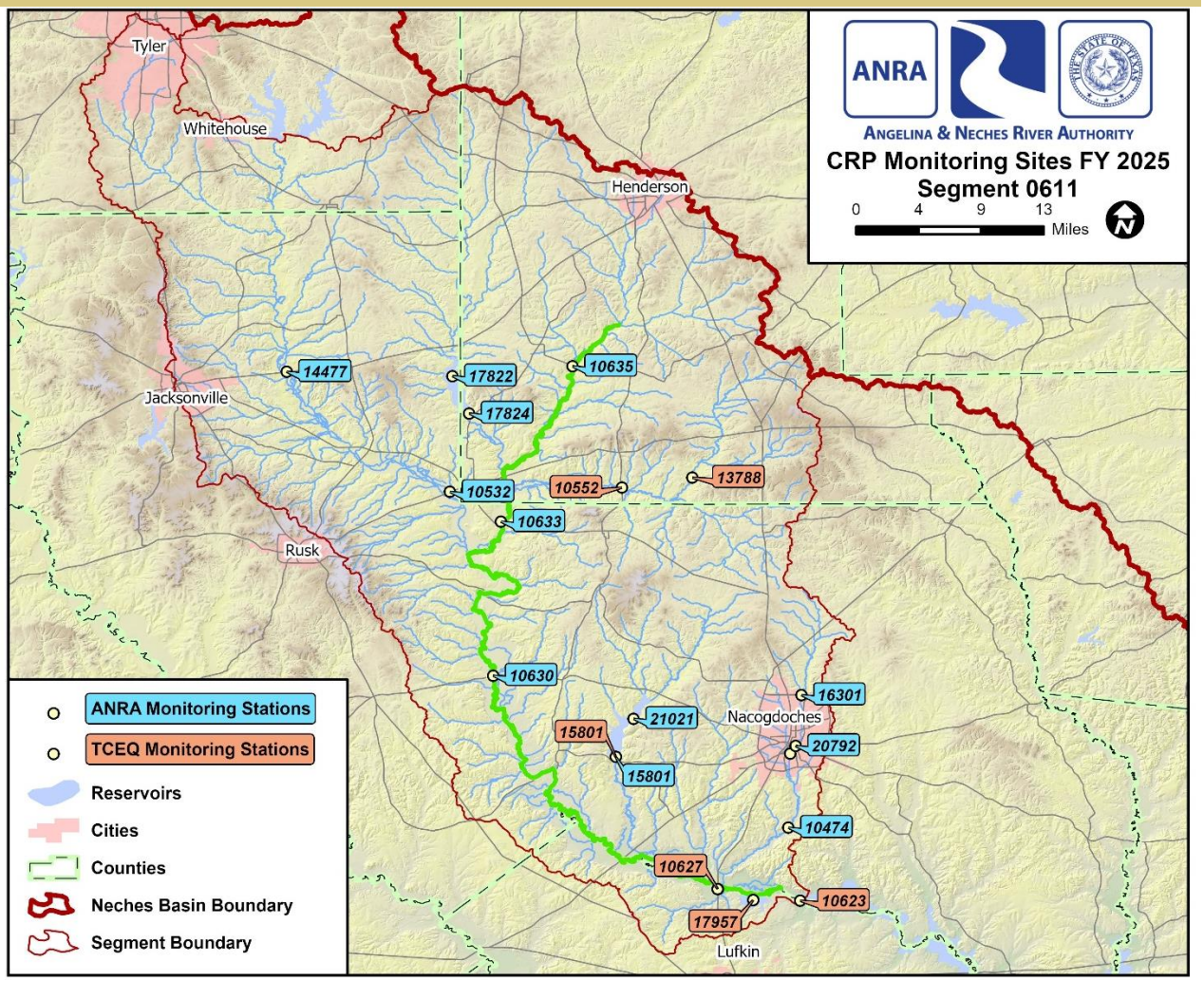
Segment 0610, which is Sam Rayburn Reservoir, includes 106,666 acres from Sam Rayburn Dam in Jasper County to a point 5.6 kilometers (3.5 miles) upstream of Marion's Ferry on the Angelina River Arm in Angelina/Nacogdoches County and to a point 3.9 km (2.4 miles) downstream of Curry Creek on the Attoyac Bayou Arm in Nacogdoches. Designated uses are general, primary contact recreation 1, aquatic life (high), domestic water supply, and fish consumption. Various contact recreational areas including trails, campgrounds, boating ramps, marinas, designated swimming areas, and group areas are located around Sam Rayburn Reservoir.

According to the 2024 IR, all ten AUs at Sam Rayburn (Segment 0610) are impaired for dioxin and mercury in edible tissue and excessive algal growth in water, additionally AU 05 is also impaired for high pH. Also, there are several unclassified stream segments that are associated with Sam Rayburn due to their direct discharge into the reservoir. Two of them are currently impaired:

- 0610A – Ayish Bayou: Bacteria.
- 0610P – Bayou Carrizo: Bacteria.

ANRA is currently working with TWRI on a TMDL funded project to address bacteriological impairments in the Ayish Bayou. Details can be found in the water quality remediation efforts section of this report.

SEGMENT 0611 – ANGELINA RIVER ABOVE SAM RAYBURN RESERVOIR



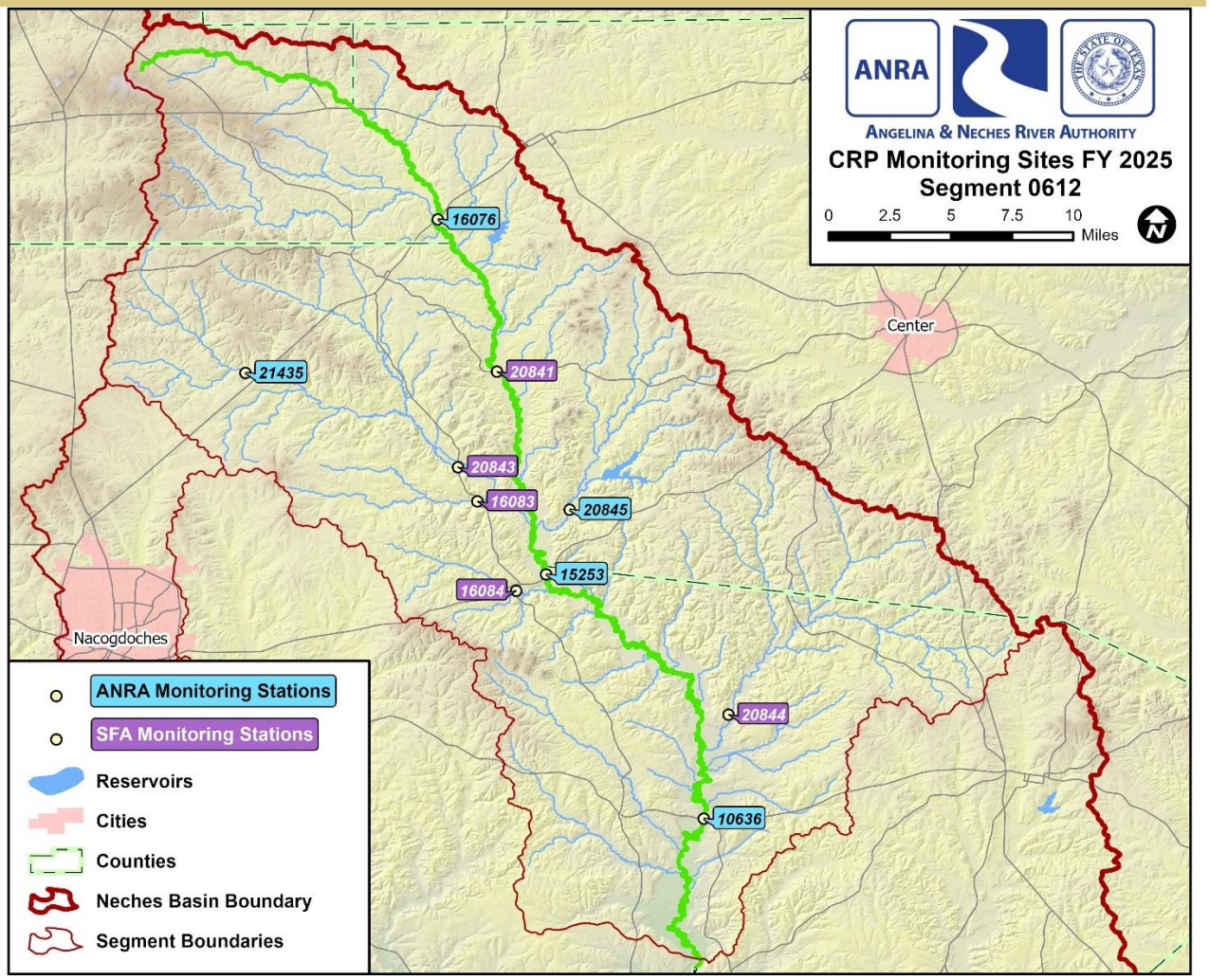
Segment 0611 is a 104-mile freshwater stream from the aqueduct crossing 0.6 miles upstream of the confluence of Paper Mill Creek in Angelina/Nacogdoches County to the confluence of Barnhardt Creek and Mill Creek at FM 225 in Rusk County. Designated uses for this segment are general, primary contact recreation 1, aquatic life (high), and domestic water supply.

According to the 2024 IR, three Segment 0611 AUs have impairments of bacteria in water. Additionally, there are multiple unclassified segments associated with this section of the Angelina River, four of which have impairments:

- 0611A – East Fork Angelina River: Bacteria.
- 0611B – La Nana Bayou: Bacteria.
- 0611C – Mud Creek: Bacteria.
- 0611D – West Mud Creek: Bacteria.

Several special projects are associated with these segments. Details can be found in the water quality remediation efforts section of this report.

SEGMENT 0612 – ATTOYAC BAYOU



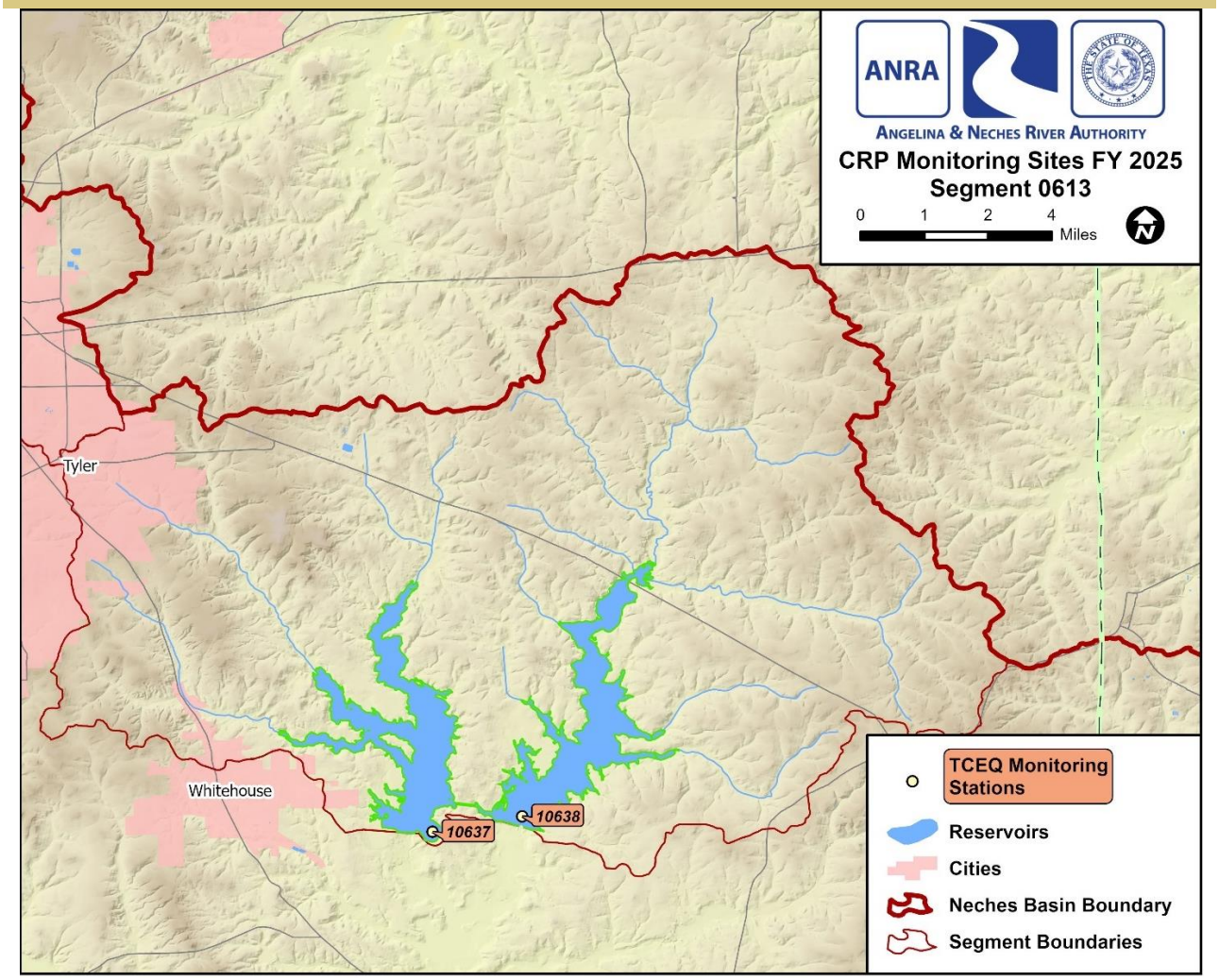
Segment 0612 is a section of freshwater stream measuring 81.7 miles in length from a point 3.9 km (2.4 miles) downstream of Curry Creek in Nacogdoches/San Augustine County to FM 95 in Rusk County. Designated uses for this segment are general, primary contact recreation 1, aquatic life (high), and domestic water supply. The area surrounding the watershed is managed for agricultural (cattle and poultry), silvicultural, recreational, and wildlife uses.

According to the 2024 IR, all three AUs of Segment 0612 are impaired for bacteria. There are multiple unclassified segments associated with 0612, but only one is impaired.

- 0612F – West Creek: Bacteria.

Several special projects are associated with this segment. Details can be found in the water quality remediation efforts section of this report.

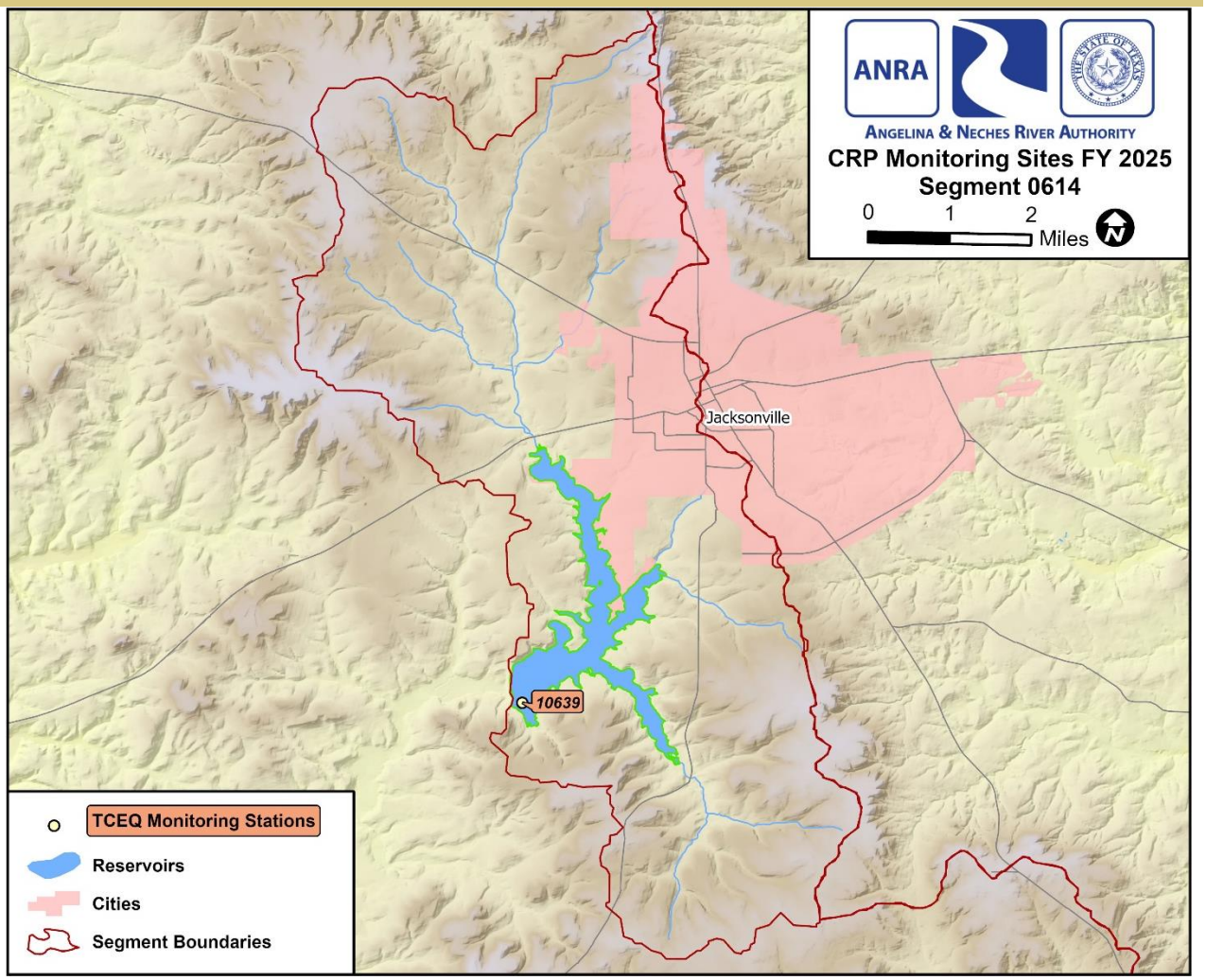
SEGMENT 0613 – LAKE TYLER/LAKE TYLER EAST



Segment 0613 extends from Whitehouse Dam and Mud Creek Dam in Smith County up to the normal pool elevation of 375.38 feet. The reservoir impounds both Prairie Creek and Mud Creek. Lake Tyler West and East include a total of 4,880 acres. Designated uses for this segment are general, primary contact recreation 1, aquatic life (high), and domestic water supply. Lake Tyler West and East were impounded in 1949 and 1966, respectively. The reservoir serves as a major source of water for local municipalities and recreational uses. There are several park areas adjacent to both lakes. The lakes have a storage capacity of 15 billion gallons of water within the watershed.

According to the 2024 IR, three AUs on Lake Tyler/Lake Tyler East (0613) have impairments for excessive algal growth in water. There are no unclassified segments associated with 0613.

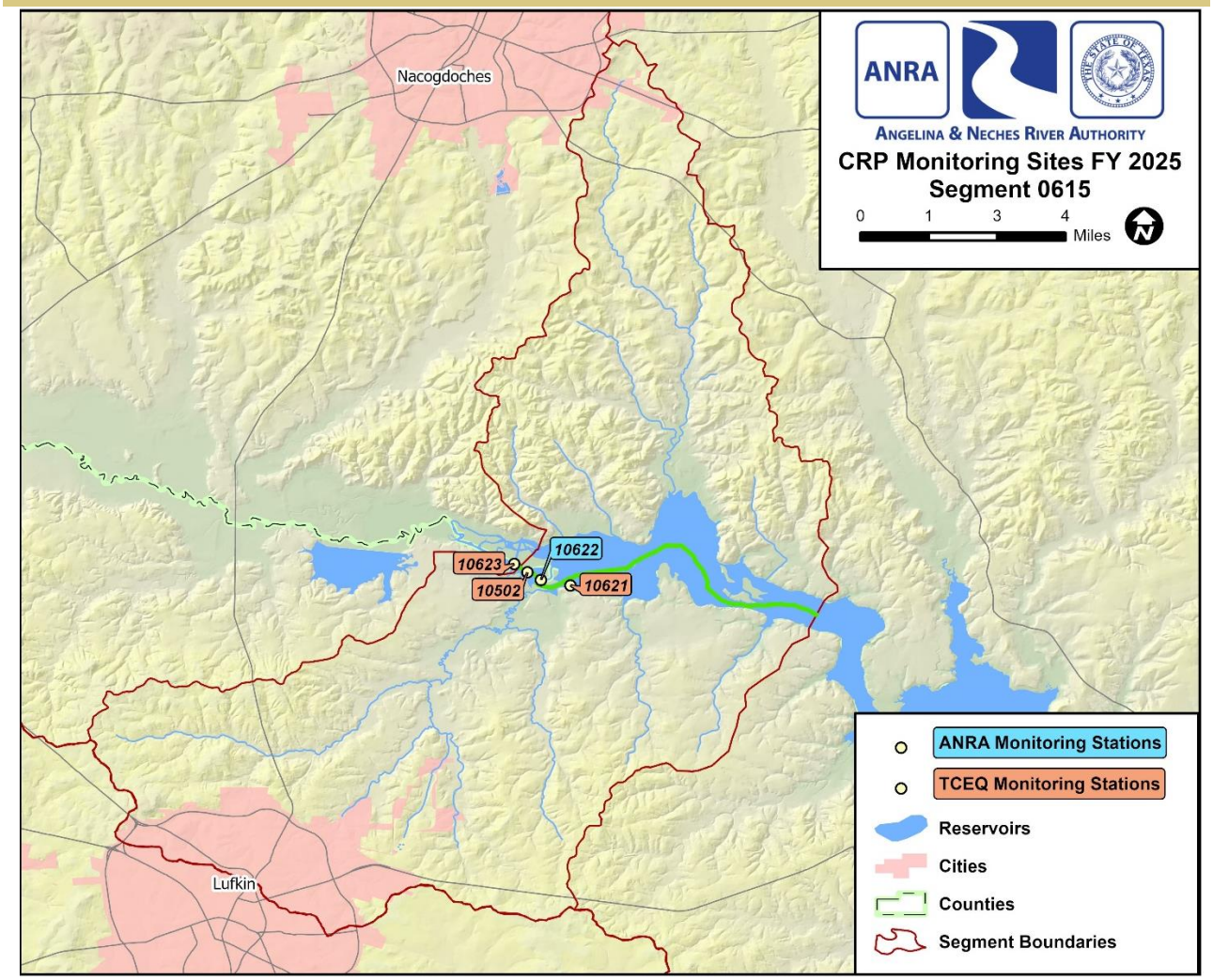
SEGMENT 0614 – LAKE JACKSONVILLE



Segment 0614 is designated as a classified reservoir - Lake Jacksonville. The description of this lake includes an area from Buckner Dam in Cherokee County up to a normal pool elevation of 422 feet (impounds Gum Creek). Designated uses for this segment are general, primary contact recreation 1, aquatic life (high), and domestic water supply.

According to the 2024 IR, Lake Jacksonville currently meets all standards for designated uses.

SEGMENT 0615 – ANGELINA RIVER/SAM RAYBURN RESERVOIR



Segment 0615, known as the riverine portion of Sam Rayburn Reservoir, extends from a point 5.6 kilometers (3.5 miles) upstream of Marion's Ferry to a point 2.75 kilometers (1.71 miles) upstream of the confluence of Paper Mill Creek. The segment includes 5,068 acres. Designated uses for this segment are general, primary contact recreation 1, aquatic life (high), domestic water supply, and fish consumption.

According to the 2024 IR, one AU is impaired for depressed oxygen levels, dioxin and mercury in edible tissue, and low pH. Three unclassified segments are associated with 0615, but only one is impaired.

- 0615A – Paper Mill Creek: Bacteria.

WATER QUALITY REMEDIATION EFFORTS

Water quality remediation efforts are a complex process involving many different steps. CRP can often be the starting point for remediation. Through CRP, water bodies across the state are monitored routinely to determine if they meet the TSWQS relevant to their designated uses, and if they are declining or improving in quality. Remediation projects can be conducted within CRP, but more often are standalone projects funded by local entities or partnerships in combination with state funding and/or federal funding from CWA §319(h) grants. Project tasks can include things like: data collection and interpretation, education and outreach, implementation of best management practices, assistance for low-income households, and more.

Examples of these types of projects can include:

Use Attainability Analysis (UAA) – These analyses evaluate designated or presumed uses if there is reason to believe the standards for a water body are inappropriate due to local conditions. A UAA is a scientific assessment of the physical, chemical, and biological characteristics of a water body.

Recreational Use Attainability Analysis (RUAA) – An RUAA is a specific type of UAA that is conducted to evaluate and determine what category of recreational use is appropriate for a particular water body. RUAAs are typically site-specific studies that assess reasonably attainable recreational uses based on the physical and flow characteristics of a stream—such as water depth and persistence of flow. Supporting information, including surveys of individuals and organizations with firsthand knowledge of a water body, is also collected to assess historical and existing patterns of recreational use.

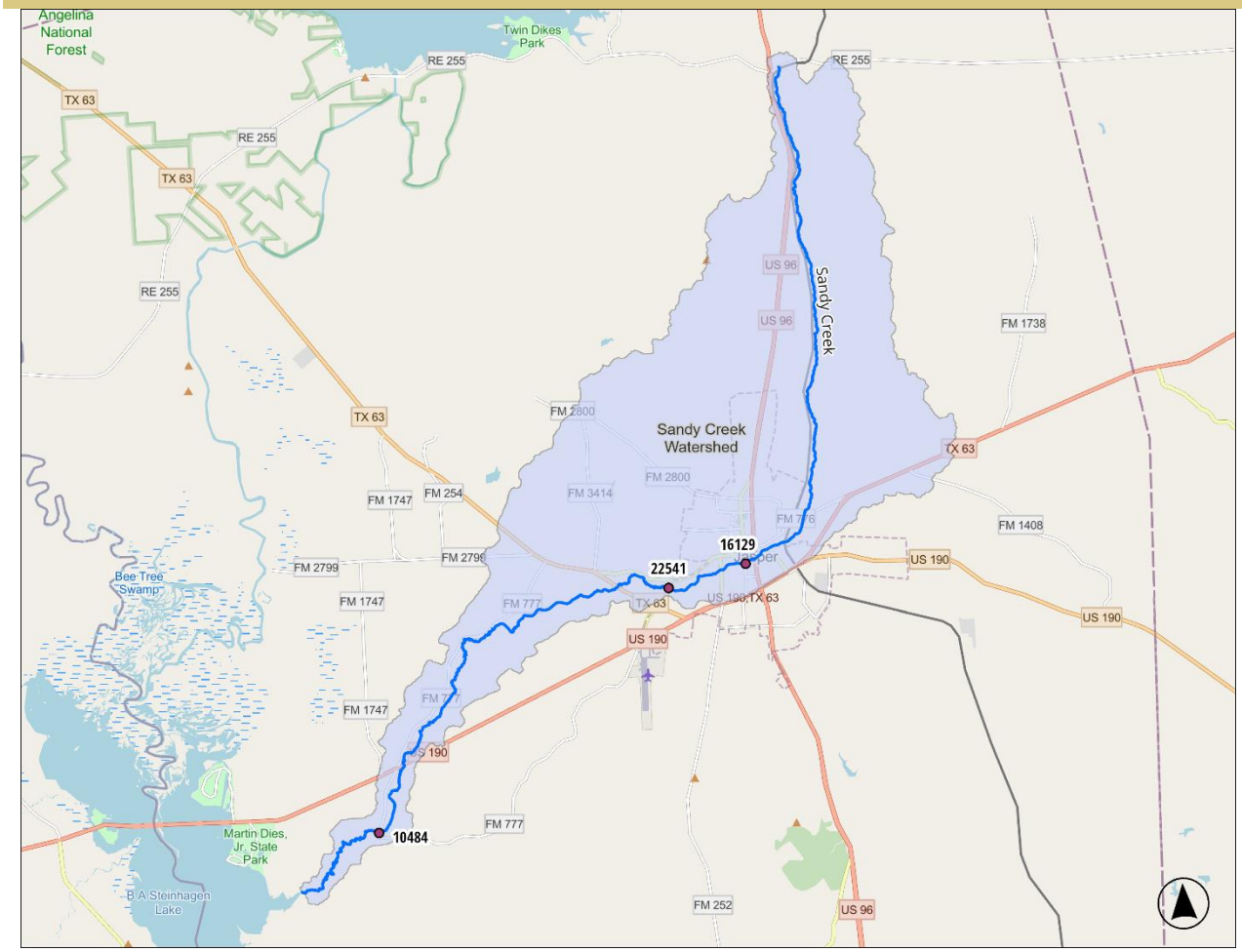
Watershed Characterization – Project goals involve the investigation of current water quality in a specific watershed through an assessment of existing water quality data, collection of additional data, and the analysis of that water quality data.

Watershed Protection Plan (WPP) – WPPs are holistic, stakeholder-driven plans that address water quality in a specific watershed. These plans identify pollutants and their potential sources and provide a framework for coordinated implementation of protection and restoration activities. All impairments are taken into consideration when developing a watershed protection plan.

Total Maximum Daily Load (TMDL) – These projects are agency-driven but are still highly stakeholder dependent. The goal of a TMDL is to identify pollutants and their potential sources and allocation loads. Implementation plans are then developed to outline the steps needed for reducing the loading of the specific pollutant identify management measures and actions that can be taken by stakeholders.

The following pages present an overview of surface water quality projects that are active, in planning, or recently completed in the upper and middle portions of the Neches River Basin.

SANDY CREEK IN JASPER – 0603A



Sandy Creek, segment 0603A, is located in Jasper County in East Texas and flows through the City of Jasper. It has been listed as impaired for elevated indicator bacteria since 2000.

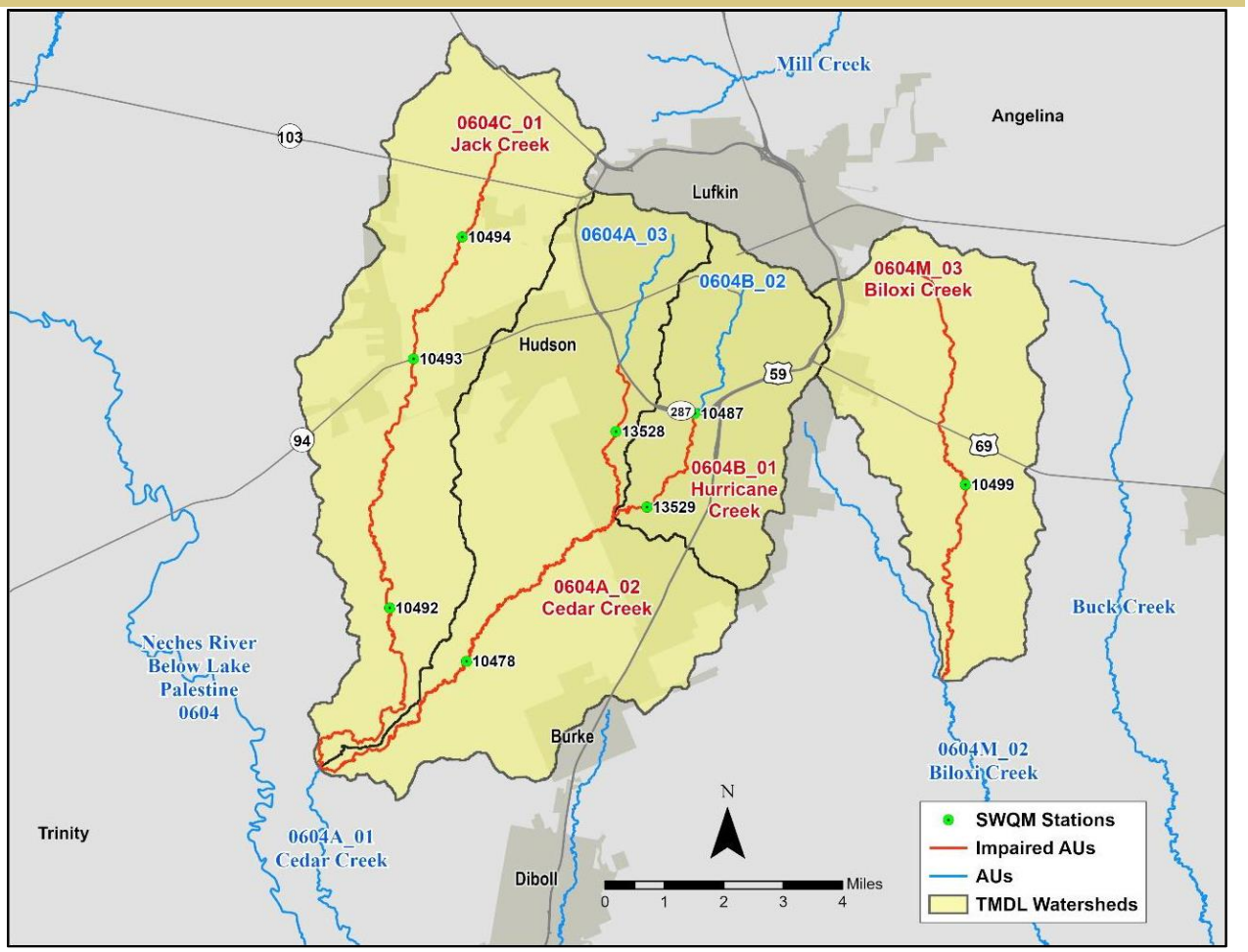
In 2019, TCEQ, TWRI, LNVA, and ANRA began working on development of a Total Maximum Daily Load (TMDL) and Implementation Plan (I-Plan) with watershed stakeholders. The TMDL was approved by EPA in August of 2022, and the I-Plan was approved in June of 2023. Currently, water quality data is available for one site near the outlet of the segment. Although sufficient data is available for assessment purposes, stakeholders had questions about water quality in the rest of the segment. Additionally, some stakeholders had interests in water quality related projects that could not be directly addressed in the I-Plan (riparian restoration, erosion control, etc.).

Through the TMDL and I-Plan planning process it was evident that a watershed protection plan (WPP) would be appropriate for the involved stakeholders, but resources were not available to jointly develop the WPP and I-Plan. Stakeholders were concerned about funding availability to implement measures in the I-Plan, which could be partially addressed with a WPP and subsequent eligibility for 319 funds. Prior to WPP development, additional data is needed to better characterize water quality throughout the watershed because data is only available at a single site.

A new project of TCEQ, TWRI, and ANRA is slated to begin spring/summer of 2025 and will focus on collecting additional water quality data needed for WPP development and development of a watershed characterization report. The project will collect existing data, as well as monthly monitoring at three sites along Sandy Creek for 24 months. The intent of the project is to collect data and develop preliminary information needed for successful WPP development.

For further information about this project, contact:
Ms. Emylea Cole at ANRA (ecole@anra.org)
Mr. Michael Schramm at TWRI (Michael.Schramm@ag.tamu.edu)
Website: https://www.tceq.texas.gov/waterquality/tmdl/nav/118-sandy-wolf-creeks-bacteria

MIDDLE NECHES TRIBUTARIES – 0604A, 0604B, 0604C, 0604M



In portions of four stream segments in the Lufkin area, bacteria concentrations are sometimes higher than the criteria set to protect the safety of recreation. High concentrations of bacteria, which are found in both human and animal waste, may indicate a health risk to people who swim or wade in the water body, which are "contact recreation" activities.

The goal of these projects is to improve water quality to protect recreational uses. To achieve that goal, the TCEQ, TWRI, and ANRA worked with local stakeholders to develop a TMDL and associated I-Plan for Jack, Cedar, Hurricane, and Biloxi creeks near Lufkin.

The developed TMDL was accepted by the TCEQ in October of 2022 and the I-Plan was approved in August 2023.

After the TMDL was originally completed, the uppermost AUs for Cedar Creek and Hurricane Creek as well as the downstream AU for Biloxi Creek were added to the list of impairments, and work has since been undertaken to add these three AUs into the existing TMDL. In April 2024, EPA approved an addendum adding 0604A_03 to the TMDL, and TCEQ is currently working on the Technical Support Document (TSD) needed to begin adding 0604B_02 and 0604M_02. Work is expected to be completed sometime in FY 2026.

Management measures outlined in the I-Plan are ongoing, and include:

1) Promoting feral hog management.
2) Implementing water quality monitoring.
3) Promoting volunteer water quality monitoring.
4) Promoting sustainable forest practices.
5) Promoting and implement Natural Resources Conservation Service conservation plans and Texas State Soil and Water Conservation Board Water Quality Management Plans.
6) Reducing sanitary sewer overflows and unauthorized discharges.
7) Promoting education and awareness for the proper disposal of fats, oils, and grease, pet waste, and illicit dumping.
8) Promoting OSSF management.

See the I-Plan at the project website for more details about these management measures.

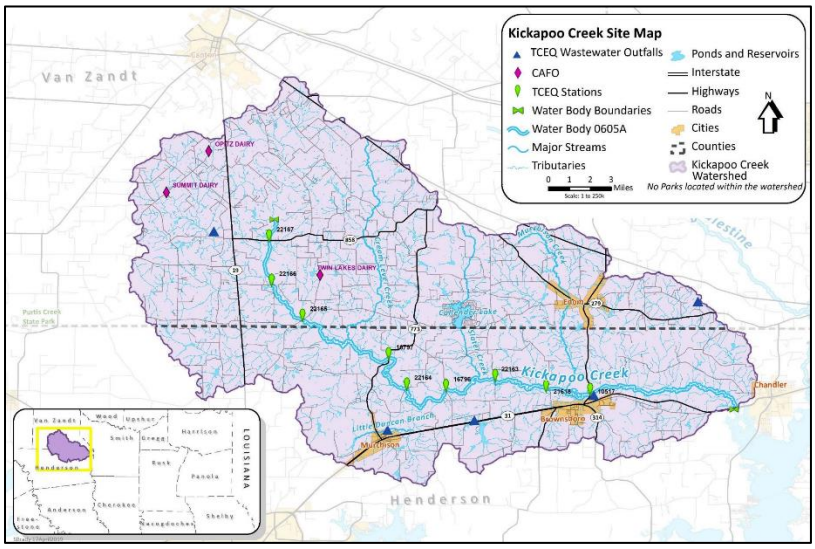
These projects have been funded by the TCEQ through the TMDL program.

For further information about these projects, contact:
Ms. Emylea Cole at ANRA (ecole@anra.org)
Mr. Michael Schramm at TWRI (Michael.Schramm@ag.tamu.edu)
Mr. Wyatt Eason at TCEQ (Wyatt.Eason@tceq.texas.gov)
Project Website: https://www.tceq.texas.gov/waterquality/tmdl/nav/118-lufkinwatersheds-bacteria

KICKAPOO CREEK – 0605A

Kickapoo Creek is impaired for elevated bacteria levels, and low dissolved oxygen. Kickapoo Creek in Henderson County (0605A) is 41 river miles long extending from the confluence of Lake Palestine to the confluence with an unnamed tributary that is approximately 1 mile north of Farm-to-Market (FM) 858 in Van Zandt County. The watershed stretches between Van Zandt and Henderson counties and includes portions of the cities of Edom, Murchison, Chandler, and Brownsboro.

A collaborative effort between TSSWCB, The Texas Institute for Applied Environmental Research (TIAER), ANRA, and local stakeholders led to the development of a WPP for Kickapoo Creek's bacteria impairment. Water quality sampling was started in 2021 and was completed in February 2023 and the WPP received EPA acceptance in January 2024. WPP implementation projects are likely to be proposed soon.

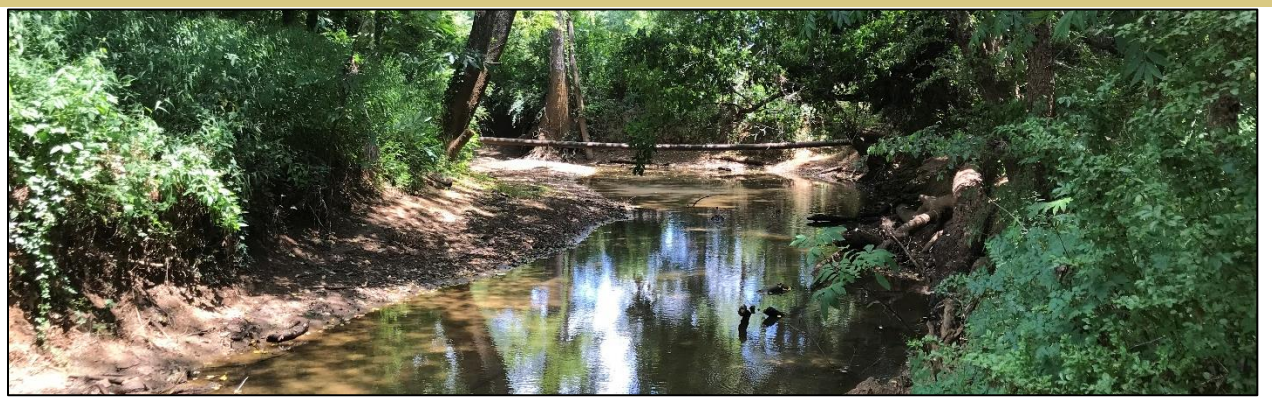


This project was funded by a State Nonpoint Source Program grant from TSSWCB.

For more information about this project, contact:

Ms. Emylea Cole (ecole@anra.org)
Ms. Leah Taylor at TIAER (ltaylor@tarleton.edu)
Watershed Protection Plan: https://tsswcb.texas.gov/sites/default/files/Kickapoo%20Creek%20WPP-FINAL.pdf

BAYOU CARRIZO WATERSHED – 0610P



Bayou Carrizo is impaired for elevated bacteria levels. Water quality monitoring first began on Bayou Carrizo at SWQM Station 21432 in 2014. Once sufficient data was collected to allow assessment, the Bayou was determined to be impaired for elevated levels of indicator bacteria and was placed on the 303(d) list in 2022. Data collected to date has been quarterly and at a single site in the watershed.

To support future watershed-based planning efforts in the Bayou Carrizo watershed, monitoring at a higher frequency and at more locations that are somewhat evenly distributed throughout the watershed is necessary.

TWRI, and ANRA have proposed a project that will conduct routine water quality monitoring monthly at three sites in the watershed. Sampling will include routine field parameters (water temperature, pH, DO, specific conductance, instantaneous stream flow, days since last significant rainfall, flow severity, present weather, secchi depth, and total water depth). Water samples will be analyzed for Nitrate-N, Nitrite-N, Ammonia-N, Total Phosphorus, Chloride, Sulfate, Total Suspended Solids, TKN, and *E. coli*.

Monitoring is expected to begin in summer/fall of 2025 and will continue for twenty-four months.

This project will be funded by a the TSSWCB.

For more information about this project, contact:
Ms. Emylea Cole at ANRA (ecole@anra.org)
Ms. Amanda Tague at TWRI (amanda.tague@ag.tamu.edu)

ANGELINA RIVER WATERSHED (ABOVE SAM RAYBURN RESERVOIR) – 0611, 0611A, 0611C, 0611D

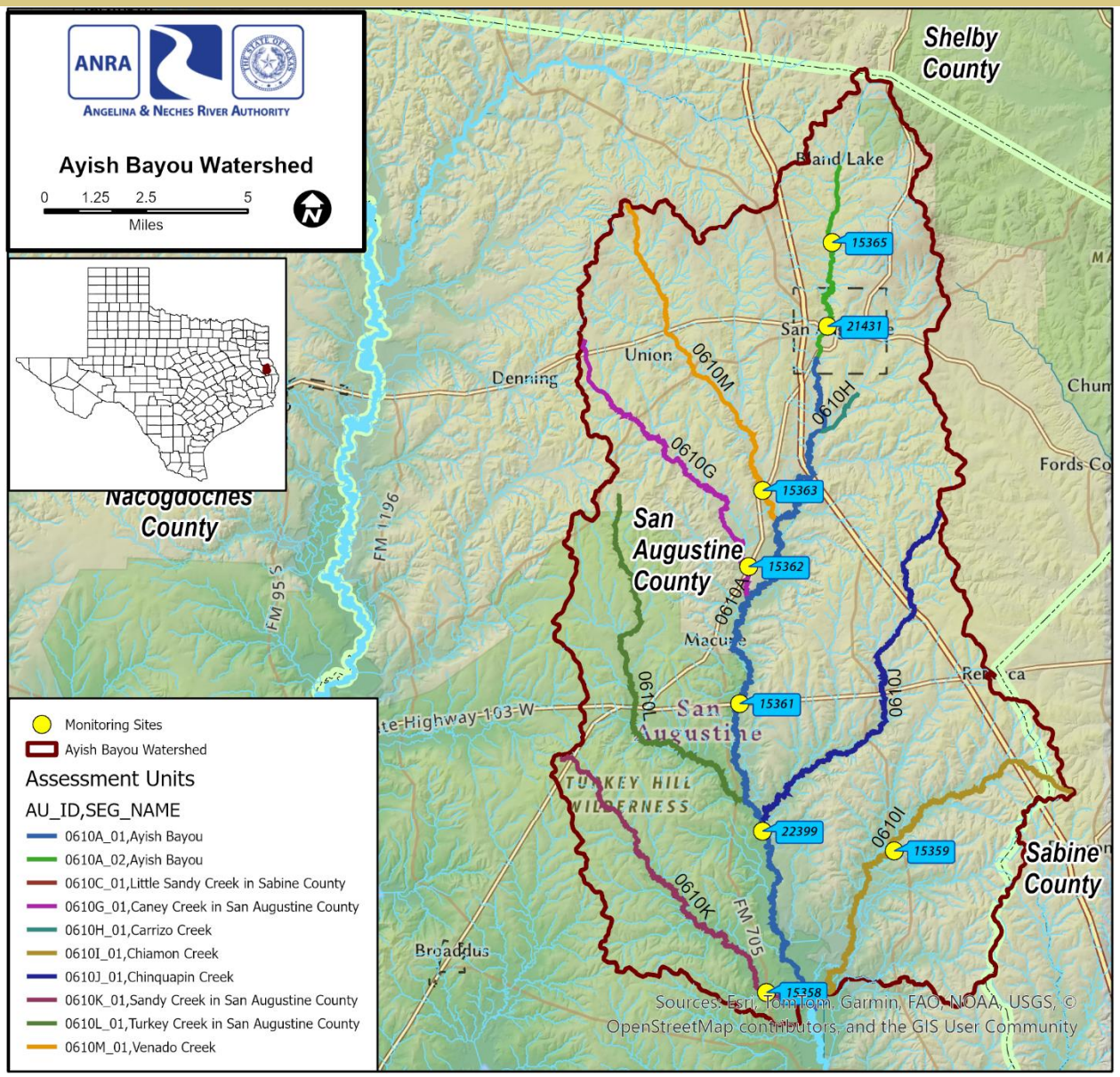
In 2017, due to a longstanding impairment for elevated bacteria levels, TSSWCB, TWRI and ANRA began monitoring in the Upper Angelina River Watershed in order to collect data for a watershed characterization. Monitoring ended in early FY 2022, and TWRI published the watershed characterization report in October of 2022. These efforts could lead to a Watershed Protection Plan in the future.

This project was funded by the TSSWCB through CWA §319(h) grants.

For more information about this project, contact:

Ms. Emylea Cole (ecole@anra.org)
Mr. Alexander Neal at TWRI (alexander.neal@ag.tamu.edu)
Watershed Characterization Report: https://twri.tamu.edu/media/6089/tr-539.pdf

AYISH BAYOU WATERSHED – 0610A, 0610G, 0610I, 0610K, 0610M

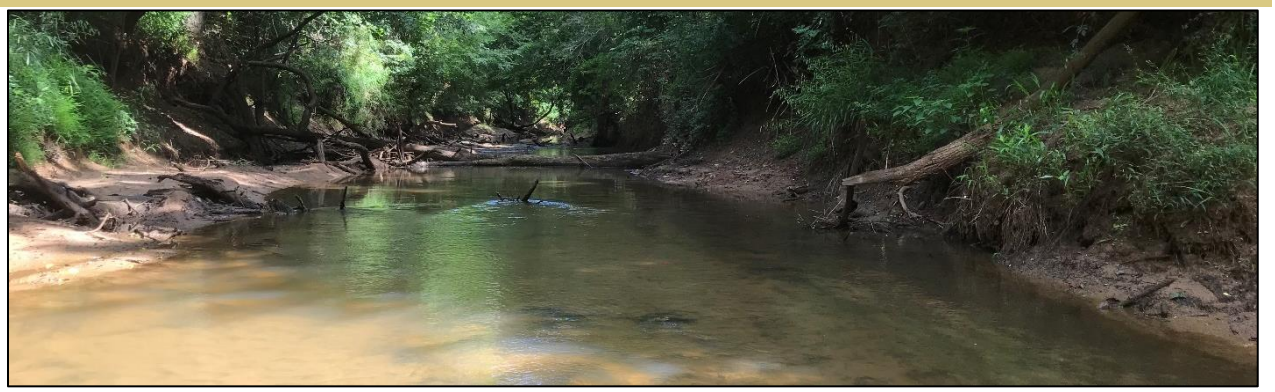


Ayish Bayou is impaired for elevated bacteria levels. Work to address the impairment began in September of 2021. A cooperative effort between TCEQ, TWRI, and ANRA. Existing data was gathered and reviewed, local stakeholders were consulted, and then additional monthly monitoring was implemented throughout the watershed at eight sites. Monitoring for the current project will complete in July of 2025, and a continuation project is expected for FY 2026.

These projects have been funded by the TCEQ through the TMDL program.

For more information about this project, contact:
Ms. Emylea Cole at ANRA (ecole@anra.org)
Mr. Michael Schramm at TWRI (Michael.Schramm@ag.tamu.edu)
Project website: https://ayish.twri.tamu.edu/

LA NANA CREEK WATERSHED – 0611B



Lan Nana Bayou is impaired for Elevated Bacteria Levels. TCEQ, TWRI, ANRA, SFA, the City of Nacogdoches, and local stakeholders worked together to develop a Watershed Protection Plan, which was accepted by the EPA in July of 2023.

The WPP identified nine primary management measures to potentially reduce the bacteria load in the watershed.

1. Mitigate Urban Stormwater Runoff Issues:
   Reduce E. coli loading associated with urban stormwater runoff through implementation of stormwater BMPs as appropriate and to increase awareness of stormwater pollution and management.
2. Promote the Development of Water Quality Management Plans or Conservation Plans:
   Develop up to 25 CPs and/or WQMPs focused on minimizing the time spent by livestock in the riparian corridor and better use of available grazing resources across the property.
3. Obtain Technical Assistance for Urban Waterfowl Management:
   Reduce waterfowl populations to improve water quality and sanitary conditions around public use areas.
4. Promote BMPs for Managing Feral Hog Populations:
   Manage the feral hog population through available means to reduce the total number of current hogs in the watershed by 10% and maintain them at this level over 10 years of implementation.
5. Promote Proper Disposal of Pet Waste in Urban Areas:
   Reduce the amount of dog waste in the watershed that may wash into water bodies during runoff events by providing educational and physical resources to increase stakeholder awareness of the water quality and potential health issues caused by excessive dog waste.
6. Identify, Inspect, and Remediate Failing On-Site Sewage Facilities:
   Because failing septic systems pose a higher human health risk than some of the other potential pollutant sources, stakeholders expressed a desire to identify, inspect, and repair or replace (as appropriate) at least 30 of the potentially 851 failing OSSFs in the watershed.
7. Reduce Illegal Dumping and Litter:
   Increase awareness of proper disposal techniques and reduce illicit dumping of waste and animal carcasses in water bodies throughout the watershed.
8. Work with Area Schools to Develop Water Quality and Conservation Programs for K-12 Students:
   Work with Nacogdoches ISD educators to determine what kind of programming already exists in their schools and what would be helpful. Develop or integrate existing educational materials for schools. Provide “train the trainer” opportunities for teachers to learn the materials and how to administer them effectively.
9. Continue and Expand Water Quality Monitoring along La Nana Bayou and Banita Creek:
   Increase spatial and temporal resolution of data and better direct technical and financial resources

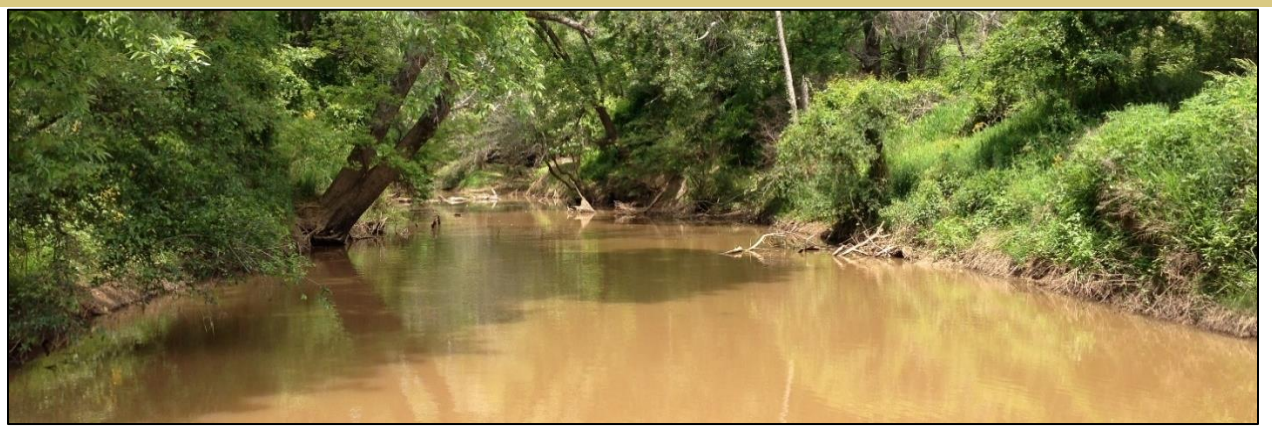
The first implementation project for the WPP began in FY 2024. And was funded by the TSSWCB. For this project SFA collected bacteria samples from 20 sites in the watershed monthly, and ANRA collected field, conventional, bacteria, and flow at two sites monthly. TWRI headed up the education and outreach components of the project, as well as project administration and reporting. Sampling for the project completed in Feb of 2025. A continuation project is planned for FY 2026.

These projects have been funded by the TCEQ and the TSSWCB through state funds as well as CWA §319(h) grants.

For more information about these projects, contact:

Ms. Emylea Cole (ecole@anra.org)
Mr. Alexander Neal at TWRI (alexander.neal@ag.tamu.edu)
Watershed Protection Plan: https://twri.tamu.edu/media/6290/tr-547.pdf

ATTOYAC BAYOU WATERSHED – 0612, 0612A, 0612B, 0612C, 0612D, 0612E, 0612F, 0612E



Attoyac Bayou is impaired for elevated bacteria levels. In 2009, with funding from the EPA and TSSWCB, the Attoyac Watershed Partnership was formed and a Watershed Protection Plan was created.

The WPP identified five primary management measures to potentially reduce the bacteria load in the watershed.

1. Develop WQMPs focused on minimizing/planning the time spent by livestock in the riparian corridor
2. Manage the feral hog population through available means in efforts to reduce the total number of hogs in the watershed by 10% and maintain that level of reduction annually.
3. Identify, inspect and repair or replace as appropriate 50 failing OSSFs in the watershed within 150 yds of a perennial waterway and an additional 50 failing OSSFs within 50 yds of an intermittent waterway.
4. Provide needed education and outreach to watershed landowners who own and operate OSSFs, pumping services and maintenance providers enabling them to better manage, repair or replace OSSFs as needed.
5. Work with landowners with hunting camps on their properties to install sufficient sewage treatment facilities to prevent future discharge of raw sewage to the watershed.

Water quality projects implementing the WPP management measures began in late 2013. Since that first implementation project, there has been an ongoing series of projects continuing implementation of the WPP via two primary tracks, BMP/WQMP Effectiveness Monitoring, and OSSF Remediation. Both tracks also have education and outreach components.

BMP EFFECTIVENESS MONITORING

This series is an ongoing effort between TSSWCB, TWRI, SFA, and ANRA to conduct monthly monitoring at five sites in the Attoyac Watershed to determine if the BMPs implemented from the WPP are having a positive effect towards reducing the bacterial load in the Attoyac Bayou. The final monitoring event for the most recent project was completed in August of 2024. The next project is in the planning stages for FY 2026.

OSSF REMEDIATION

This partnership between TCEQ, TWRI, Pineywoods RC&D, and ANRA has been focused on replacing and repairing failing OSSFs within the Attoyac Bayou Watershed to reduce the pollutant load from insufficiently treated wastewater. The most recent project completed in August of 2024. To date, over 80 OSSFs have been installed or repaired by this series of projects. At this time, there are no continuation projects proposed.

These projects were funded by CWA §319(h) grants distributed through the TSSWCB and TCEQ.

For more information about either of these projects, contact:
Ms. Emylea Cole (ecole@anra.org)
Mr. Alexander Neal at TWRI (alexander.neal@ag.tamu.edu)
Project Website: https://attoyac.tamu.edu/

STAKEHOLDER PARTICIPATION AND OUTREACH

Through dedicated and improved public awareness and education efforts, in 2024-2025, ANRA participated in a number of outreach activities, focused on the Clean Rivers Program and Clean Water Activities.

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 as well as the 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 of 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 the 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.

The 2024 CRP Steering Committee Meeting was held in Person with a Virtual option on Tuesday, July 30, 2024, at the Texas Forestry Association Building in Lufkin. For more information or to be added to the Steering Committee mailing list, please contact Emylea Cole at 936-632-7795 or ecole@anra.org.

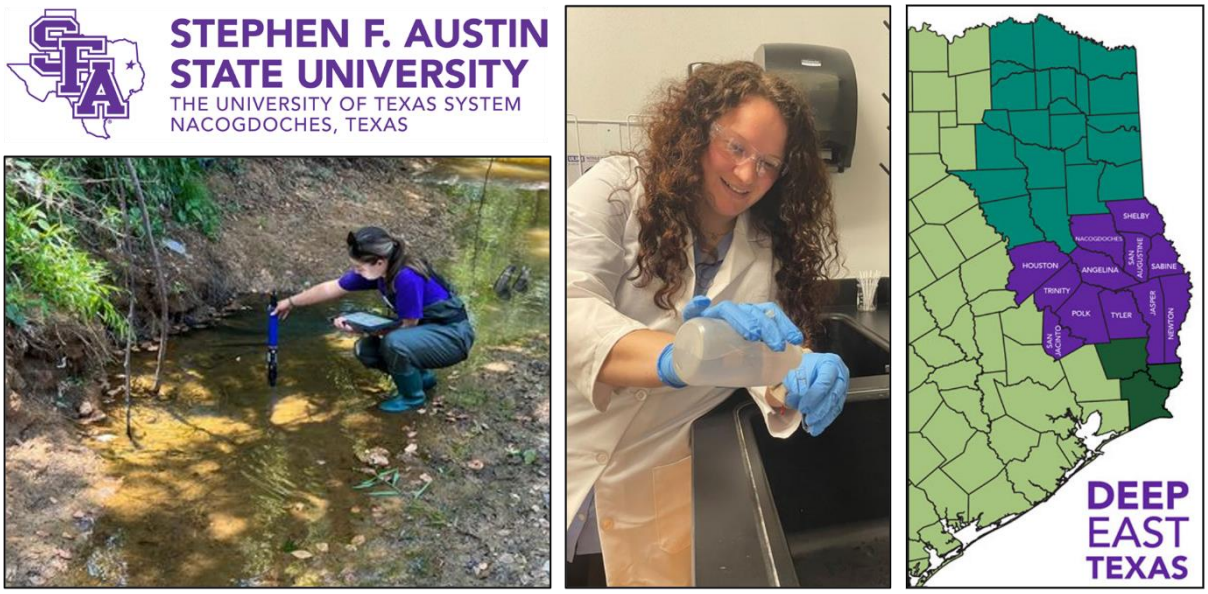
A recording of the meeting, as well as copies of the presentations, are available on the ANRA website:
https://www.anra.org/conservation-recreation/water-quality-activities/clean-rivers-program/meetings-events/

RECREATION, EDUCATION, AND OUTREACH

LITTER ABATEMENT CAMPAIGN

In 2024, within less than two years of purchasing 10,000 Stash Your Trash litter bags, ANRA successfully distributed all 10,000 bags throughout East Texas. The mesh litter bags, which are made from recycled material and intended to be reused, are designed especially for outdoor recreational activities, such as paddling, boating, fishing, hiking, and camping. The bags are durable and allow water to flow through them, while keeping trash contained. ANRA worked with multiple Keep Texas Beautiful affiliates, as well as local businesses and organizations to promote and distribute the bags. In April 2025, ANRA purchased an additional 10,000 bags.

SFASU CARRI PROGRAM INTERNSHIP PARTNERSHIP



CENTER FOR APPLIED RESEARCH AND RURAL INNOVATION

In late spring of 2023, ANRA began a partnership with Stephen F. Austin State University's Center for Applied Research and Rural Innovation (CARRI) Program. The CARRI program provides funding to SFA students to join the ANRA team for a semester to gain experience in the environmental industry. At the time of the release of this report, the CARRI/ANRA internship partnership has hired two Environmental Laboratory interns and two Clean Rivers Program interns. This program is currently active and applicants may qualify if they meet these requirements:

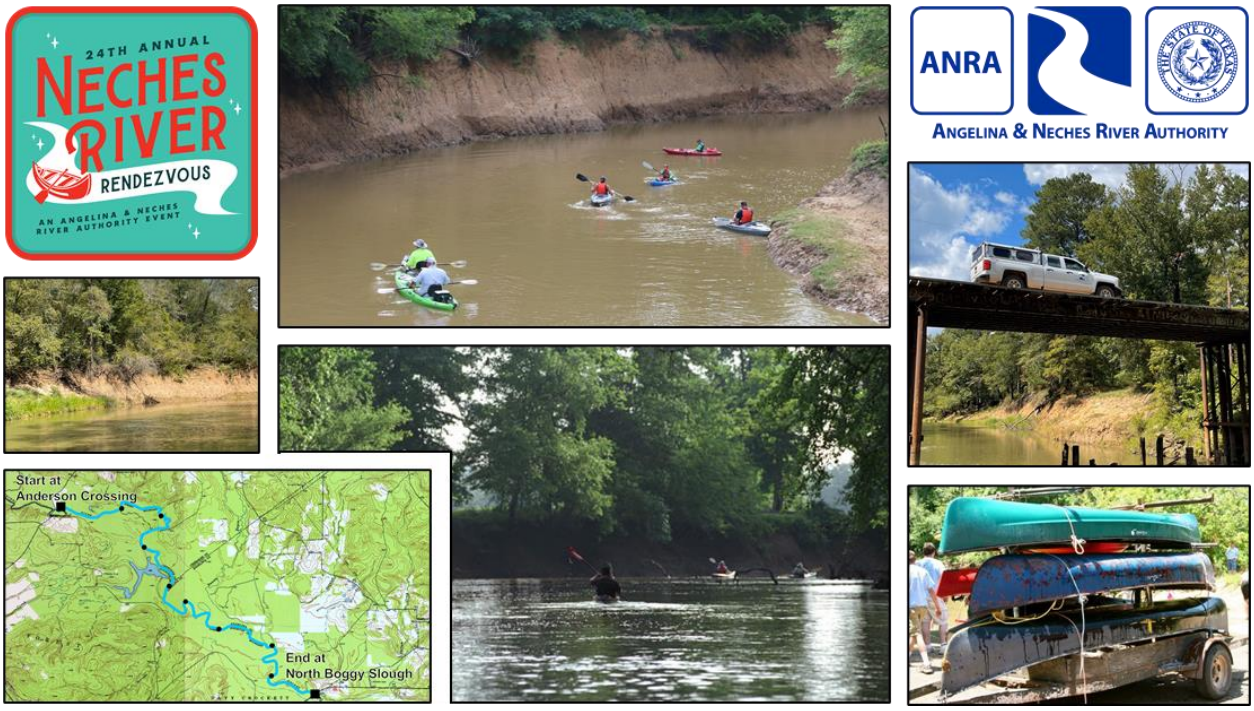
- Currently enrolled at Stephen F. Austin State University
- Are a graduate student or a senior-level undergraduate student (preferred)
- Have course-related experience in sciences and/or environmental fields
- Have a GPA of 2.75 or greater

If you meet these requirements and are interested in a paid internship opportunity in either the surface water quality or environmental laboratory industry, contact any of the following people below for more information.

Ms. Monica Loa at (loamm@sfasu.edu) – SFASU CARRI Program Director
Ms. Mary Ann Rojas (maryann.rojas@sfasu.edu) – SFASU CARRI Executive Director
Ms. Kimberly Wagner at (kwagner@anra.org) – ANRA Executive Manager, Communications
Ms. Emylea Cole at (ecole@anra.org) – ANRA Clean Rivers Program Coordinator

NECHES RIVER RENDEZVOUS

The Neches River Rendezvous is a long-standing tradition in East Texas which involves paddling down the Neches River through ten miles of pristine waterway through the Davy Crockett National Forest. The event had been hosted almost every year since 1997 by the Lufkin/Angelina County Chamber of Commerce. Stewardship of the Rendezvous was transferred to ANRA from the Lufkin/Angelina County Chamber of Commerce in 2024. However, two weeks before the event was to take place, it was cancelled due to record-breaking rainfall and flood stage conditions at both the launch and takeout points on the river. The river was more than half a mile out of its banks, causing unsafe paddling conditions. The 25th Annual Neches River Rendezvous is scheduled for Saturday, May 31, 2025.



Registrations for the event sold out in early May, and at the time of writing, the weather looks favorable for the event in 2025. Exciting new features such as food trucks, contests, games, and conservation education have been planned, and we anticipate the event being a great success!

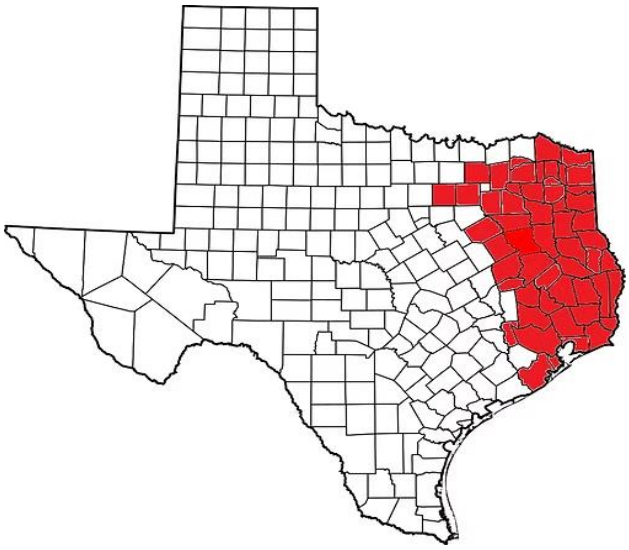
To find out more information about the 25th Annual Neches River Rendezvous, check out the Rendezvous page on the ANRA website at: https://www.anra.org/conservation-recreation/neches-river-rendezvous/

Or contact us via email at (recreation@anra.org) or by phone at (936)-632-7795

ALLIGATOR SNAPPING TURTLE AWARENESS CAMPAIGN

ABOUT ALLIGATOR SNAPPING TURTLES

The alligator snapping turtle is one of the largest freshwater turtles in the world and can live for up to 200 years. Alligator snapping turtles are protected by the state of Texas, and to further enhance protection, the U.S. Fish and Wildlife Service proposed a threatened designation under the Endangered Species Act. The biggest direct threats to this species are illegal harvesting for the black-market meat trade in Louisiana and the use of unattended baited lines. Additionally, the illegal pet trade poses a significant risk.



Alligator snapping turtle county range map. texasturtles.org

The geographic range of the alligator snapping turtle includes extreme southeastern Kansas, southwestern and eastern Illinois in the Mississippi Valley, Iowa, southwestern Kentucky, southwestern Georgia, northern Florida, Alabama, Mississippi, Louisiana, Arkansas, Texas, and eastern Oklahoma. In Texas, these turtles can be found in the Trinity River and river systems eastward of Tarrant County. With an impressive bite force of 1,000 PSI, the prey of alligator snapping turtles consists of fish, mollusks, amphibians, water birds, aquatic plants, and other turtles. A worm-like appendage can be seen in its mouth that is utilized to lure in aquatic prey.

ANGELINA NECHES RIVER AUTHORITY

In 2019, the Authority increased its involvement in education and outreach related to the Endangered Species Act. It partnered with Texas Parks & Wildlife and other agencies to launch an Alligator Snapping Turtle Awareness Campaign in the Neches River Basin. As part of this initiative, 20 public awareness signs were placed at boat ramps throughout the basin to encourage the public to report sightings of alligator snapping turtles. The sightings reported to the Authority are entered into a shared, statewide database, helping researchers improve monitoring and understanding of populations and spatial ecology of these turtles. Since the campaign began, 147 individual sightings of alligator snapping turtles have been reported by the public.

STEPHEN F. AUSTIN STATE UNIVERSITY

In 2016, the U.S. Fish and Wildlife Service (USFWS) confiscated approximately 30 adult alligator snapping turtles (*Macrochelys temminckii*) from poachers. These turtles were kept at the USFWS Fish Hatchery in Natchitoches, Louisiana, until in July 2020, USFWS, TPWD, and Louisiana Department of Wildlife and Fisheries decided that the turtles should be released back into Texas, providing opportunity for development of repatriation protocols, and assessment of repatriation as a potential tool in Texas.

Dr. Chris Schalk prepares to release one of the turtles back into its native habitat.

A collaboration was initiated in 2020 to repatriate the alligator snapping turtles back into their native Texas waters. *Repatriation of Illegally Collected Alligator Snapping Turtles (Macrochelys temminckii) into Native Texas Waters,* led by Connor S. Adams, Paul Crump, Jessica Glasscock, Christopher M. Schalk, and Andrew J. Mullaney, released 23 adult alligator snapping turtles back into East Texas waterways as part of a coordinated effort involving the Texas Parks and Wildlife Department, the U.S. Fish and Wildlife Service, Stephen F. Austin State University, the Sabine River Authority, the Northeast Texas Municipal Water District, the U.S. Army Corps of Engineers, Houston Zoo, and the Turtle Survival Alliance. Collaborating with turtle researchers and the Turtle Survival Alliance, staff members from TPWD's Nongame and Rare Species Program conducted a genetic analysis on all of the released turtles to determine the river basins from which each turtle originated. A health assessment was performed on each turtle, along with morphological measurements and demographic information. Holohil AI-2F transmitters equipped with temperature sensors were attached to the turtles' carapaces. Post-release, the turtles were being tracked using radiotelemetry to gather weekly location data. A variety of microhabitat variables were collected which included water depth, water temperature, canopy cover, flow rate, substrate, and percent cover of various structures, along with temperature readings from the sensors.

In 2024, Drs. Jessica Glasscock and Cord Eversole, assistant professors of forest wildlife management, received a grant exceeding $1 million from the Texas Department of Transportation. This funding will support their research project focused on the conservation and ecology of the alligator snapping turtle. This study is projected to lay the groundwork for targeted management and conservation, improving the current limited understanding of alligator snapping turtle nesting habitats and behaviors. The project is also projected to improve the ability to manage effects of anthropogenic disturbances on the species' life history characteristics and movement patterns. Drs. Glasscock and Eversole will be collaborating with Dr. Chris Schalk from the U.S. Forest Service and Matt Buckingham from the U.S. Fish and Wildlife Service on this project.

TEXAS TURTLES

Texas Turtles is a registered 501(c)(3) nonprofit organization committed to the conservation and study of Texas turtles through research, field studies, and educational outreach. Alligator snapping turtle study sites are located in Cherokee, Hardin, Liberty, and Tarrant Counties, with access granted through the cooperation of local landowners. Texas Turtles efforts have yielded the first comprehensive insights into the reproductive biology of wild alligator snapping turtles in Texas. As a nonprofit organization, Texas Turtles does not receive any state or federal funding, and rely entirely on donations from the public.

UNIVERSITY OF HOUSTON-CLEAR LAKE

In 2021, *The Evaluation of Anthropogenic Disturbances Affecting Alligator Snapping Turtles*, led by Kelly Garcia, Mandi Gordon, and George Guillen, highlighted important anthropogenic factors that influence the species' viability. These findings are projected to improve implementing range-wide conservation strategies, including the designation of “critical habitat” areas, mandatory reporting, and regulations on trap and hook types. Additionally, the results may significantly inform the U.S. Fish and Wildlife Service's five-year review and update of the Species Status Assessment (SSA) scheduled for 2026.

The anthropogenic factors investigated included accidental capture, poaching and illegal harvesting, climate change, and habitat alteration. The study examined 34 sites across 10 river basins, revealing that eighteen sites (52.9%) were occupied. In the Cypress and Sulphur Basins, there were six sites, of which only one (16.7%) was occupied. A Principal Component Analysis of 215 individuals in which blood and/or tissue samples were collected identified three distinct metapopulations in East Texas—Cypress, Sulphur, and Red River Basins—demonstrating minimal genetic mixing among them.

TURTLE SURVIVAL ALLIANCE

Turtle Survival Alliance -The North American Freshwater Turtle Research Group (TSA-NAFTRG) undertakes long-term population monitoring in the greater Houston metropolitan area, one of the most densely populated areas known to science. Their research encompasses tracking, documentation, and population assessment of alligator snapping turtles.

NECHES RIVER DOCUMENTARY

A YOUNG ALLIGATOR SWIMMING IN MUD CREEK, NEAR HIGHWAY 84

During the past year, ANRA staff have provided information and interviews for a forthcoming feature documentary, The Neches River: Wild Heart of East Texas (working title). The film will explore the entire length of the Neches River in East Texas, telling the stories of the communities, wildlife, and history. Funding for the film comes from local philanthropist, Ellen Temple. Temple’s team includes Cinematographer Curtis Craven, Editor Ron Kabele, and Writer Thad Sitton. The film is expected to premiere in the fall of 2025.

TEXAS STREAM TEAM

In March 2024, ANRA teamed up with Keep Nacogdoches Beautiful to host a Stream Team up & Cleanup, a two-part event, including a Stream Cleanup at Banita Creek, followed by a Texas Stream Team training event. More than 50 volunteers helped cleanup up a nearly two-mile segment of Banita Creek and 15 volunteers (the maximum allowed for trainings) participated in the Texas Stream Team training. ANRA and Keep Nacogdoches Beautiful have agreed to make this an annual event to celebrate Clean Water Month in March as well as World Water Day, designated by the United Nations, on March 22.

Additional education and outreach includes: Participation and collaboration with multiple agencies, including Angelina Beautiful Clean, Keep Nacogdoches Beautiful, Texas Master Naturalists, and Texas Conservation Alliance to host fundraisers, litter cleanup events, and awareness events that benefit our waterways. Multiple presentations were also made at Rotary International clubs, schools, Master Gardeners meetings, and Texas Master Naturalist meetings.

ADDITIONAL INFORMATION

ANRA OPERATIONS

The Angelina & Neches River Authority promotes public involvement in the Upper & Middle 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 third biennium) that discusses water quality in the Neches River Basin. These reports are distributed to our Steering Committee members, 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.

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The 2025 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.

Cover Photos:
Front: Diamondback Water Snake on the Riverine portion of Sam Rayburn Reservoir/Angelina River, Feb 2025
Back: Yellow-bellied Slider in Sandy Creek at FM-705, May 2025

2025 Upper Neches Basin Highlights Report

The 2025 Basin Highlights Report was prepared by the Angelina & Neches River Authority in cooperation with the Texas Commission on Environmental Quality (TCEQ) under the authorization of the Texas Clean Rivers Act.