2026 Cypress Creek Basin Highlights Report

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THE TEXAS CLEAN RIVERS PROGRAM

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Foreword

The Clean Rivers Program (CRP) is a water quality monitoring, assessment, and public outreach program administered by the Texas Commission on Environmental Quality (TCEQ) and is funded by state collected fees. The Northeast Texas Municipal Water District (NETMWD) coordinates the CRP for the Cypress Creek Basin. As a participant in the Clean Rivers Program, NETMWD submits its basin highlights and basin summary reports to the TCEQ and CRP partners.

This report and others submitted throughout the State are used to develop and prioritize programs to protect the quality of healthy water bodies and improve the quality of impaired water bodies. Under the CRP, biologists and field staff collect water quality and biological samples, field parameters and measure flow at sites throughout the Cypress Creek Basin.

Monitoring and analysis are the basis for maintaining good water quality within the Cypress Creek Basin. Within a cooperative program directed by the NETMWD, these activities are an integral part of the State's Clean Rivers Program. Cypress Creek Basin CRP stakeholders include:

- Caddo Lake Institute
- U. S. Steel Tubular Products, Inc.
- Northeast Texas Community College
- Luminant
- Pilgrim's Pride Corporation
- AEP SWEPCO
- Titus Co. Fresh Water Supply District #1
- City of Marshall
- Texas Parks and Wildlife Department
- United States Geological Survey
- Franklin County Water District
- East Texas Baptist University

NETMWD contracts with Water Monitoring Solutions, Inc. (WMS) to fulfill the sampling, data analysis, and reporting requirements of the CRP.

cover photo: Station 16458 – Big Cypress Creek below the confluence with Greasy Creek in January 2026

Get Involved!

Each spring, NETMWD provides a venue for stakeholders to learn about water quality issues affecting their region and to provide input on projects in their communities. The Cypress Creek Steering Committee meetings allow stakeholders to have input on addressing water quality concerns and to prioritize water quality monitoring within the Cypress Creek Basin. NETMWD and its Clean Rivers Program partners continue to reach out to the public to educate and help resolve local water quality issues. Members of the public, water supply corporations, permitted dischargers, councils of government, and city and county officials are invited annually to become steering committee members.

A joint NETMWD and Sulphur River Basin CRP Steering Committee meeting was held in March 2026 at North Texas Community College and virtually via Zoom. Topics included information on the construction activities of Lake Ralph Hall, Aquatic Invasive Species, TCEQ mercury in fish tissue sampling results, and discussions of the Sulphur River Basin and Cypress Creek Basin Highlights reports.

NETMWD plans and coordinates monitoring efforts with other basin entities, the TCEQ monitoring staff, Texas Parks and Wildlife Department (TPWD), Caddo Lake Institute, and other interested participants annually within the Cypress Creek Basin. All entities collecting water quality data in the Cypress Creek Basin are encouraged to coordinate their efforts with the NETMWD and participate under the NETMWD Quality Assurance Project Plan.

Visit NETMWD to join the Clean Rivers Program Steering Committee or contact Robert Speight at 903-639-7538 or rspeight@netmwd.org.

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Abbreviations and Acronyms

24-Hour DO	Diel Dissolved Oxygen measurements
ALM	Aquatic Life Monitoring
AU	Assessment Unit
CN	Concern for Non-attainment of water quality criterion
CS	Concern for Screening level
CRP	Clean Rivers Program
DO	Dissolved Oxygen; 24 HR DO
E. coli	*Escherichia coli* (bacteria)
FM	Farm-to-Market Road
FY	Fiscal Year
IR	Integrated Report
mg/L	milligrams per liter
NA	Not Assessed
NETMWD	Northeast Texas Municipal Water District
NS	Non-support of water quality criterion
R5	TCEQ Region 5 - Tyler
SH	State Highway
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
TSWQS	Texas Surface Water Quality Standards
WMS	Water Monitoring Solutions, Inc.
§303(d) List	Impaired water bodies in Section §303(d) of the Federal Clean Water Act

Introduction

The Texas Clean Rivers Program (CRP) is a statewide water quality monitoring and assessment program that provides funding and resources for regional watershed protection efforts. The program is administered by the Texas Commission on Environmental Quality (TCEQ) in partnership with river authorities and other regional governments with the goal of maintaining and improving water quality in each river basin in the state.

As the coordinating agency in the Cypress Creek basin, the Northeast Texas Municipal Water District (NETMWD) works with federal and state agencies, municipalities, water suppliers, and private companies to accomplish water quality monitoring and watershed protection objectives. Monitoring priorities are established through stakeholder input and coordination with other organizations working in the basin. Water quality sampling regimens are established though an annual Coordinated Monitoring Meeting with the objective of ensuring that resources and efforts are not duplicated or overlapped. Coordinating entities in attendance often include the TCEQ staff from the CRP, Surface Water Quality Monitoring, Standards, and Region 5 teams; Texas Parks and Wildlife Department (TPWD); U. S. Geological Survey; and Texas State Soil and Water Conservation Board.

During most years, a basin highlights report is authored, presented at stakeholder meetings, and posted to the NETMWD Clean Rivers Program website. The basin highlights report is typically non-technical and intended to provide a high-level overview of issues that may affect water quality in the basin. Every five to six years, a basin summary report is written. Last year, a basin summary report was completed. The technical report provided an in-depth review of historical and recent data, and an analysis of water quality trends occurring throughout the watershed. The report authored the year following a basin summary report is a program update. The program update provides information about CRP activities in the basin and provides information about changes to the water quality assessment and to the monitoring program. This year's report discusses the *2024 Texas Integrated Report* (IR), the Draft 2026 IR, species of concern, and the results of the bioassessments conducted over the past year.

Overview of the Cypress Creek Basin

The Cypress Creek watershed encompasses approximately 6,000 square miles. Its major tributaries – Big Cypress Creek, Little Cypress Creek, James' Bayou, Harrison Bayou, and Black Cypress Bayou – drain into Caddo Lake on the Texas/Louisiana border. The watershed has a diverse ecology. The headwaters of Big Cypress Creek, above Lake Cypress Springs, is intermittent. Releases into Big Cypress Creek from Lake Bob Sandlin runs through flat to rolling

terrain surfaced by sandy and clay loams that support water-tolerant hardwoods, conifers, and grasses before entering Lake O' the Pines. Below Lake O' the Pines, Big Cypress Creek (Bayou) flows into Caddo Lake through bottomland thick with hardwood and cypress trees.

The watershed originates in the southern portions of Hopkins and Franklin Counties. Headwaters flow south eastwardly into Camp, Titus, Morris, Cass, Marion, and Harrison Counties. Reservoirs in the basin include Monticello Reservoir, Lake Cypress Springs, Lake Bob Sandlin, Lake Gilmer, Lake Daingerfield, Ellison Creek Reservoir, Lake O' the Pines, and Caddo Lake. The major tributaries of Caddo Lake include Big Cypress Creek, Little Cypress Creek (Bayou), Black Cypress Bayou, James Bayou, and Harrison Bayou. The basin experienced a pervasive drought that began around 1999 and extended through 2014. During this period, the drought was punctuated with large rainfall events. In 2011 and 2012, the drought reached comparable levels with the drought of record from the 1950s. This drought was followed by near-historic flooding in 2015 and 2016 which ended the drought.

Much of the basin experienced some level of drought in 2022 through 2024, especially throughout the summer and fall of these years. Rainfall records at the Fort Sherman Dam (Lake Bob Sandlin), located in the upper portion of the basin, have been maintained since its completion in 1978. Over the past forty-six years, annual precipitation has averaged around 51.5 inches. However, from 1979 to 1999, the average was 53.7 inches per year, as compared to 49.6 inches from 2000 through 2024. During the 1999 - 2014 drought, an annual average of 48 inches of rain was recorded. At slightly over 25 inches of precipitation, 2005 was the driest year on record and was also the first year that no water had been released from Lake Bob Sandlin since its completion. In 2024, the area received above average rainfall of 59.4 inches with April being the wettest month at 12.04 inches of precipitation.

Releases from Lake Bob Sandlin play an important role in the water quality of Big Cypress Creek and Lake O' the Pines. There are no instream flow requirements in Big Cypress Creek, so water is only released by the Titus County Freshwater Supply District #1 to maintain the freeboard of the Fort Sherman Dam. In addition to providing stream flow in Big Cypress Creek, the high-quality water from Lake Bob Sandlin helps to offset the nutrient-laden discharges from wastewater treatments plants in the Lake O' the Pines watershed. When there are no releases from the reservoir, Big Cypress Creek becomes effluent-dominated.

In 2025, almost 258,000 acre-feet of water was released from the reservoir. On average, about 102,000 acre-feet is released each year. From 2005 to 2007 and from 2011 through 2014, no water was released from the reservoir. The greatest amount released was 280,000 acre-feet in 2015 followed by 269,000 acre-feet in 2019. Despite no water being released in 2022, the average released from 2015 through 2025 was 164,000 acre-feet. On average, the majority (79%) of the

water released each year occurs between February and June with over half (58%) of those releases in the months of March, April, and May.

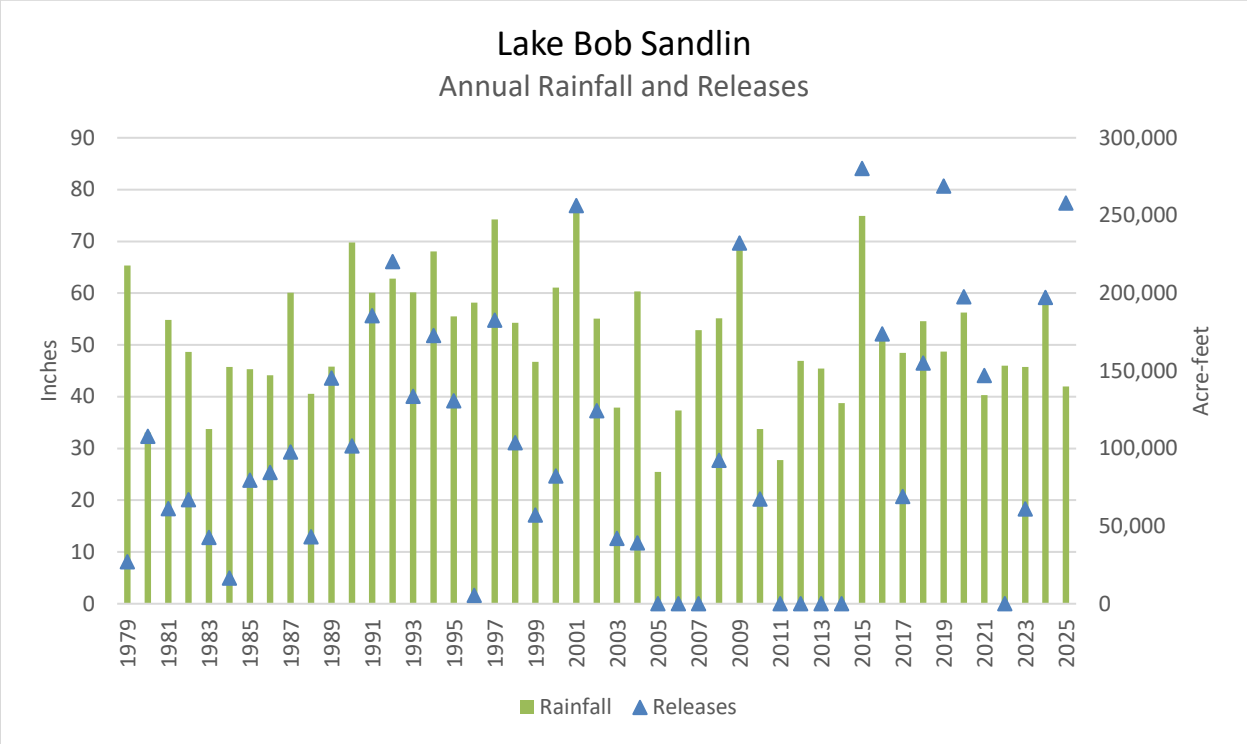

Figure 1: Graph of annual rainfall and releases form Lake Bob Sandlin, 1979 - 2025

Water Quality Monitoring and Assessment

The 2024 Texas Integrated Report (2024 IR) assessed data collected between **December 1, 2015 and November 30, 2022**. The methods used for water quality assessments are developed through the Guidance Advisory Work Group meetings.

The Integrated Reports are based on designated uses and assessment units. **Designated uses** for water bodies include Aquatic Life Use, Recreation Use, General Use, and Domestic Water Supply Use. Support for each of these designated uses is based on attainment of water quality criteria for various parameters. These criteria may be either standards or screening levels. Standards are defined in the Texas Surface Water Quality Standards (TSWQS) and are "narrative and numerical criteria deemed necessary to protect" the designated uses of water bodies. Screening levels are criteria that have been developed for parameters which do not have water quality standards.

Each river basin in the state is broken into **segments** which are major water bodies such as reservoirs, rivers, and tributaries. These segments can be either classified or unclassified. **Classified segments** are water bodies that are defined in Appendix A of the TSWQS; **unclassified segments** are water bodies that are not defined in Appendix A. All unclassified water bodies are identified by the segment number of the water body into which they flow followed by a letter suffix. **Assessment units** (AU) are hydrologically distinct sub-sections of classified and unclassified water bodies. They represent discrete areas of the segment such as the arms of a reservoir or portions of a stream between tributaries. If there are multiple monitoring stations within an assessment unit, data from these stations are grouped together for assessment purposes. Some segments may only have a single assessment unit while others may consist of several assessment units.

Data collected through CRP has many uses, including the development of the surface water quality standards, determining if water bodies meet those standards, and the development of wastewater permit limits. This report references the 2024 IR which compares all available quality assured data to the TSWQS or to screening levels when no standards have been established. The Integrated Report defines the status of each water body as one of the following:

> **Meets or Supports** — Sufficient data are available to assess. The water body meets all applicable surface water quality standards and fully supports its designated uses. These water bodies are labeled in tables as "FS" for fully supporting the criteria. When the water body meets its screening level for a parameter, the label of "NC" is assigned meaning there is "No Concern" for that constituent.
>
> **Concern** — **a)** A concern for not meeting water quality criterion based upon adequate data, **b)** Sufficient data are not available to perform a full assessment and the limited data

indicate surface water quality standards are not being met, or **c)** Surface water quality standards have not yet been established. If water quality data indicate a concern, resources are allocated to collect more data and verify the concern. These water bodies are labeled in tables as "CN" or "CS". The "**CN**" label indicates that there is a concern for not meeting the water quality standard for that parameter while "**CS**" indicates a concern for not meeting TCEQ screening levels.

Impaired — Sufficient data are available and show that the water body does not meet surface water quality criteria. If monitoring data indicate that a water body does not support one or more of its designated uses, then it is said to be impaired. Details of the impairment are published in the Texas Integrated Report and §303(d) List. Impaired water bodies are shown as "**NS**" for not supporting its designated uses.

LEVELS OF SUPPORT	
Designated Use Criteria	**Screening Level**
FS Fully Supporting	NC No Concern
CN Use Concern	CS Screening Level Concern
NS Non-support	NA Not Assessed

Figure 2: Table of levels of support

These standards define an antidegradation policy of the Clean Water Act to protect existing uses and water quality of less impacted water bodies. Some water quality standards are applied generally across the state while other criteria are site-specific. Site-specific criteria may be revised when new data become available. Initially, site-specific standards were set for individual water bodies in the state using limited data to establish uses and criteria. Many of the subsequent changes in water quality standards have involved revisions to the initial standards based upon additional data and evaluations. As new data were collected, a subsequent evaluation found that a revised criterion was appropriate.

Clean Rivers Program partners collect monitoring data following a TCEQ-approved Quality Assurance Project Plan. This plan references procedures and methods for sample collection and handling. All CRP partners follow these methods of data collection and quality assurance protocols. The resulting data are submitted to the TCEQ for inclusion in the state water quality database, the Surface Water Quality Monitoring Information Systems. After a thorough review and approval by TCEQ, these data are made available for public access via the NETMWD and TCEQ websites. These data are used by the TCEQ to assess the water quality of the basin.

Physical and chemical measurements of water quality are typically made at each station. Common parameters include dissolved oxygen (DO), pH, suspended sediments, nutrients, bacteria, and stream flow or lake level. Biological assessments include the collection of fish, aquatic invertebrates, and habitat assessments to quantify the overall health of streams. Water quality monitoring is often described in general terms of field parameters, conventional laboratory parameters, diel studies (data collected over a twenty-four-hour period [*i.e*. 24-Hour DO]), stream flow, and biological monitoring.

The 2024 §303(d) List identified 21 water bodies located in nine classified and twelve unclassified segments that did not meet the water quality criteria. High levels of bacteria and low concentrations of dissolved oxygen were the most common impairments in the basin. Impairments due to contaminants in fish tissue, leading to fish consumption advisories, were found in five segments while high pH impairments were shown for two reservoir segments.

The following table is a list of all impairments by segment in the Cypress Creek Basin. Note that there is an impairment denoted with an asterisk (*) for low dissolved oxygen in the upper assessment unit of Segment 0403 - Lake O' the Pines. This is not included on the §303(d) List since the impairment is addressed through the Total Maximum Daily Load Implementation Plan.

2024 Texas §303(d) List		
Segment ID	**Description**	**Parameter**
0401	Caddo Lake	Mercury in fish tissue
		DO
0401A	Harrison Bayou	DO, *E. coli*
0402	Big Cypress Creek below Lake O' the Pines	Mercury in fish tissue
		DO
0403	Lake O' the Pines	High pH, DO*
0404	Big Cypress Creek below Lake Bob Sandlin	*E. coli*
0404A	Ellison Creek Reservoir	Sediment Toxicity
		Dioxin in fish tissue
		PCBs in fish tissue
0404B	Tankersley Creek	*E. coli*
0404C	Hart Creek	*E. coli*
0404E	Dry Creek	*E. coli*
0404F	Sparks Branch	*E. coli*
0404J	Prairie Creek	DO
0404N	Lake Daingerfield	Mercury in fish tissue
0405	Lake Cypress Springs	High pH
		Nutrient Reservoir Criteria
0405A	Big Cypress Creek	DO, *E. coli*

2024 Texas §303(d) List		
Segment ID	**Description**	**Parameter**
0406	Black Bayou	DO, *E. coli*
0407	James' Bayou	DO, *E. coli*
0409	Little Cypress Bayou	DO, *E. coli*
0409A	Lilly Creek	*E. coli*
0409B	South Lilly Creek	DO
0410	Black Cypress Bayou	Mercury in fish tissue
		Copper, Lead in water
		DO
0410A	Black Cypress Creek	*E. coli*

Figure 3: Table of the 2024 Texas §303(d) List for the Cypress Creek Basin

The Integrated Report is updated every two years, and the period of record for the Draft 2026 IR includes samples collected between **December 1, 2017 and November 30, 2024**. The TCEQ assessed 53 water bodies in the Draft 2026 IR. One new impairment was added to the *Draft 2026 Texas §303(d) List* while three were removed. A new impairment for dissolved oxygen was added to Segment 0409A – Lilly Creek. Data collected during the 2026 assessment period showed that both assessment units of Segment 0406 – Black Bayou and in AU 0410_04 of Black Cypress Bayou were meeting their respective dissolved oxygen criteria. All three assessment units will be removed from the §303(d) List after the Draft 2026 IR is approved. A discussion of these watersheds follows the table below.

Assessment Unit	**Description**	**Parameter**
0406_01	Black Bayou	DO
0406_02	Black Bayou	DO
0410_04	Black Cypress Bayou	DO

Figure 4: Table of water bodies removed from the §303(d) List in the Draft 2026 IR

Unclassified Segment 0409A – Lilly Creek

Lilly Creek originates two miles west of Pine in Camp County and flows southeast for nine miles to its confluence with Little Cypress Creek. The stream is classified as intermittent with perennial pools and has a limited aquatic life use designation. Monitoring in Lilly Creek has been conducted at station 20153 at FM 556 since October 2007. The station is located near the headwaters of the stream, and the upstream watershed is almost entirely forested.

Figure 5: Photo of station 20153 - Lilly Creek at FM 556 during low flow (left) and high flow (right)

Concerns for dissolved oxygen grab minimum criterion and screening level were shown in the 2024 IR while the stream is shown as impaired for DO in the Draft 2026 IR. Six out of 25 DO readings fell below the 2 milligrams per liter (mg/L) minimum criterion and 3 mg/L screening level with a mean of 1.28 mg/L. There was no flow on the dates of these low DO readings. In fact, "low flow" and "no flow" were commonly reported for flow severity at this station. Out of 63 values reported, 52 percent of site visits had a flow status of "no flow" or "low flow." The *2025 Cypress Creek Basin Summary Report* concluded that due to the proximity of the station to the headwaters, moving the station further downstream should be considered to address the dissolved oxygen concern (impairment) in the future.

Segment 0410 – Black Cypress Creek (Bayou)

Black Cypress Creek (Bayou) is a perennial stream that begins at the confluence with Big Cypress Creek and extends about 52 miles upstream to FM 250 while the intermittent reach of the stream extends northeast of Daingerfield in eastern Morris County. The channel meanders through a mostly forested watershed of bottomland hardwood and has numerous tributaries and sloughs. The confluence of Black Cypress Creek with Big Cypress Creek is located east of Jefferson and upstream of the Little Cypress Creek confluence with Big Cypress Creek. There are no impoundments on the stream, thus floodwaters flow through Big Cypress Creek directly into Caddo Lake.

Figure 6: Photo of station 10247 - Black Cypress Bayou at SH 11

Segment 0410 includes four assessment units along with Segment 0410A. Segment 0410A is the intermittent with perennial pools reach of Black Cypress Creek that extends from FM 250 north of Hughes Springs to its confluence with Kelly Creek (Segment 0402E). Black Cypress Creek was formerly designated as Segment 0402A, an unclassified stream that became a classified water body in the 2010 Texas Surface Water Quality Standards revision, and was first shown as Segment 0410 in the 2016 IR.

The uppermost reach of Black Cypress Creek, AU 0410_04, was first shown as impaired for dissolved oxygen grab minimum in the 2000 IR. WMS commenced diel monitoring to address the impairments in October 2020 at station 10247, located at SH 11. None of the eight diels assessed in the 2024 IR fell below the criteria. Four additional diels completed after the end of the 2024 assessment period also met the dissolved oxygen criteria. These results indicated that the stream was meeting its high aquatic life use designation, so sampling was discontinued. As result of these diels, the low DO impairment was removed from the §303(d) List in the Draft 2026 IR.

Segment 0406 – Black Bayou

Black Bayou, a relatively small watershed, emerges near Wright Patman Reservoir in northeastern Cass County, flows through Atlanta, Texas, and continues into Louisiana where it is impounded to form Black Bayou Lake. The stream is intermittent and traverses flat to gently rolling terrain that supports grasses, mixed hardwoods, and pines. Black Bayou is generally a slow, meandering water body with a mostly sand and clay loam bottom. The upper assessment unit of Black Bayou, AU 0406_02, is a 28.6 km reach that extends from its headwaters downstream to its confluence with Hurricane Creek. The lower assessment unit (AU 0406_01) ranges from Hurricane Creek downstream 19.1 km to the Louisiana state line.

Monitoring is conducted by the TCEQ Region 5 office at station 10314 at CR 4659 in lower assessment unit near the Louisiana state line and at station 10318 at SH 43 south of Atlanta. Samples for field and laboratory parameters, bacteria, and flow are collected quarterly at both stations.

Figure 7: Photo of station 10318 - Black Bayou at SH 43 during a bioassessment

Although the entire segment is classified as intermittent with perennial pools, Black Bayou has a high aquatic life use designation. It should be noted that, for Black Bayou, diel dissolved oxygen criteria are site-specific, and variable as determined by using a multiple regression equation which includes the water temperature, stream flow, and watershed size. Using the equation, 1.5 mg/L is the minimum 24-Hour DO Average criterion allowed. To read more about how the site-specific criteria are calculated, see Appendix D of the TSWQS.

Both assessment units of Black Bayou were impaired for depressed dissolved oxygen. During periods of low flow, the stream tends to become stagnant and dissolved oxygen levels decrease under these conditions. To address the dissolved oxygen impairments, TCEQ Region 5 completed ten diels in each assessment unit between 2021 and 2024. Four diels in AU 0406_01 were assessed in the 2024 IR while only one event was reviewed from AU 0406_02. For the Draft 2026 assessment period, none of the diels in AU 0406_01 fell below the criteria while one diel in the upper assessment unit failed to meet the 24-Hour DO Minimum and Average criteria. In addition, all DO grab samples met the criterion and one reading fell below the screening level in AU 0406_01 while only three of 29 grab samples failed to meet the criterion and screening level in AU 0406_02. These results demonstrated that the stream was meeting its high aquatic life use designation and the impairments were removed from the Draft 2026 §303(d) LisIt should be noted that in the *2025 Cypress Creek Basin Summary Report*, an increasing dissolved oxygen trend was identified using data from the past twenty years. Coupled with the low dissolved oxygen impairment, the long-term increasing trend is encouraging. These results also support the grab sample and diel results which demonstrate that the assessment unit appeared to be meeting its high aquatic life use designation.

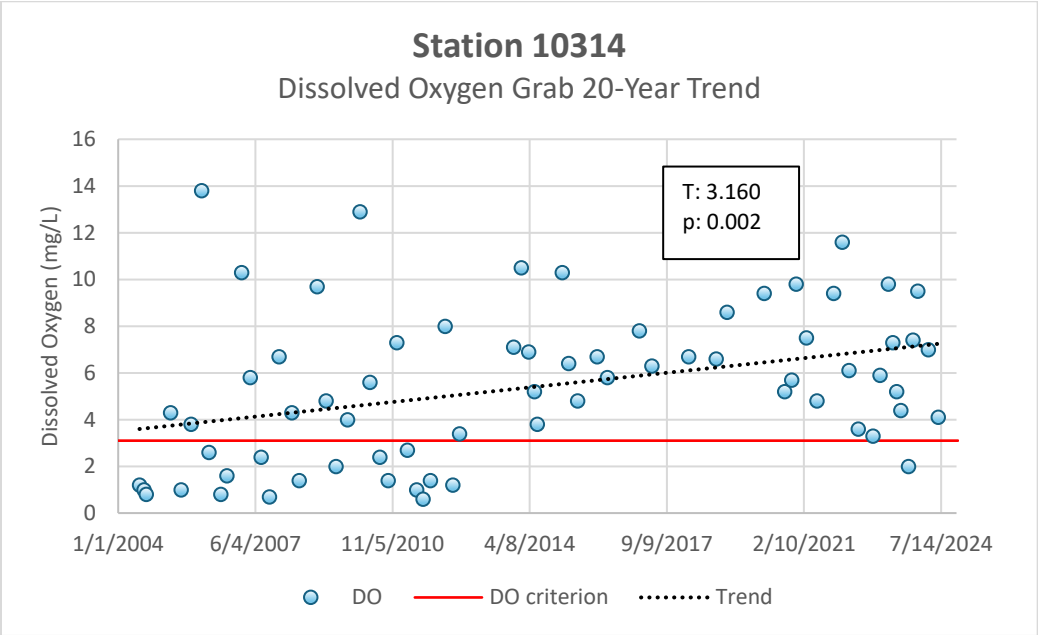

Figure 8: Graph of increasing 20-Year dissolved oxygen trend at station 10314

The following discussion provides definitions of the common field and conventional laboratory parameters detailed in this report.

FIELD PARAMETERS

Field parameters include those obtained using a water quality sonde such as temperature, dissolved oxygen, pH, and specific conductance (also referred to as temperature-compensated conductivity). Other field parameters include Secchi transparency, stream flow, air temperature, and general observations.

Temperature – Water temperature affects the oxygen content of the water, with warmer water unable to hold as much oxygen. When the water temperature is too cold, cold-blooded organisms such as fish and invertebrates may either die or become weaker and more susceptible to other stresses, such as disease or parasites. In addition to weather conditions, colder water can be caused by reservoir releases while higher water temperatures can be the result of removing trees from the riparian zone, soil erosion, or the use of water to cool equipment in manufacturing or power generation processes.

Dissolved Oxygen (DO) – The concentration of dissolved oxygen is a characteristic of water that correlates with the occurrence and diversity of aquatic life. A water body that can support diverse, abundant aquatic life is a good indication of water quality since all aerobic aquatic organisms require oxygen to live. Modifications to the riparian zone, decreases in stream flow, increases in water temperature, increases in organic matter, bacteria, and over abundant algae may lead to lower DO concentrations in water.

Specific Conductance – Conductivity is a measure of the water body's ability to conduct electricity and indicates the approximate levels of dissolved salts, such as chloride, sulfate, and sodium in the stream. Elevated concentrations of dissolved salts can impact the water as a drinking water source and as suitable aquatic habitat.

pH – pH is a measure of the acidity or basicity of a solution. The pH scale is a logarithmic (base 10) scale. A change of one pH unit means that the water has become ten times more acidic or basic. Most aquatic life is adapted to live within a relatively narrow pH range, but tolerant species can adjust to varying pH ranges. However, pH levels below 4 (acidity of orange juice) or above 12 (basicity of ammonia) are lethal to most fish species and invertebrates. Industrial and wastewater discharge, runoff from quarry operations, and accidental spills are examples of factors that can change the pH composition of a water body. For many water bodies in East Texas, the pH tends to be naturally low (acidic) due to soil composition and tannins contained in plant life, especially in the bark of shrubs and trees.

Transparency – Transparency is measured using a Secchi disk and is a measure of the depth to which light is transmitted through the water column and thus the depth at which algae and aquatic plants can grow. Transparency is an important secondary parameter for assessing eutrophication, a natural aging process in lakes and reservoirs, and perturbation of water quality through soil erosion. Transparency can be reduced by the overabundance of algal populations and by sediments through runoff events.

Flow – Flow is an important parameter affecting water quality. Low flow conditions, common in the dry summer months, create critical conditions for aquatic organisms. At low flows, the stream has a lower assimilative capacity for waste inputs from point and non-point sources. Streams have critical low flows calculated by TCEQ. When stream flows drop below these (known as 7Q2) calculations, some water quality standards do not apply. For example, low DO is often a result of low flows. Because of this, flow is often evaluated in conjunction with DO by the assessors to determine if an assessment unit meets its Aquatic Life Use designation.

Figure 9: Photo of sample bottles and instruments used to measure field parameters

CONVENTIONAL LABORATORY PARAMETERS

Laboratory analysis of "conventional" parameters generally includes solids, salts, nutrients, and bacteria. Conventional parameters analyzed by a laboratory include:

Solids: Total Suspended Solids and Total Dissolved Solids – High solids may affect the aesthetic quality of the water, interfere with washing clothes, and corrode plumbing fixtures. High total

dissolved solids in the environment can also affect the permeability of ions in aquatic organisms. Mineral springs, carbonate deposits, salt deposits, and sea water intrusion are sources for naturally occurring high concentration of solids levels. Other sources can be attributed to oil and gas exploration, drinking water treatment chemicals, storm water and agricultural runoff, and point/non-point wastewater discharges. Elevated levels of dissolved solids such as chloride and sulfate can cause water to be unusable, or simply too costly to treat for drinking water uses. Changes in dissolved solids concentrations also affect the quality of habitat for aquatic life.

Total Hardness – Hardness is a composite measure of ions in water and is primarily composed of calcium and magnesium. The hardness of the water is critical due to its effect on the toxicity of certain metals. Higher hardness concentrations in the receiving stream can result in reduced toxicity of heavy metals.

Chloride – Chloride is an essential element for maintaining normal physiological functions in all organisms. Elevated chloride concentrations can disrupt osmotic pressure, water balance, and acid/base balances in aquatic organisms which can adversely affect survival, growth, and/or reproduction. Natural weathering and leaching of sedimentary rocks, soils, and salt deposits can release chloride into the environment. Other sources can be attributed to oil and gas exploration and storage, wastewater discharges, landfill run off, and saltwater intrusion.

Sulfate – Effects of high sulfate levels in the environment have not been fully documented; however, sulfate contamination may contribute to the decline of native plants by altering chemical conditions in the sediment. Due to abundance of elemental and organic sulfur and sulfide mineral, soluble sulfate occurs in almost all natural waters. Other sources are the burning of sulfur-containing fossil fuels, steel mills, wastewater treatment plant discharges, and fertilizers.

***Escherichia coli (E. coli)* –** Occurring naturally in the digestive system of warm-blooded animals, *E. coli* bacteria are commonly found in surface water. Although not all sub-species of *E. coli* bacteria are harmful to human beings, their presence is an indication of recent fecal matter contamination, and that other pathogens dangerous to human beings may be present. Bacteria are measured to determine the relative risk of human contact with pathogens through swimming or other contact recreation activities. Sources may include inadequately treated sewage; waste from livestock, pets, waterfowl, and wildlife; or malfunctioning/failing septic systems.

Chlorophyll *a* – High levels of chlorophyll *a* can indicate algal blooms, decrease water clarity, and cause swings in pH and dissolved oxygen concentrations due to photosynthesis and respiration processes. An increase in nutrients can lead to excessive algal production. Chlorophyll *a* concentrations are used as an indication of eutrophication in lakes and reservoirs.

Total Kjeldahl Nitrogen – Total Kjeldahl nitrogen is a measure of organic nitrogen, a compound derived from all life forms including plants, animals, and wastes. The process of mineralization is the conversion of organic nitrogen (measured by total Kjeldahl nitrogen analysis) into inorganic nitrogen. Nitrate is the form of inorganic nitrogen that is biologically available for uptake by plants and algae.

Nutrients (Ammonia, Nitrate, Phosphorus) – Nutrients are essential for life. However, elevated nutrients can cause excessive growth in aquatic vegetation and may lead to algal blooms. Bloom conditions may cause wide variations in pH and dissolved oxygen within a water body. Common sources of nutrient pollution are treated effluent, malfunctioning septic systems, and agricultural runoff. Soil erosion and runoff from farms, lawns, and gardens can add nutrients to the water. Some nutrient loading may also occur naturally through biotic decomposition. When plants and algae die in aquatic systems, bacteria use oxygen to decompose these materials, thereby reducing the amount of dissolved oxygen in the water column which may lead to fish kills and decreased species diversity.

Elevated amounts of nitrogen in the environment can adversely affect fish and invertebrate reproductive capacity and reduce the growth of young. High levels of nitrite can produce nitrite toxicity, or “brown blood disease.” Excess nitrate can contribute to Blue Baby Syndrome in humans, a disease which reduces the ability of blood to transport oxygen throughout the body.

Ammonia is excreted by animals and is produced during the decomposition of organic matter. Municipal and industrial wastewater treatment plant discharge is another common source of ammonia.

Phosphorus is one of the most abundant elements on the planet; however, most natural phosphate compounds are very insoluble and not biologically available for plant uptake. Most water bodies are phosphorus-limited, meaning that algal production is limited by the amount of soluble phosphorus in the water column. Common contributors of soluble phosphorus are non-point sources such as human and animal waste as well as commercial fertilizers. Commercial fertilizers are a more soluble form that can readily be used by plants, but this property also makes the phosphorus more susceptible to runoff.

Total Alkalinity - Total Alkalinity is referred to as “alkalinity” throughout this report. Alkalinity is the measure of the water’s ability to neutralize acids to maintain a stable pH level. Alkalinity is introduced to the water column through the weathering of rocks and minerals.

Organics - Toxic substances from pesticides and industrial chemicals pose the same concerns as metals. PCBs (polychlorinated biphenyls), for example, are industrial chemicals that are toxic

and possibly carcinogenic. Despite being banned in the United States in 1977, PCBs remain in the environment, and they accumulate in fish and human tissues when consumed.

Metals – High concentrations of metals such as cadmium, mercury, and lead pose a threat to drinking water supplies and human health. Eating fish contaminated with metals can cause these toxic substances to accumulate in human tissue and organs, posing a long-term significant health threat. Bioaccumulation of mercury in the edible tissue of many fish species to the point of becoming a human health concern has prompted the Texas Department of State Health Services to issue fish consumption advisories around the basin. Mercury in edible tissue has been identified in fish tissue in water bodies throughout East Texas.

FISCAL YEAR (FY) 2026

Water quality monitoring and reporting is the heart of the CRP program. NETMWD/WMS and the TCEQ Region 5 – Tyler routinely collects water quality data. In 2026, monitoring is conducted at 37 stations located in all ten classified segments and in nine unclassified water bodies within the Cypress Creek Basin.

The NETMWD/WMS is scheduled to sample ten stations quarterly for field and laboratory parameters and at two stations for field parameters and flow only. Diel, or 24-Hour DO monitoring, is scheduled at two stream stations while Aquatic Life Monitoring (ALM) is being conducted at one station. The TCEQ collects field and laboratory samples quarterly at 23 stations. For a full list of stations monitored by NETMWD/WMS and TCEQ Region 5, visit the Coordinated Monitoring Schedule.

The following pages include a map of all CRP stations sampled by NETMWD/WMS. The FY 2026 monitoring table shows the Collecting Entity (CE) as WMS or R5 for the TCEQ Region 5 stations. The monitoring type (MT) is identified as routine (RT) and/or biased to season (BS).

2026 CYPRESS CREEK BASIN MONITORING SCHEDULE										
STATION DESCRIPTION	**STATION**	**SEGMENT**	**CE**	**MT**	**Field**	**Lab**	**Bacteria**	**Flow**	**24 HR DO**	**ALM**
CADDO LAKE IN GOOSE PRAIRIE	10288	0401	WMS	RT	4	4	4			
CADDO LAKE MID LAKE	10283	0401	WMS	RT	4	4	4			
CADDO LAKE TURTLE SHELL	15249	0401	WMS	RT	4	4	4			
HARRISON BAYOU AT AVENUE Q	22543	0401A	WMS	RT/BS	4	4	4	4	2	2
KITCHEN CREEK AT CR 3416	14998	0401B	WMS	RT	4			4		
BIG CYPRESS BAYOU AT US 59	15511	0402	R5	RT	4	4	4	4		
BIG CYPRESS BAYOU AT BACKWATER JACKS	22422	0402	WMS	BS	4			4	4	
BIG CYPRESS CREEK AT SH 43	10295	0402	WMS	RT	4	4	4	4		
LAKE O THE PINES ABOVE SH 155	17087	0403	R5	RT	4	4	4			
LAKE O THE PINES AT NETMWD INTAKE	10297	0403	R5	RT	4	4	4			
LAKE O THE PINES NEAR DAM	10296	0403	R5	RT	4	4	4			
LAKE O THE PINES MID LAKE	16156	0403	R5	RT	4	4	4			
BIG CYPRESS AT SH 11	10308	0404	R5	RT	4	4	4	4		
BIG CYPRESS CREEK AT US 259	13631	0404	R5	RT	4	4	4			
BIG CYPRESS CREEK NEAR GREASY CREEK	16458	0404	WMS	RT	4	4	4	4		
TANKERSLEY CREEK AT FM 3417	10261	0404B	WMS	RT	4	4	4	4		
HART CREEK AT CR 4550	10266	0404C	WMS	RT	4	4	4	4		
LAKE DAINGERFIELD AT HEADWATERS	17337	0404N	R5	RT	4	4	4			
LAKE CYPRESS SPRINGS NORTH OF FM 115	10313	0405	R5	RT	4	4	4			
LAKE CYPRESS SPRINGS NEAR DAM	10312	0405	R5	RT	4	4	4			
BIG CYPRESS CREEK AT CR SW 3170	22151	0405A	WMS	RT	4	4	4	4		
BLACK BAYOU AT CR 4659	10314	0406	R5	RT	4	4	4	4		
BLACK BAYOU AT SH 43	10318	0406	R5	RT	4	4	4	4		

2026 CYPRESS CREEK BASIN MONITORING SCHEDULE										
STATION DESCRIPTION	**STATION**	**SEGMENT**	**CE**	**MT**	**Field**	**Lab**	**Bacteria**	**Flow**	**24 HR DO**	**ALM**
JAMES BAYOU AT CR 1775	10321	0407	WMS	BS	4			4	4	
JIMS BAYOU AT SH 43	14976	0407	WMS	RT	4	4	4	4		
FRAZIER CREEK AT US 59	10259	0407B	WMS	RT	4			4		
LAKE BOB SANDLIN AT FM 21	16158	0408	R5	RT	4	4	4			
LAKE BOB SANDLIN AT MID DAM	10329	0408	R5	RT	4	4	4			
LITTLE CYPRESS BAYOU AT SH 154	22455	0409	R5	RT	4	4	4			
LITTLE CYPRESS BAYOU AT US 271	16017	0409	R5	RT	4	4	4	4		
LITTLE CYPRESS BAYOU AT US 259	16861	0409	R5	RT	4	4	4	4		
LITTLE CYPRESS CREEK AT FM 134	10331	0409	R5	RT	4	4	4			
LAKE GILMER AT MID DAM	17478	0409D	R5	RT	4	4	4			
LAKE GILMER AT FM 852	18825	0409D	R5	RT	4	4	4			
BLACK CYPRESS BAYOU AT SH 11	10247	0410	R5	RT	4	4	4	4		
BLACK CYPRESS CREEK AT SH 49	10243	0410	R5	RT	4	4	4	4		
BLACK CYPRESS CREEK AT CR 2924	21729	0410A	R5	RT	4	4	4	4		

Figure 10: Table of FY 2026 NETMWD/WMS and TCEQ Region 5 coordinated monitoring schedule in the Cypress Creek Basin

Key:

CR	County Road
FM	Farm to Market Road
SH	State Highway
US	US Highway

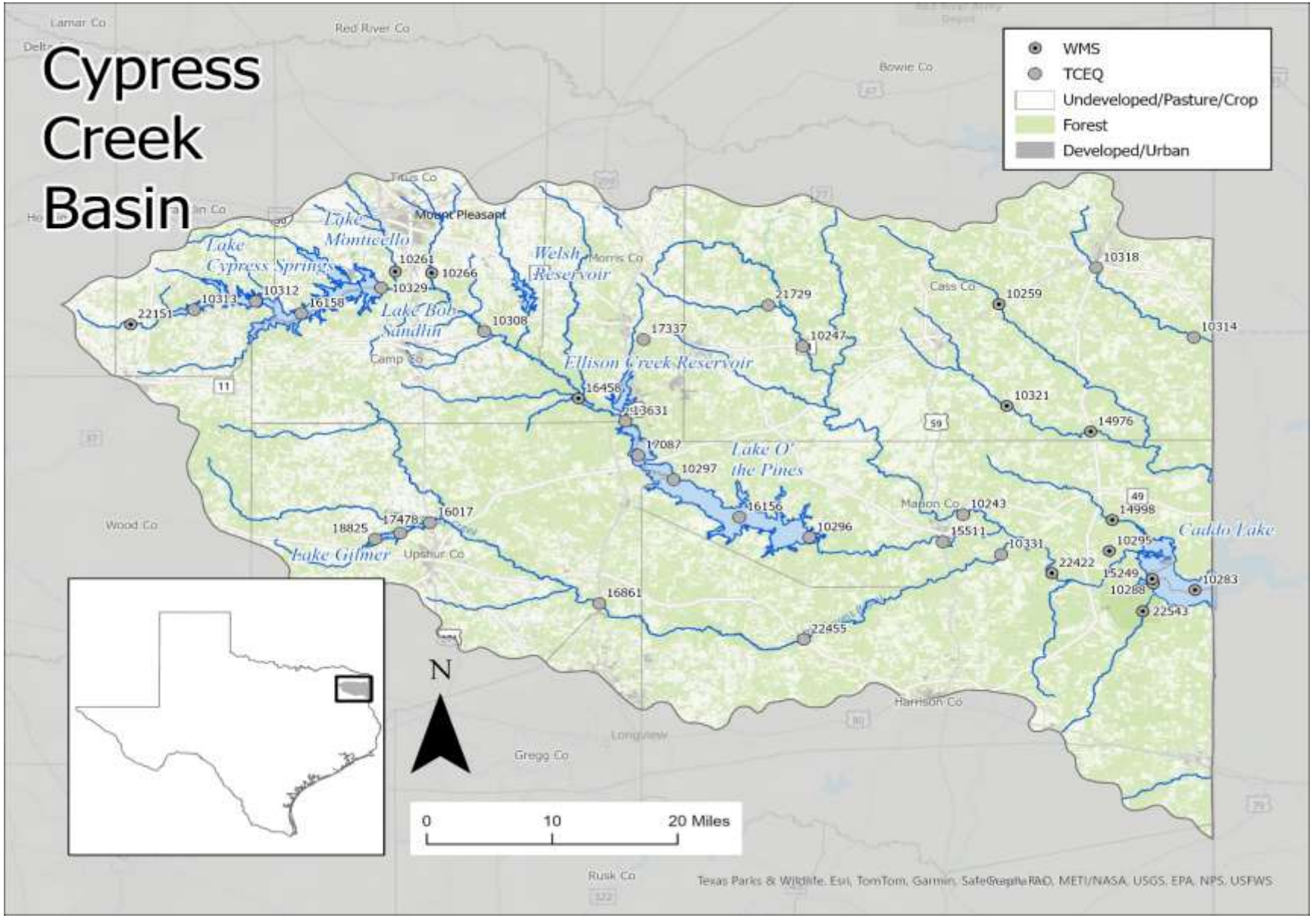

Figure 11: Map of the FY 2026 NETMWD/WMS and TCEQ Region 5 monitoring stations in the Cypress Creek Basin

Biological Discussions

Rare, Threatened, and Endangered species are taxa that are listed on the state and/or federal level. Endangered species are at serious risk of becoming extinct, while threatened species are organisms that are likely to become endangered in the near future. On the state level, TPWD also includes species that are considered imperiled or vulnerable of becoming threatened.

The TPWD maintains a list of state and federally listed rare, threatened, and endangered species. There are currently nine fish species in the Cypress Creek Basin that are listed as threatened or imperiled by the State of Texas, along with five mollusk, one crustacean, and two reptile species.

The statewide list of aquatic threatened (T) and imperiled (S) species in the Cypress Creek Basin is shown below. Imperiled species are identified as S1 – Critically Imperiled, S2 – Imperiled, and S3 – Vulnerable.

Taxon	Common Name	Scientific Name	State Listing
Fish	bluehead shiner	*Pteronotropis hubbsi*	T
	blackside darter	*Percina maculata*	T
	western creek chubsucker	*Erimyzon claviformis*	T
	paddlefish	*Polyodon spathula*	T
	taillight shiner	*Notropis maculatus*	S1
	ironcolor shiner	*Notropis chalybaeus*	S3
	western sand darter	*Ammocrypta clara*	S3
	blackspot shiner	*Notropis atrocaudalis*	S3
	Sabine shiner	*Notropis sabinae*	S3
Mollusk	Louisiana pigtoe	Pleurobema riddellii	T
	sandbank pocketbook	*Lampsilis satura*	T
	Texas heelsplitter	*Potamilus amphichaenus*	T
	southern hickorynut	*Obovaria arkansasensis*	T
	Texas pigtoe	*Fusconaia askewi*	T
Crustacean	Kisatchie painted crayfish	*Orconectes maletae*	S2
Reptile	alligator snapping turtle	*Macrochelys temminckii*	T
	western chicken turtle	*Deirochelys reticularia miaria*	S2, S3

Figure 12: Table of threatened and Imperiled aquatic species in the Cypress Creek Basin

Threatened fish species include the bluehead shiner (*Pteronotropis hubbsi*), blackside darter (*Percina maculate*), western creek chubsucker (*Erimyzon claviformis*), and the paddlefish (*Polyodon spathula*). The only critically imperiled fish is the taillight shiner (*Notropis maculatus*)

while vulnerable species are the ironcolor shiner (*Notropis maculatus*), western sand darter (*Ammocrypta clara*), blackspot shiner (*Notropis atrocaudalis*), and Sabine shiner (*Notropis sabinae*).

Kisatchie Painted Crayfish

Crayfish, in general, are keystone species that may indicate the health of a watershed, and nearly half of crayfish species are vulnerable, threatened, or endangered. The Kisatchie painted crayfish, *Faxonius* (or *Orconectes*) *maletae*, has few historical records and is believed to be restricted to the Kisatchie Bayou and Bayou Teche watersheds in Louisiana and in the Cypress Creek Basin. The Kisatchie painted crayfish is considered an imperiled species by the State of Texas and is currently being considered for potential listing as a threatened species by the U.S. Fish and Wildlife Service.

The crayfish is characterized by an olive carapace or hard, upper shell and the red marks on the legs and above the eyes while its chelae (claws) have red, yellow, and blue markings. The size of Kisatchie painted crayfish appears to be influenced by water depth. Individuals found in deep water have been documented to reach lengths of 101.6 mm whereas those found in shallow water rarely reach lengths over 50.8 mm.

Figure 13: Photos of Kisatchie painted crayfish captured and released during bioassessments in Big Cypress Creek

Little is known about the habitat requirements of the Kisatchie painted crayfish. They have historically been collected in freshwater streams with sand, gravel, mud, or silt; however, the Texas habitat tended to be more stagnant and muddier than in Louisiana. The Kisatchie painted

crayfish may prefer streams with varying water depth, heavy leaf litter, and cobble-lined stream bottoms. Historical collection locations were obtained from TPWD, and recent field surveys determined that the Kisatchie painted crayfish was absent from 60 percent of its historical range in Texas.

In 2021, researchers from Stephen F. Austin State University collected and confirmed the identification of Kisatchie painted crayfish in Prairie Creek, a tributary of Big Cypress Creek. Three individuals were collected in 2021 by Texas Tech researchers in Little Cypress Creek and its tributaries.

Since 2022, NETMWD and WMS staff have been observing crayfish incidentally collected while seining and electrofishing as part of aquatic life monitoring efforts. It is important to note that the species was not targeted for collection during these field efforts and all individuals were immediately returned to their habitat after identification. At present, no incidental mortalities during collection and identification have been observed by field biologists. In total, eighteen Kisatchie painted crayfish have been collected in the Cypress Creek Basin during these assessments. Six individuals were captured in Hart Creek in 2022 while twelve were observed in Big Cypress Creek from 2023 to 2025.

Station	Description	Date	Number
10266	Hart Creek	6/20/2022	6
16458	Big Cypress near Greasy Creek	6/3/2023	4
16458	Big Cypress near Greasy Creek	8/12/2023	2
22423	Big Cypress below Walker’s Creek	10/20/2023	1
22423	Big Cypress below Walker’s Creek	8/24/2024	3
22423	Big Cypress below Walker’s Creek	8/9/2025	2

Figure 14: Table of Kisatchie painted crayfish collected around the Cypress Creek Basin

Paddlefish Reintroduction Project

The paddlefish (*Polyodon spathula*) is native to the Big Cypress Bayou and Caddo Lake and is listed as a Threatened species by the TPWD. The paddlefish fishery began to decline after construction of Lake O' the Pines, and no occurrences of paddlefish had been reported since the 1980s. It is well documented that certain life history patterns required by paddlefish have been disturbed by the addition of dams, which hinder migration and alter historical flows and pulses that the paddlefish need to reproduce and recruit into their populations.

The U.S. Fish and Wildlife Service initiated the Paddlefish Reintroduction Project as a tool to help evaluate the effectiveness of the environmental flow regime that had been agreed upon by the U.S. Army Corps of Engineers and the NETMWD. It was believed that if the paddlefish can successfully be reintroduced under the environmental flow regime, then other native species are likely to benefit.

The U.S. Fish and Wildlife Service and Tishomingo National Fish Hatchery implanted 47 paddlefish with radio tags for phase one of the project. In March 2014, 54 paddlefish were released into the Big Cypress Bayou at Caddo Lake State Park, and at the boat ramp in Jefferson. An additional 2,621 paddlefish were stocked into the Big Cypress Bayou in April 2016 and at Starr Ranch in Caddo Lake. Over twelve thousand paddlefish were stocked in the Big Cypress Bayou in 2018 and again in 2019.

In 2018, paddlefish that were previously released were recaptured and implanted with long lasting acoustic telemetry tags so the fish can be tracked into adulthood. Monitoring of the stocked fish is ongoing and is expected to continue through the ten-year stocking plan to evaluate the environmental flows.

Figure 15: Photo of paddlefish snagged in Big Cypress Bayou above the SH 43 bridge in late December 2025. The fish was released after this photo was taken

Aquatic Life Monitoring

The NETMWD has long recognized the importance and value of biological monitoring in the Cypress Creek Basin as the fisheries of East Texas tend to be the most diverse in Texas. Aquatic Life Monitoring (ALM) consists of collecting fish using electrofishing and seining techniques, collecting benthic macroinvertebrates using dip, sweep, and kick-net techniques, measuring habitat conditions at five to six transects over the reach length, and performing stream flow and diel water quality measurements. Organisms are identified, enumerated, and evaluated using species diversity, functional feeding groups, biotic index, as well as other scoring metrics. Unless a microscope is required for identification, all fish are returned to the stream after enumeration and voucher photos are taken. Similarly, an assessment of the habitat is performed using the results of the field measurements.

The Texas Surface Water Quality Standards establishes the criteria for water quality conditions that need to be met in order to support and protect designated uses as detailed in Title 30 Texas Administrative Code, Chapter 307. To evaluate support of existing Aquatic Life Uses, the TCEQ established an index period, representing the warm-weather seasons, during which most bioassessments of aquatic assemblages in freshwater river and stream systems should be conducted. Bioassessment sampling for freshwater streams must be conducted during the non-critical period of March 15 to June 30 and from October 1 to October 15. A subset of the samples should be collected during critical conditions (July 1–September 30) when maximum temperatures, minimal stream flows, and minimum dissolved oxygen concentrations typically occur in Texas streams. These data help determine whether the criteria set for the designated uses are being met and maintained when flow is at or above critical low flow. The assessors work under the assumption that criteria met under these conditions would also be met during other seasons when water temperature is expected to be lower, and the flow and dissolved oxygen are higher.

The index period was established to:

- Minimize year-to-year variability resulting from natural events.
- Maximize gear efficiency.
- Maximize accessibility of targeted assemblages.
- Ensure that a portion of the samples is collected during critical low-flow and temperature conditions.

The NETMWD and its contractors have performed aquatic life monitoring in numerous watersheds over the years to gain an understanding of the biological integrity of the streams within the basin. At present, over thirty water bodies have been studied since 2001. In total, 103

bioassessments have been conducted across the basin since June 2001 with one-third (34) of those events completed between 2020 and 2025.

Fishing is conducted using seining and electroshocking techniques. A minimum of six seine hauls of ten meters each are performed. Seining continues until no new species are collected. Woody debris, snags, Cypress knees, and logjams frequently obstruct the seine net in East Texas streams so seine hauls of less than ten meters are not uncommon. As a result, ALM studies in the Cypress Creek Basin often have more than six seine hauls.

Figure 16: Photo collage of electrofishing and seining activities in the Cypress Creek Basin

The electroshocking method is non-lethal and is used to stun and turn fish. Shocking is performed for a minimum of 900 seconds or until no new species are collected. During collection, fish are netted and are placed in an aerated bucket until identification, enumeration, and photo-vouchering are completed.

It should be noted that darters are the most imperiled group of North American fishes, with roughly one-third of all darters in some degree of decline (Boschung and Mayden, 2004; Walsh et al., 2011). Darter species richness varies greatly among river basins and has decreased in their relative proportion of species richness in Texas streams by more than half since 1953 (Anderson *et al.*, 1995). Relative abundance of invertivorous species decreases with degradation, possibly in response to variability in the invertebrate food supply, which in turn reflects alterations of

water quality, energy sources, and/or instream habitat (Karr *et al*., 1986). For these reasons, careful attention should be paid to this group of fishes due to their present abundance and sensitivity to water quality impairments and habitat disturbance.

Due to the low prevalence of riffles in East Texas streams, benthic macroinvertebrates are most often collected using a five-minute kicknet technique using a D-frame net. The kicknet technique consists of sweeping the net for five minutes over habitat such as aquatic macrophytes, overhanging vegetation, root mats, undercut banks, leaf packs, and woody debris. The sample is placed on a sorting tray and up to 210 invertebrates are collected and placed in ethanol. The organisms are then identified and enumerated in the laboratory. In cases where fewer than 100 organisms are collected, the kicknet technique is repeated for another five minutes. If the sample size is still inadequate, then snag sampling is conducted which involves searching for organisms attached to woody debris such as logs and limbs.

Once collected, these data are processed and scored using a set of metrics specific to the ecoregion where the stream is located. Until recently, benthic analysis was also scored using statewide metrics. Recently, regionalized metrics for benthic analysis have been developed. Occasionally, regionalized benthic scores have been lower than statewide, however, both the regionalized and statewide scores generally fell within the same Aquatic Life Use category.

Figure 17: Photos of benthic macroinvertebrate sampling (left) and habitat measurements (right)

Bioassessments of benthic organisms often fall into the Intermediate category in the Cypress Creek Basin (Crowe and Bayer, 2005, Rogers and Harrison, 2007). One might infer that impaired water quality is negatively affecting benthic diversity; however, the benthic population is diverse

with over 285 species collected in the basin. Impaired water quality that negatively affects the benthic community should also negatively impact the fish community. Biological monitoring results indicate this is not the case in the Cypress Creek Basin. Rather, scoring metrics along with other factors may not accurately reflect the benthic populations in the basin.

It should be noted that high flow events, also referred to as scouring events, can negatively affect benthic populations. These disturbances can redistribute the organisms which may take several days to weeks to become reestablished in the stream. Further, aquatic insects typically complete two to three stages of their life cycle (egg, nymph or larvae, pupae) in the water prior to emergence as a terrestrial species. Due to this process, immature insects may not be abundant during certain times of year. Most insects emerge as adults during the late spring and summer before returning to lay eggs. As a result, the absence or low abundance of these species may be due to their life cycle stage rather than an indication of water quality conditions.

Habitat analysis includes the measurement of stream width, depth, bank slope, and tree canopy at five to six transects throughout the stream reach. Observations such as bed substrate type(s), channel sinuosity, erosion potential, instream cover, riparian vegetation, and riparian buffer width are also recorded. Habitat is scored using statewide metrics.

The average habitat score of the entire basin is on the borderline of Intermediate and High. Some components of the statewide habitat assessment metrics include the number of riffles, substrate type, and emergent vegetation. Many streams in the basin will have an artificially reduced habitat score due in part to these metrics (Crowe and Hambleton, 1998). Most perennial streams in East Texas function as glide/pool rather than as riffle/run systems. Streams typically have low velocity and due to the murkiness of the water, it is often difficult to determine where a pool begins and ends without making stream width and depth measurements. Riffles are uncommon and are mostly found in the western portion of the basin. When riffles are present, they are usually found in small, intermittent streams that often become completely dry without pools during extended periods without rainfall.

Riffles and emergent vegetation are important to support diverse biota. An ecoregion-specific habitat assessment would better describe streams within the Cypress Creek Basin especially when considering that the least impacted reference sites should represent realistic, attainable conditions for aquatic ecosystems (Omernik, 2014).

Although it is not uncommon to find aquatic plants along stream margins, due to the high turbidity, erosional sediments, and heavy tree canopy, emergent macrophytes are seldom encountered within the stream channel. Even though the riparian zone may be natural and show few, if any, signs of human impact, the habitat may still score in the Intermediate range. For

example, Frazier Creek is considered an ecoregion reference stream and has been classified as a "Least Disturbed Stream" (Bayer *et al*., 1992; Linam *et al*., 2002).

Station 22423 – Big Cypress Creek below Walker's Creek

In FY 2024 and 2025, ALMs were performed at station 22423 - Big Cypress Creek below the confluence with Walker Creek in AU 0404_02. The station is located on private property downstream of US 271. Four ALM events were conducted between October 2023 and August 2025. Station 22423 had a prolific and diverse darter population with nine taxa collected and 33 individuals collected over the course of four sampling events. The taxa collected included the redspot darter (*Etheostoma artesiae*), mud darter (*Etheostoma asprigene*), bluntnose darter (*Etheostoma chlorosomum*), harlequin darter (*Etheostoma histrio*), blackside darter (*Percina maculata*), and logperch (*Percina caprodes*). The harlequin darter was the most collected taxa with ten individuals followed by the bluntnose (*Etheostoma chlorosomum*) and slough darter (*Etheostoma gracile*) at five individuals each. A complete list of taxa and individual counts is included in the Appendix.

Figure 18: Voucher photos of redspot darter, Etheostoma artesiae (top) and blackside darter, Percina maculata (bottom)

This was the first reported collection of a redspot darter for the basin in the TCEQ database; however, this species has been collected by TPWD and other researchers. Fifteen blackside darters have been recorded in the database including one found in Walkers Creek in 2000. The other individuals were captured in Frazier Creek and James' Bayou in the early 2000s. It should

be noted that the blackside darter is listed as a "Species of Greatest Conservation Need" by TPWD. All individuals were returned unharmed to the stream after identification and photo vouchering.

As an aside, Dr. Carmen Montana at Stephen F. Austin State University conducted surveys of fish communities at five sites in or associated with Big Cypress Creek in southeastern Camp County on September 17 and 18, 2021. Overall, 439 individuals of 35 fish species were collected including the ironcolor shiner (*Notropis chalybaeus*), also a Species of Greatest Conservation Need.

Station 22423 scored in the exceptional range for fish and in the high range for habitat. Invertebrates scored in the high category using statewide metrics and in the intermediate range using regionalized metrics. It should be noted that the exceptional range is greater than or equal to 52, and the mean fish score at this station was 56.

Station 22543 – Harrison Bayou

Harrison Bayou (0401A) is a tributary of Caddo Lake. The stream is approximately 14 miles long and extends from its confluence with the Harrison Bayou Arm of Caddo Lake toward the southwest to a point just upstream of FM 1998, east of Marshall and near Scottsville, Texas. Harrison Bayou flows through the Caddo Lake National Wildlife Refuge immediately prior to entering the lake. The 8,416-acre property was formerly the Longhorn Army Ammunition Plant and was added to the National Priorities List by the Environmental Protection Agency in August 1990 due to soil and groundwater contamination from volatile organic compounds, perchlorate, metals, and explosives. The plant was closed in 1997, and the U.S. Army is the lead agency tasked with the remediation of the Longhorn Army Ammunition Superfund site.

Harrison Bayou had been sampled at station 15508, located at the FM 134 crossing south of Karnack since 2004. Station 15508 was frequently too deep to wade to make flow measurements yet tended to have little to no velocity. The average of the 45 historical flow measurements was 2.3 cubic feet per second. Most flow measurements were reported prior to the bridge construction which was completed around 2015. During construction, the stream was channelized above and below the bridge. Due to these conditions, sampling was moved downstream in mid-2025 to the Caddo Lake National Wildlife Refuge to a location more representative of natural conditions. Sampling is now conducted at station 22543 – Harrison Bayou at Avenue Q.

Harrison Bayou was first listed for low dissolved oxygen in 2000 and was included in the 2024 §303(d) List for not meeting the 24-Hour DO Average and 24-Hour DO Minimum criteria. These

2024 listings were carried forward from previous assessments since no diels were conducted during the assessment period. Thirty-eight diel studies were conducted in Harrison Bayou between March 2002 and July 2012. The mean of the 24-Hour DO Average values was 4.9 mg/L while the mean of the 24-Hour DO Minimum readings was 4.3 mg/L.

Twenty-nine diels were performed in Segment 0401A between 2002 and 2004. None of the ten diels from the upstream station 15507 fell below 5 mg/L while five out of nine diels at the most downstream station 15509 had 24-Hour DO Average values of less than 0.5 mg/L. Nineteen diels were completed at station 15508 between 2002 and 2012. The mean of the 24-Hour DO Average readings was 5.4 mg/L, and the average of the 24-Hour DO Minimum values was 4.8 mg/L. Diel monitoring should be considered in the future to address these impairments.

About one-quarter of the thirty dissolved oxygen grab samples reported during the 2024 assessment period fell below the 4 mg/L grab minimum criterion. All low readings were obtained during low flows in the summer and early October site visits.

Figure 19: Photo collage of ALM at station 22543 in October 2025

It should be noted that the diel dissolved oxygen criteria for Harrison Bayou are site-specific and variable as determined by using a multiple regression equation which includes the water temperature, stream flow, and watershed size. Using the equation, 1.5 mg/L is the minimum 24-Hour DO Average criterion allowed. To read more about how the site-specific criteria are calculated, see Appendix D of the Texas State Water Quality Standards.

To address this impairment and to obtain current biological data, the Coordinated Monitoring Committee agreed to conduct ALM studies in this stream. In October 2026, WMS completed a bioassessment at station 22543. Despite having no flow and low dissolved oxygen (24 Hour Average - 1.6 mg/L), the fish results were outstanding. Over 300 individuals representing 29 taxa were collected including three ironcolor shiner (*Alburnops chalybaeus*) and five spotted suckers (*Minytrema melanops*), both Species of Greatest Conservation Need. In addition, nine individuals from three darter taxa were collected along with fourteen hardy silversides (*Labidesthes vanhyningi*), five pallid shiners (*Hybopsis amnis*) and three cypress minnows (*Hybognathus hayi*).

As a result, the fish scored in the Exceptional category with 56 out of 60 possible points. Both habitat and benthic macroinvertebrates scored in the High category using statewide metrics while benthics scored in the Intermediate category using regionalized metrics. A complete taxa list is included in the Appendix. The next bioassessment is planned for July or August 2026 along with two other events in FY 2027.

Conclusions and Recommendations

The 2024 Texas Integrated Report assessed data collected between December 1, 2015, and November 30, 2022. The methods used for water quality assessments are developed through the Guidance Advisory Work Group meetings. The TCEQ assessed 38 water bodies in the Cypress Creek Basin in the 2024 IR. The 2024 §303(d) List identified 21 water bodies located in nine classified and twelve unclassified segments that did not meet the water quality criteria. High levels of bacteria and low concentrations of dissolved oxygen were the most common impairments in the basin. Impairments due to contaminants in fish tissue, leading to fish consumption advisories, were found in five segments while high pH impairments were shown for two reservoir segments. Segment 0408 – Lake Bob Sandlin was the only segment in the Cypress Creek Basin with no impairments or concerns.

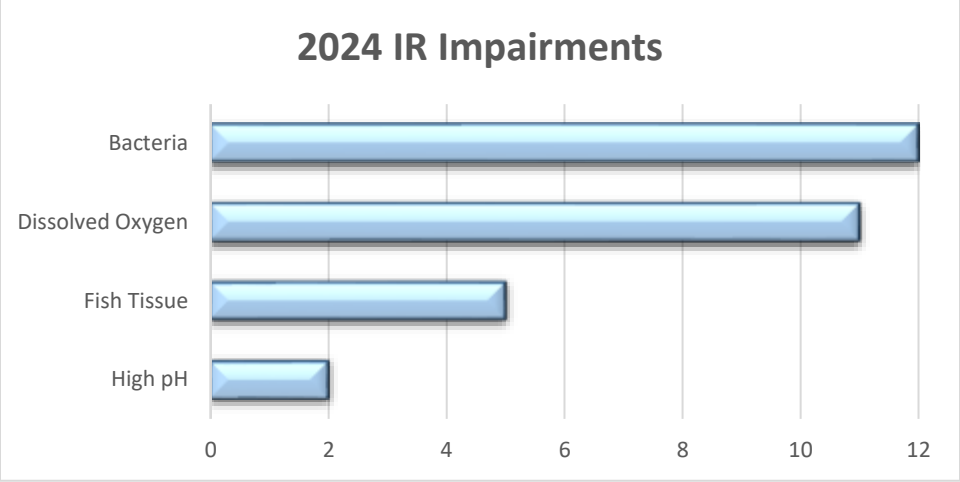

Figure 20: Chart of the number of impairments from the 2024 IR

Low dissolved oxygen impairments were found in most segments except for Lake Bob Sandlin and Big Cypress Creek below Lake Bob Sandlin. For the stream segments, low DO readings were quite often associated with low flow, especially in the intermittent streams of Black Bayou, James Bayou, and Segment 0410A of Black Cypress Creek. The pervasive drought most likely exacerbated the low DO conditions leading to these impairments. In the Draft 2026 IR, low DO impairments were dropped from AU 0410_04 of Black Bayou and in both assessment units of 0406 – Black Cypress Bayou. Diel data demonstrated that these water bodies were meeting their Aquatic Life Use designations so the impairments were removed from the Draft 2026 §303(d) List.

Releases from Lake Bob Sandlin play an important role in the water quality of Big Cypress Creek and Lake O' the Pines. In addition to providing stream flow in Big Cypress Creek, the high-quality water from Lake Bob Sandlin helps to offset the nutrient-laden discharges from the eight wastewater treatments plants in the Lake O' the Pines watershed. There are no instream flow

requirements in Big Cypress Creek, so water is only released by the Titus County Freshwater Supply District #1 to maintain the freeboard of the Fort Sherman Dam. On average, a little over 102,000 acre-feet of water were released each year.

Despite the water quality impairments found around the basin, its streams support abundant and diverse biota. These streams are home to two turtle species (alligator snapping turtle, western chicken turtle) and one crayfish species (Kisatchie painted crayfish) that are being considered for listing as threatened and endangered by the U.S. Fish and Wildlife Service.

Since 2001, 103 bioassessments have been conducted across the basin including 34 monitoring events completed between 2020 and 2025. Over 5,000 fish were collected representing 57 species during these recent bioassessments. In almost all cases, the fish populations scored in the high Aquatic Life Use category regardless of the stream classification of perennial or intermittent with perennial pools. Darters are an important indicator of stream health since they tend to be sensitive to water quality conditions. From these recent studies, 251 individuals from ten darter species were identified. Two species rarely found were collected in Big Cypress Creek including the redspot darter and the blindside darter. The blindside darter is listed by the TPWD as a species of greatest conservation need.

Recommendations:

Areas of future study that should be considered are:

- Diel monitoring in the upper assessment unit of Lake O' the Pines to address the dissolved oxygen impairment. Diel dissolved oxygen met the criteria during all five studies conducted in the summer of 2023.
- Bacterial Source Tracking and Recreational Use Attainability Analysis should be performed in all streams with bacteria impairments to determine whether the streams are being used for primary contact recreation.
- Continue biological monitoring studies to evaluate the biotic integrity of stream segments within the basin.

In addition, NETMWD should encourage:

- the Department of State Health Services to perform fish tissue studies to determine whether the consumption advisories should be removed or remain in place, and
- the TCEQ to incrementally raise the CRP budget to offset higher costs to maintain the current number of monitoring stations.

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Appendix

Fish Taxa List by Station

Harrison Bayou at Ave. Q	Station #22543	10/3/2025
Common Name	**Scientific Name**	**# Individuals**
blackstripe topminnow	*Fundulus notatus*	5
bluegill	*Lepomis macrochirus*	49
bullhead minnow	*Pimephales vigilax*	1
channel catfish	*Ictalurus punctatus*	1
cypress darter	*Etheostoma proeliare*	2
cypress minnow	*Hybognathus hayi*	3
dollar sunfish	*Lepomis marginatus*	1
flier	*Centrarchus macropterus*	3
golden shiner	*Notemigonus crysoleucas*	11
green sunfish	*Lepomis cyanellus*	1
hardy silverside	*Labidesthes vanhyningi*	14
ironcolor shiner	*Alburnops chalybaeus*	3
largemouth bass	*Micropterus salmoides*	5
logperch	*Percina caprodes*	2
longear sunfish	*Lepomis megalotis*	16
orange spotted	*Lepomis humilis*	3
pallid shiner	*Hybopsis amnis*	5
pirate perch	*Aphredoderus sayanus*	37
redear sunfish	*Lepomis microlophus*	8
redfin pickerel	*Esox americanus*	4
redfin shiner	*Lythrurus umbratilis*	4
ribbon shiner	*Lythrurus fumeus*	45
slough darter	*Etheostoma gracile*	3
spotted sucker	*Minytrema melanops*	5
tadpole madtom	*Noturus gyrinus*	3
western mosquitofish	*Gambusia affinis*	59
warmouth	*Lepomis gulosus*	9
weed shiner	*Notropis texanus*	5
yellow bullhead	*Ameiurus natalis*	10
# Taxa		**# Individuals**
29		**317**

Station #22423	Big Cypress Creek below Walkers Creek	Oct 2023 - Aug 2025
Common Name	**Scientific Name**	**# Individuals**
bigscale logperch	*Percina caprodes*	3
black crappie	*Pomoxis nigromaculatus*	5
blackside darter	*Percina maculata*	3
blackstripe topminnow	*Fundulus notatus*	27
bluegill	*Lepomis macrochirus*	49
bluntnose darter	*Etheostoma chlorosomum*	5
bullhead minnow	*Pimephales vigilax*	63
channel catfish	*Ictalurus punctatus*	18
dusky darter	*Percina sciera*	4
flathead catfish	*Pylodictis olivaris*	3
flier	*Centrarchus macropterus*	10
freckled madtom	*Noturus nocturnus*	1
gizzard shad	*Dorosoma cepedianum*	4
green sunfish	*Lepomis cyanellus*	11
harlequin darter	*Etheostoma histrio*	10
inland silverside	*Menidia beryllina*	3
largemouth bass	*Micropterus salmoides*	14
Logperch	*Percina caprodes*	1
longear sunfish	*Lepomis megalotis*	116
mimic shiner	*Notropis volucellus*	2
mud darter	*Etheostoma asprigene*	1
orangespotted sunfish	*Lepomis humilis*	5
pirate perch	*Aphredoderus sayanus*	14
red shiner	*Cyprinella lutrensis*	9
red spotted	*Lepomis miniatus*	3
redear sunfish	*Lepomis microlophus*	70
redfin pickerel	*Esox americanus*	11
redspot darter	*Etheostoma artesiae*	1
redspotted sunfish	*Lepomis miniatus*	2
ribbon shiner	*Lythrurus fumeus*	106
slough darter	*Etheostoma gracile*	5
spotted bass	*Micropterus punctulatus*	2
spotted sucker	*Minytrema melanops*	3
tadpole madtom	*Noturus gyrinus*	5
western mosquito fish	*Gambusia affinis*	34
warmouth	*Lepomis gulosus*	4
weed shiner	*Notropis texanus*	22
western blacktail shiner	*Cyprinella venusta*	127
yellow bullhead	*Ameiurus natalis*	20
# Taxa		**# Individuals**
39		**796**