

# SPRING CREEK WATERSHED SUMMARY REPORT

DECEMBER 2025



Photo credit: Steve James



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## ACKNOWLEDGEMENTS

The Texas Stream Team encourages life-long learning about the environment and people's relationship to the environment through its multidisciplinary community science programs. We also provide hands-on opportunities for Texas State University students and inspire future careers and studies in natural resource related fields. Preparation of this report fulfills a contract deliverable for the granting entity, but it also serves as a valuable educational experience for the students that assisted in preparing the report. The Texas Stream Team staff values the student contributions and recognizes each individual for their role. The following staff and student workers assisted in the preparation of this report and are acknowledged for their contributions:

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# INTRODUCTION

## Texas Stream Team

Texas Stream Team is a volunteer-based community science water quality monitoring program. Water quality monitoring occurs at predetermined monitoring sites, at roughly the same time of day each month. The information that Texas Stream Team community scientists collect is covered under a Texas Commission on Environmental Quality-approved Quality Assurance Project Plan to ensure that a standard set of methods are used statewide. The data may be used by professionals to identify surface water quality trends, target additional data collection needs, identify potential pollution events and sources of pollution, and to test the effectiveness of water quality management measures. Texas Stream Team community scientist data can be used by the state to assess whether water bodies are meeting the designated surface water quality standards, however it is not a requirement. The data collected by Texas Stream Team provides valuable records, often collected in portions of a water body that professionals are not able to monitor frequently or monitor at all.

For additional information about water quality monitoring methods and procedures, including the differences between professional and volunteer community science monitoring, please refer to the following sources:

- [Texas Stream Team Core Water Quality Community Scientist Manual](#)
- [Texas Stream Team Advanced Water Quality Community Scientist Manual](#)
- [Texas Stream Team Quality Assurance Project Plan](#)
- [Texas Commission on Environmental Quality Surface Water Quality Monitoring Procedures](#)

The purpose of this report is to provide a summary of the data collected by Texas Stream Team community scientists under a specific watershed. The data presented in this report should be considered in conjunction with other relevant water quality reports for a holistic view of water quality. Such sources may include, but are not limited to, the following:

- Texas Surface Water Quality Standards
- Texas Water Quality Inventory and 303(d) List (Integrated Report)
- Texas Clean Rivers Program partner reports, such as Basin Summary and Highlight Reports
- Texas Commission on Environmental Quality Total Maximum Daily Load reports
- Texas Commission on Environmental Quality and Texas State Soil and Water Conservation Board Nonpoint Source Program funded reports, including watershed protection plans

To get involved with Texas Stream Team or for questions regarding this watershed data report contact us at [TxStreamTeam@txstate.edu](mailto:TxStreamTeam@txstate.edu) or at 512.245.1346. Visit our website for more information on our programs at [www.TexasStreamTeam.org](http://www.TexasStreamTeam.org).

## Recognition of Field Contribution

This report owes much to the Houston-Galveston Area Council and their long-standing partnership with the Texas Stream Team. As one of the longest-running, continuous, and largest Texas Stream Team groups in the state, the council has been involved in the program

nearly since its inception. Through regular sampling across the Spring Creek watershed (the watershed), the council has built a critical dataset that captures water quality trends and seasonal variability in the region.

Beyond field sampling, the council has played a leading role in coordinating the Spring Creek Watershed Protection Plan, which was accepted by the U.S. Environmental Protection Agency in June 2023. The council actively integrates Texas Stream Team data into their Clean Rivers Program monitoring and other watershed initiatives to ensure a continuous understanding of local waterway health.

Over the years, the council has trained hundreds of community scientists and developed several trainers, expanding the reach and impact of community-based water quality monitoring throughout the watershed. Their commitment to data quality, collaboration, and public education has made them an invaluable partner in advancing both this report and the broader mission of protecting Texas waterways. The Texas Stream Team extends its deepest appreciation for the council's sustained dedication and leadership in watershed stewardship.

## WATERSHED DESCRIPTION

### Location and Physical Description

The watershed is located in southeastern Texas spanning Grimes, Harris, Montgomery, and Waller counties, encompassing approximately 1,016 square miles. Walnut Creek rises fifteen miles southeast of Navasota and 1 ½ miles north of the Waller county line in southeast Grimes County. It flows southeast for 24 miles, through Waller and Montgomery counties, to its mouth on Spring Creek two miles west of the Montgomery-Harris county line and five miles from Tomball in Harris County (Texas State Historical Association, 1996). Spring Creek rises at Farm Road 1736 two miles west of the Fields Store community in northeast Waller County. The creek flows southeast for 64 miles to its mouth at the junction of the San Jacinto River and the Lake Houston Spillway in Harris County. It forms the northern boundary between Waller and Harris and Montgomery and Harris counties (Texas State Historical Association, 2018).

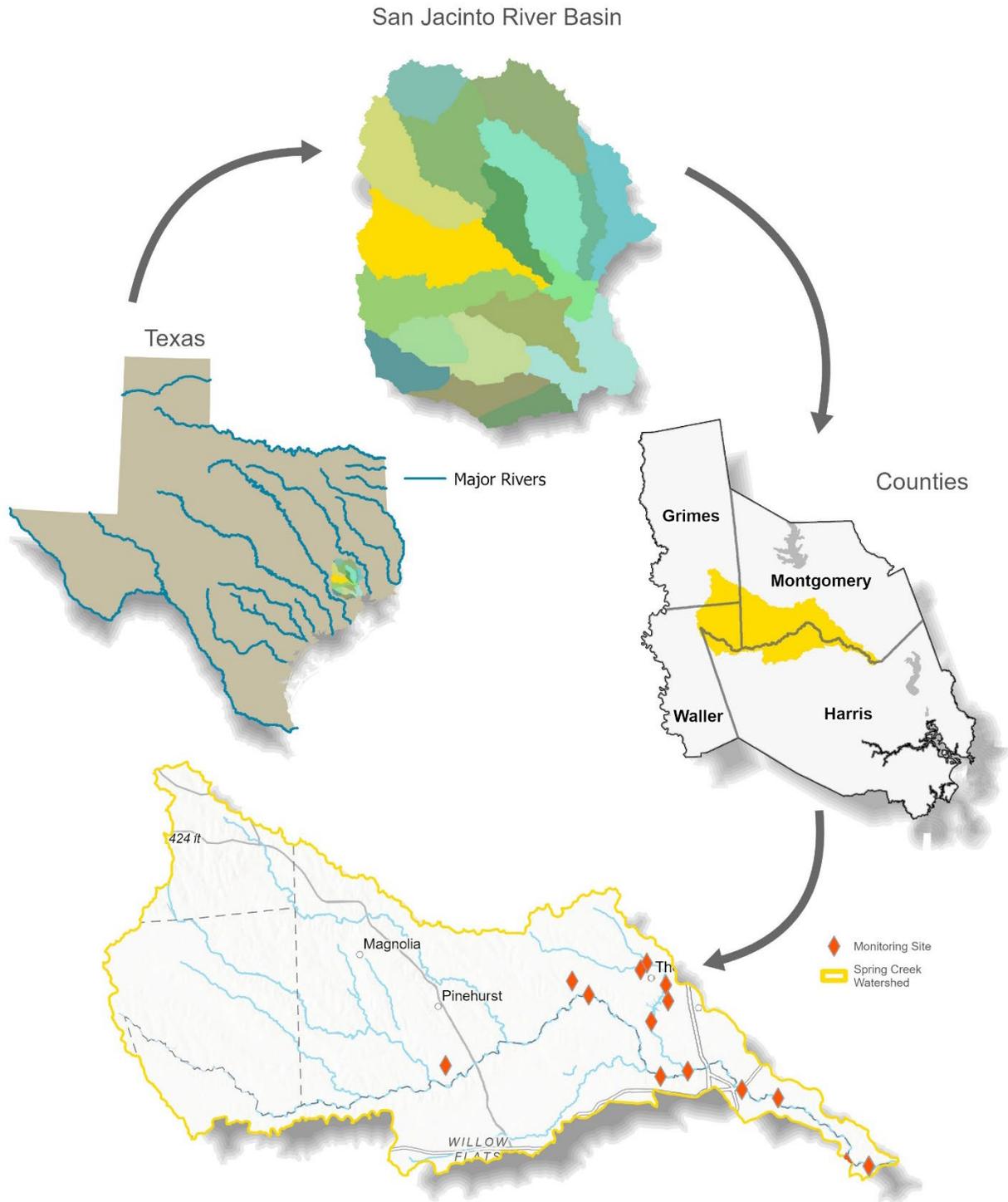


Figure 1. Spring Creek watershed in Grimes, Harris, Montgomery, and Waller counties, Texas.

The watershed is positioned within several ecoregions, such as the Texas Blackland Prairies, East Central Texas Plains, Western Gulf Coastal Plains, and South Central Plains. The corresponding sub-ecoregions and counties are listed in Table 1. The physiology in this region is described as having flat to rolling terrain with sandy and clay loam soils (Texas State Historical

Association, 1996; Texas State Historical Association, 2018). The ecoregions in the watershed support a wide array of flora and fauna. The flora includes, but is not limited to, tall grass, little bluestem, switchgrass, yellow Indiangrass, oak savannas, elm, ash, cottonwood, pecan, hackberry, longleaf pine woodlands, and longleaf pine savannas (Griffith et al., 2008). The fauna consists of white-tailed deer, rabbit, raccoons, opossums, fox squirrels, bobcats, coyotes, red and grey fox, alligator, cottonmouths, bobwhite quail, mourning dove, and roadrunners (Jackson, 2020; Long, 2022).

*Table 1. Ecoregions located within the watershed in Grimes, Harris, Montgomery, and Harris counties, Texas.*

<b>Ecoregion</b>	<b>Sub-Ecoregion</b>	<b>County/Counties</b>
Texas Blackland Prairies	Southern Blackland Prairie	Grimes
East Central Texas Plains	Southern Post Oak Savanna	Grimes
Western Gulf Coastal Plains	Northern Humid Gulf Coastal Prairie	Harris, Waller
South Central Plains (Piney Woods)	Southern Tertiary Uplands/Flatwoods	Montgomery

The Texas Commission on Environmental Quality designates classifications for streams, rivers, lakes, and bays throughout Texas, including those within the watershed (Table 2). One classified freshwater stream and 11 unclassified freshwater streams within the watershed were monitored by Texas Stream Team community scientists and are included in this report. Spring Creek (Segment 1008) is a classified stream and arises from the confluence with the West Fork San Jacinto River in Harris/Montgomery County to the most upstream crossing of FM 1736 in Waller County. The unclassified freshwater streams, segments 1008A, 1008B, 1008C, 1008D, 1008E, 1008H, 1008I, 1008J, 1008K, 1008L, and 1008M, are described in Table 2.

*Table 2. Texas Commission on Environmental Quality surface water quality viewer (Texas Commission on Environmental Quality, 2022).*

<b>Segment Number</b>	<b>Segment Name</b>	<b>Segment Description</b>
1008	Spring Creek	From the confluence with the West Fork San Jacinto River in Harris/Montgomery County to the most upstream crossing of FM 1736 in Waller County.
1008A	Mill Creek	Perennial stream from the normal pool elevation of Neidigk Lake upstream to the confluence of Hurricane Creek and Kickapoo Creek.
1008B	Upper Panther Branch	From the normal pool elevation of 125 feet of Lake Woodlands upstream to Old Conroe Road.
1008C	Lower Panther Branch	From the Spring Creek confluence upstream to the dam impounding Lake Woodlands in Montgomery County.
1008D	Metzler Creek	Intermittent stream with perennial pools from the confluence of Cannon

		Gully up to 0.2 km below Kuykendahl Road.
1008E	Bear Branch	From the Upper Panther Branch confluence to south of FM 1488 in Montgomery County.
1008H	Willow Creek	From the Spring Creek confluence to a point 0.48 km (0.3 mi) north of Juergen Rd.
1008I	Walnut Creek	From the Spring Creek confluence to a point 41.1 km (25.5 mi) upstream.
1008J	Brushy Creek	From the Spring Creek confluence upstream to a point 5.6 km (3.5 mi) upstream of FM 1488.
1008K	Arnold Branch	Intermittent stream with perennial pools from the confluence with Mink Branch upstream to the headwaters just upstream of FM 1774.
1008L	Mink Branch	Perennial stream from the confluence with Walnut Creek upstream to the confluence with an unnamed tributary approximately 1.0 km upstream of Nichols-Sawmill Road.
1008M	Sulphur Branch	Intermittent stream with perennial pools from an unnamed reservoir, known locally as Lake Apache, upstream to FM 1774. The unnamed reservoir impounds Sulphur Branch approximately 0.8 km upstream of the confluence with Walnut Creek.

**Climate**

The climate in this area is described as humid and subtropical with hot, humid summers, mild winters, and no dry season (Köppen-Geiger climate classification). Climate data from the National Oceanic and Atmospheric Administration was collected at a weather station located in Montgomery County and acquired from the National Data Center (National Oceanic and Atmospheric Administration, 2021). The average annual precipitation is 51.02 inches and typically occurs year-round (Figure 2). Long-term monthly precipitation shows a bimodal distribution, with peaks occurring in May and October, averaging 5.43 inches of rainfall during these months. The least amount of rainfall (3.32 inches) occurs in February and July. The warmest and coldest months of the year are August (29.5°C) and January (11.3°C), respectively.

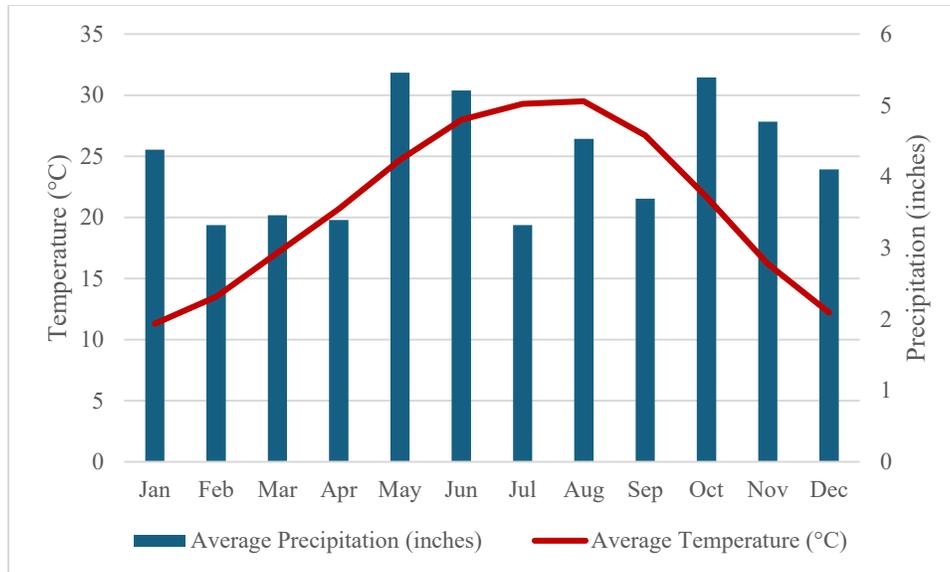


Figure 2. Long-term (1991-2020) monthly average precipitation (inches) and air temperature (°C) from Montgomery County, Texas (National Oceanic and Atmospheric Administration, 2021).

## History

The land in this region has a long history of human presence, with the Atakapan and Bidai Native Americans being the earliest known inhabitants. The combination of European exploration and Anglo settlement in early 19<sup>th</sup> century led to rapid decline in Native American population, largely due to the introduced diseases. Population growth rapidly increased in the early 19<sup>th</sup> century because of founding of Stephen F. Austin’s original colony between the lower Brazos and Colorado. As the population in this area grew, the Republic of Texas was formed and cities began to emerge, most notably, Houston in 1836 (Christian and Leffler, 2021; Jackson, 2020; Henson, 2020; Long and Searle, 2022).

Throughout the 19<sup>th</sup> and 20<sup>th</sup> centuries, agriculture was a prominent economic driver across the region. Farming, cotton production, and timber harvesting were essential to the growth of local economies of Grimes, Harris, Montgomery, and Wallace counties (Christian and Leffler, 2021; Jackson, 2020; Henson, 2020; Long and Searle, 2022). Montgomery County developed an extensive timber production industry, as the county is situated and supported by the Piney Woods region of eastern Texas (Long and Searle, 2022). Harris County’s economy eventually grew from the agricultural realm to oil and gas when the Texas oil boom struck the Houston area in the early 20<sup>th</sup> century. The discovery of these coveted natural resources led to an explosion in population, industry, rail expansion, and the addition of ports in and around the Houston area. These factors helped transform the region from an agricultural landscape into one of the most diverse economic regions of Texas (Henson, 2020).

## Land Use

Land cover types were determined from spatial datasets from the National Land Cover Database and processed in Esri ArcGIS Pro for the watershed (Figures 3 and 4).

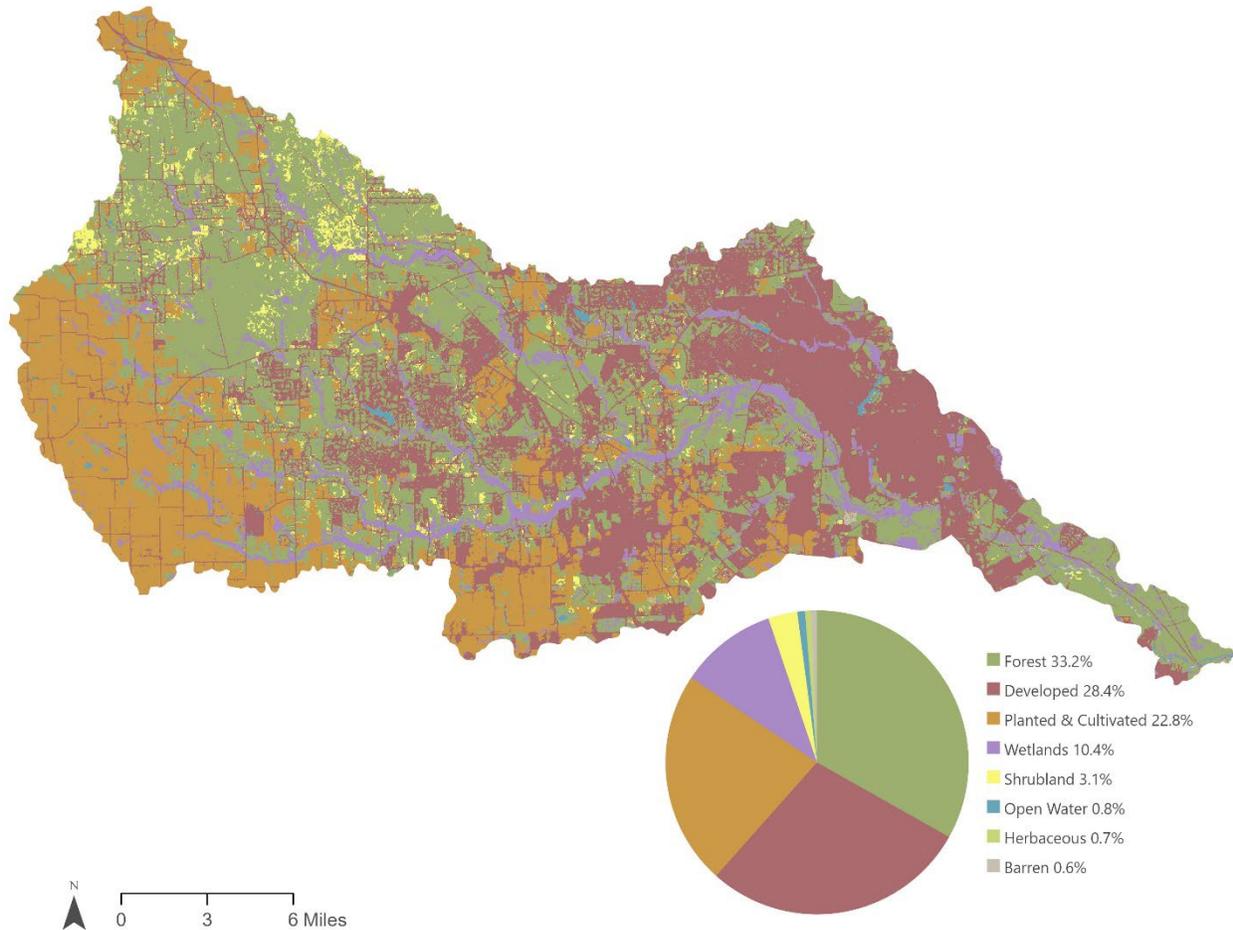


Figure 3. 2004 land use and land cover for the watershed in Grimes, Montgomery, Harris, and Waller Counties, Texas (National Land Cover Data, 2004).

In 2004, the watershed was primarily forested, with forest covering 33.2% of the area. Developed land made up 28.4% of the watershed, while planted and cultivated land accounted for 22.8% and wetlands for 10.4%. The remaining 5.2% consisted of shrubland (3.1%), open water (0.8%), herbaceous cover (0.7%), and barren land (0.6%).

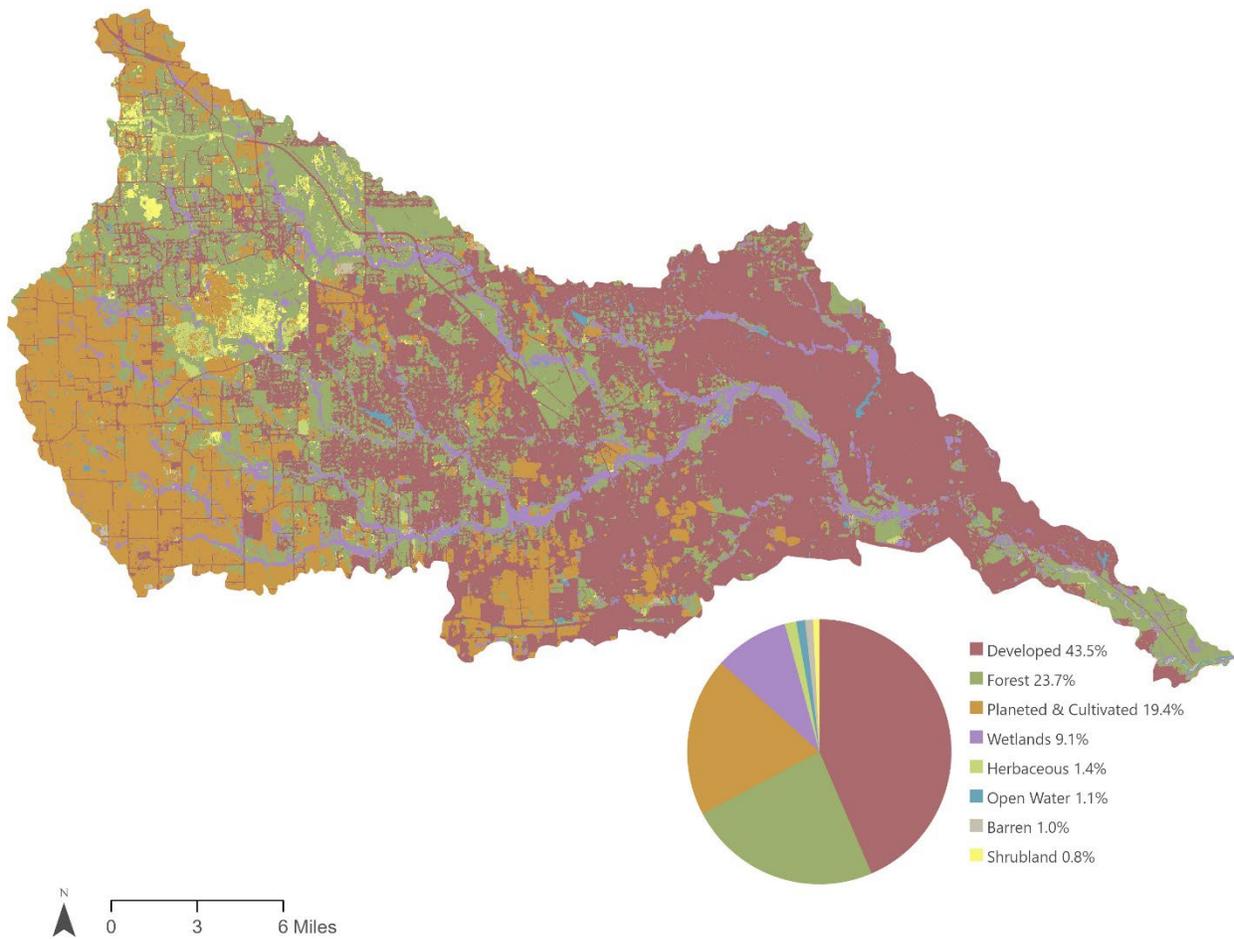


Figure 4. 2024 land use and land cover for the watershed in Grimes, Montgomery, Harris, and Waller Counties, Texas (National Land Cover Data, 2024).

In 2024, developed land became the predominant land use, covering 43.5% of the watershed. Forest cover decreased to 23.7%, and planted/cultivated land to 19.4%, while wetlands comprised 9.1% of the area. The remaining 4.3% of the watershed consisted of herbaceous cover (1.4%), barren land (1.0%), open water (1.1%), and shrubland (0.8%).

Table 3. Comparison of watershed land use categories by acreage and percentage in 2004 and 2024 (National Land Cover Data, 2004 and 2024).

Land Use	2004, Acreage	2004, Percentage	2024, Acreage	2024, Percentage	Change in Land Use
Forest	215,742.20	33.2%	154,223.47	23.7%	-28.5%
Developed	184,862.30	28.4%	283,131.55	43.5%	+53.2%
Planted/Cultivated	148,492.10	22.8%	126,491.99	19.4%	-14.8%
Wetlands	67,486.50	10.4%	59,172.28	9.1%	-12.3%

Shrubland	20,235.01	3.1%	5,072.15	0.8%	-74.9%
Open Water	5,314.56	0.8%	7,118.18	1.1%	+33.9%
Herbaceous	4,301.11	0.7%	9,022.99	1.4%	+109.8%
Barren	4,027.79	0.6%	6,229.05	1.0%	+54.7%

## Endangered Species and Conservation Needs

The common names of 56 of species listed as threatened or endangered (under the authority of Texas state law and/or the United States Endangered Species Act) within the watershed are included in Appendix A. A summary of the number of species per taxonomic group listed as state or federally endangered, threatened, G1 or G2 (critically imperiled or imperiled), species of greatest conservation need, and/or endemic is provided in Table 4.

*Table 4. State and federally listed species in the watershed in Grimes, Harris, Montgomery, and Waller counties, Texas.*

<b>Taxon</b>	<b>Endangered (Federal or State) LE/E</b>	<b>Threatened (Federal or State) LT/T</b>	<b>G1 or G2 (Critically Imperiled/Imperiled)</b>	<b>Species of Greatest Conservation Need (TPWD) (S1 or S2)</b>	<b>Endemic Total Count</b>
Amphibians	1	0	1	1	1
Birds	3	10	1	15	0
Fish	0	7	0	9	0
Mammals	8	12	3	24	0
Reptiles	3	5	4	9	1
Crustaceans	0	0	1	0	0
Insects	0	0	3	3	0
Mollusks	0	4	3	4	2
Plants	2	1	13	15	16
<b>TOTAL</b>	17	39	29	80	20

## Texas Water Quality Standards

The Texas Surface Water Quality Standards establish explicit goals for the quality of streams, rivers, lakes, and bays throughout the state. These standards are designed to maintain surface water quality in support of public health, aquatic life, and recreational uses, while remaining consistent with sustainable economic development. Water quality standards identify the appropriate uses of classified and unclassified water bodies, including aquatic life protection, recreation, and public water supply.

For monitoring sites located on tributaries feeding into Spring Creek (Segment 1008), the criteria used to assess support of these designated uses are summarized in Table 5. Unclassified water bodies are not defined individually in the state's standards but are associated with the classified segment because they lie within the same watershed.

The dissolved oxygen criterion represents the minimum allowable mean concentration at any site within the segment. The acceptable pH range applies to any monitoring location within the watershed. The total dissolved solids criterion represents the mean allowable concentration for the segment. The indicator bacteria criterion for freshwater systems is a geometric mean based on *E. coli* levels. The temperature criterion represents the maximum allowable value at any site within the segment.

Table 5. State water quality criteria for the Spring Creek (Segment 1008) watershed, Texas (Texas Commission on Environmental Quality, 2022).

Segment	Dissolved Oxygen (mg/L)	pH Range (s.u.)	Total Dissolved Solids (mg/L)	<i>E. coli</i> (CFU/100 mL)	Temperature (°C)
1008 (Spring Creek)	5.0	6.5 - 9.0	450	126	32.2

## Water Quality Impairments

The 2024 Texas Integrated Report of Surface Water Quality for Clean Water Act Sections 305(b) and 303(d) includes an Index of Water Quality Impairments (Texas Commission on Environmental Quality, 2024). Table 6 summarizes the water quality impairments and Total Maximum Daily Load status for the stream segments within the watershed that were evaluated in this assessment cycle.

Table 6. Water Quality Impairments and Total Maximum Daily Load Status of the watershed (Texas Commission on Environmental Quality, 2024).

Segment	Name	Impairment Parameter(s)	Category	TMDL Status
1008	Spring Creek	Bacteria in water (Recreation Use)	4a	TMDL approved/established for bacteria
1008A	Mill Creek	Bacteria in water (Recreation Use)	5r	A Watershed Protection Plan has been developed or accepted by EPA; therefore, no separate TMDL is required.
1008B	Upper Panther Branch	Not listed in the 2024 Index	—	—
1008C	Lower Panther Branch	Not listed in the 2024 Index	—	—
1008D	Metzler Creek	Not listed in the 2024 Index	—	—
1008E	Bear Branch	Not listed in the 2024 Index	—	—
1008H	Willow Creek	Bacteria in water (Recreation Use)	4a	TMDL approved/established for bacteria

1008I	Walnut Creek	Bacteria in water (Recreation Use)	4a	TMDL approved/established for bacteria
1008J	Brushy Creek	Bacteria in water (Recreation Use)	4a	TMDL approved/established for bacteria
1008K	Arnold Branch	Not listed in the 2024 Index	—	—
1008L	Mink Branch	Not listed in the 2024 Index	—	—
1008M	Sulphur Branch	Not listed in the 2024 Index	—	—

The assessment of monitored segments in the watershed shows that bacteria impairments associated with recreation use are the most common issue. Segment 1008 (Spring Creek) is listed under Category 4a, indicating that a Total Maximum Daily Load plan has already been developed and approved. The impairment was carried forward in the 2024 cycle because insufficient new data was available to reassess the condition.

Mill Creek (Segment 1008A) is listed under Category 5r, meaning that although the segment is impaired for bacteria, a Watershed Protection Plan has been developed and accepted by the Environmental Protection Agency. In these cases, the approved Watershed Protection Plan serves in place of a Total Maximum Daily Load plan, and no separate Total Maximum Daily Load development is required.

Several tributaries, including Upper Panther Branch (1008B), Lower Panther Branch (1008C), Metzler Creek (1008D), Bear Branch (1008E), Arnold Branch (1008K), Mink Branch (1008L), and Sulphur Branch (1008M), do not appear in the 2024 Impairment Index, indicating that no official impairments have been identified for these segments during the current assessment cycle. Absence from the Impairment Index does not necessarily indicate the absence of water quality concerns, but rather that these waterbodies were not classified as impaired based on available statewide assessment data. Notably, Upper Panther Branch (1008B) is marked as “Impaired = Y” in the local dataset, indicating a locally defined screening flag for potential water quality concern, rather than an officially designated impairment, and this designation is not reflected in the 2024 statewide Integrated Report.

Other tributaries, Willow Creek (1008H), Walnut Creek (1008I), and Brushy Creek (1008J), are listed as impaired for bacteria under Category 4a, indicating that Total Maximum Daily Load allocations have been developed and approved. Similar to the main segment, these impairments were carried forward due to a lack of new assessment data.

Overall, the findings highlight bacterial contamination as the primary water quality concern across the watershed. While several segments have approved Total Maximum Daily Loads or Watershed Protection Plan -based management strategies in place, others remain unlisted due to insufficient evidence for impairment. The watershed therefore includes both priority areas, where bacteria problems persist, and segments that currently meet water quality expectations based on the statewide 2024 assessment.

## WATER QUALITY PARAMETERS

The water quality parameters collected by Texas Stream Team community scientists specifically for this watershed are outlined and defined below.

### **Water Temperature**

Water temperature influences the physiological processes of aquatic organisms, and each species has an optimum temperature for survival. High water temperatures increase oxygen-demand for aquatic communities and can become stressful for fish and aquatic insects. Water temperature variations are most detrimental when they occur rapidly, leaving the aquatic community no time to adjust. Additionally, the ability of water to hold oxygen in solution (solubility) decreases as temperature increases. This effect is exacerbated in coastal water bodies influenced by tidal, saline waters. Warm water temperatures occur naturally with seasonal variation, as water temperatures tend to increase during summer and decrease in winter in the Northern Hemisphere. Daily (diurnal) water temperature changes occur during normal heating and cooling patterns. Man-made sources of warm water include power plant effluent after it has been used for cooling or hydroelectric plants that discharge warm water. Community scientist monitoring may not identify fluctuating patterns due to diurnal changes or events such as power plant releases because of the monthly sampling frequency. While community scientist data may not show diurnal temperature fluctuations, they could demonstrate the fluctuations over seasons and years when collected consistently at predetermined monitoring sites and monthly frequencies.

### **Conductivity**

Conductivity (specific conductance) is a measure of the ability of a body of water to conduct electricity. It is measured in microsiemens per centimeter ( $\mu\text{S}/\text{cm}$ ). A body of water is more conductive if it has more total dissolved solids such as nutrients and salts, which indicates poor water quality if they are overly abundant. High concentrations of nutrients can lead to eutrophication, which results in lower levels of dissolved oxygen. High concentrations of salt can inhibit water absorption and limit root growth for vegetation, leading to an abundance of more drought tolerant plants, and can cause dehydration of fish and amphibians. Sources of total dissolved solids can include agricultural runoff, domestic runoff, or discharges from wastewater treatment plants.

### **Dissolved Oxygen**

Oxygen is necessary for the survival of organisms like fish and aquatic insects. The amount of oxygen needed for survival and reproduction of aquatic communities varies according to species composition and adaptations to watershed characteristics like stream gradient, habitat, and available streamflow.

The dissolved oxygen concentrations can be influenced by other water quality parameters such as nutrients and temperature. High concentrations of nutrients can lead to excessive surface vegetation and algae growth, which may starve subsurface vegetation of sunlight and, therefore, reduce the amount of oxygen they produce via photosynthesis. This process is

known as eutrophication. Low dissolved oxygen can also result from high groundwater inflows (which have low dissolved oxygen due to minimal aeration), high temperatures, or water releases from deeper portions of dams where dissolved oxygen stratification occurs. Supersaturation typically occurs underneath waterfalls or dams with water flowing over the top where aeration is abundant.

## pH

The pH scale measures the concentration of hydrogen ions in a range from zero to 14 and is reported in standard units (s.u.). The pH of water can provide information regarding acidity or alkalinity. The range is logarithmic; therefore, every one-unit change is representative of a 10-fold increase or decrease in acidity or alkalinity. Acidic sources, indicated by a low pH level, can include acid rain and runoff from acid-laden soils. Acid rain is predominantly caused by coal powered plants with minimal contributions from the burning of other fossil fuels and other natural processes, such as volcanic emissions. Soil-acidity can be caused by excessive rainfall leaching alkaline materials out of soils, acidic parent material, crop decomposition creating hydrogen ions, or high yielding fields that have drained the soil of all alkalinity. Sources of high pH (alkaline) include geologic composition, as in the case of limestone increasing alkalinity and the dissolving of carbon dioxide in water. Carbon dioxide is water soluble, and as it dissolves it forms carbonic acid. A suitable pH range for healthy organisms is between 6.5 and 9.0 s.u.

## Water Transparency and Total Depth

Two instruments can be used by Texas Stream Team community scientists to measure water transparency, a Secchi disc or a transparency tube. Both instruments are used to measure water transparency or to determine the clarity of the water, a condition known as turbidity. The Secchi disc is lowered into the water until it is no longer visible, then raised until it becomes visible, and the average of the two depth measurements is recorded. A transparency tube is filled with sample water and water is released until the Secchi pattern at the bottom of the tube can be seen. The tube is marked with two millimeter increments and is used to measure water transparency. Transparency measurements less than the total depth of the monitoring site are indicative of turbid water. Readings that are equal to total depth indicate clear water. Highly turbid waters pose a risk to wildlife by clogging the gills of fish, reducing visibility, and carrying contaminants. Reduced visibility can harm predatory fish or birds that depend on good visibility to find their prey. Turbid waters allow less light to penetrate deep into the water, which, in turn, decreases the density of phytoplankton, algae, and other aquatic plants. This reduces the dissolved oxygen in the water due to reduced photosynthesis. Contaminants are mostly transported in sediment rather than in the water. Turbid water can result from sediment runoff from construction sites, erosion of farms, or mining operations.

## *E. coli*

Escherichia coli (*E. coli*) bacteria originate in the digestive tracts of warm-blooded animals and enter water bodies through fecal contamination. For this reason, the presence of *E. coli* in water indicates fecal pollution and the potential presence of pathogens, which are disease-causing

biological agents. The U.S. Environmental Protection Agency has identified *E. coli* as the primary indicator for assessing microbial contamination in freshwater systems.

Bacterial impairment is determined by using the geometric mean of *E. coli* measurements. The geometric mean is used because *E. coli* concentrations can vary widely, ranging from zero to thousands of colony-forming units per 100 milliliters (CFU/100 mL). A water body is considered impaired if the geometric mean exceeds the water quality standard.

## Riparian Indicators

Riparian evaluation assesses the condition of the streamside corridor and its ability to support stable channel structure, healthy vegetation, and aquatic habitat. Well-functioning riparian areas help reduce erosion, stabilize streambanks, filter runoff before it enters the stream, and provide shade that moderates water temperature. Because riparian zones link upland areas to the stream channel, their condition can strongly influence overall watershed health.

Riparian condition is evaluated using a set of visual indicators that reflect vegetation structure, bank stability, geomorphic processes, and evidence of disturbance. These indicators are grouped into bull's-eye, mid-zone, and outer-zone categories, representing fully functional, moderately functioning, and stressed riparian conditions, respectively. The distribution of indicators across these categories provides insight into riparian resilience and functional status. Changes in riparian indicators over time can reflect natural recovery processes, episodic disturbance, or sustained stress within the riparian corridor. When collected consistently at fixed monitoring locations, riparian evaluations help place water quality and habitat observations into a broader physical and ecological context for the watershed.

# DATA COLLECTION, MANAGEMENT, AND ANALYSIS

## Data Collection

The field sampling procedures implemented by trained community scientists are documented in the Texas Stream Team Core Water Quality Community Scientist Manual and the Texas Stream Team Advanced Water Quality Community Scientist Manual. The sampling protocols in the manuals adhere closely to the Texas Commission on Environmental Quality Surface Water Quality Monitoring Procedures Manual, Volume 1 (August 2012). Additionally, all data collection adheres to Texas Stream Team's Texas Commission on Environmental Quality-approved [Quality Assurance Project Plan](#).

Procedures documented in Texas Stream Team Water Quality Community Scientist Manuals or the Texas Commission on Environmental Quality Surface Water Quality Monitoring Procedures Manual, Volume 1 (August 2012) outlines the necessary steps to prevent contamination of samples, including direct collection into sample containers, when possible. Field quality control samples are collected and analyzed to detect whether contamination has occurred and to ensure data accuracy and precision. Field sampling activities are documented on Environmental Monitoring Forms. The following items are recorded for each field sampling event: station ID,

location, sampling time, date, depth, sample collector's name/signature, group name, meter calibration information, and reagent expiration dates. *E. coli*) data were evaluated following program guidance. Measurements reported as zero were not considered valid and were reported as less than the method detection limit (<1). Summary statistics for *E. coli* were based on the geometric mean (average) of samples collected within the applicable assessment period, reflecting standard regulatory practice for bacterial indicators due to their highly variable and right-skewed distributions. These procedures ensure consistency with state assessment practices and prevent bias in bacterial summary statistics.

Specific conductance values are converted to total dissolved solids using a conversion factor of 0.65 and are reported as mg/L. Values for measured parameters are recorded. If reagents or media are expired, it is noted, and data are flagged and communicated to Texas Stream Team staff. Sampling is not permitted with expired reagents or bacteria media; the corresponding values will be flagged in the database and excluded from data reports. Detailed observational data recorded include water appearance, weather, field observations (biological activity and stream uses), algae cover, unusual odors, days since last significant rainfall, and flow severity. Comments related to field measurements, number of participants, total time spent sampling, and total round-trip distance traveled to the sampling site are also recorded for grant reporting and administrative purposes.

## Data Management

The community scientists collect field data and report the measurement results to Texas Stream Team, by submitting a hard copy of the Environmental Monitoring Form, entering the data directly into the online Waterways Dataviewer database, or by using the electronic Environmental Monitoring Form. All data are reviewed to ensure they are representative of the samples analyzed and locations where measurements were made. The measurements and associated quality control data are also reviewed to ensure they conform to specified monitoring procedures and project specifications as stated in the approved Quality Assurance Project Plan. Data review and verification is performed using a quality control checklist and self-assessments, as appropriate to the project task, followed by automated database functions that validate data as the information is entered into the database. The data are verified and evaluated against project specifications and are checked for errors, especially errors in transcription, calculations, and data input. Potential errors are identified by examination of documentation and by manual and computer-assisted examination of corollary or unreasonable data. Issues that can be corrected are corrected and documented. Once entered, the data can be accessed publicly through the online [Texas Stream Team Datamap](#).

## Data Analysis

Data were compiled, analyzed, summarized, and compared to state water quality standards and/or criteria to provide readers with a reference point for parameters that may be of concern. The statewide, biennial assessment performed by the Texas Commission on Environmental

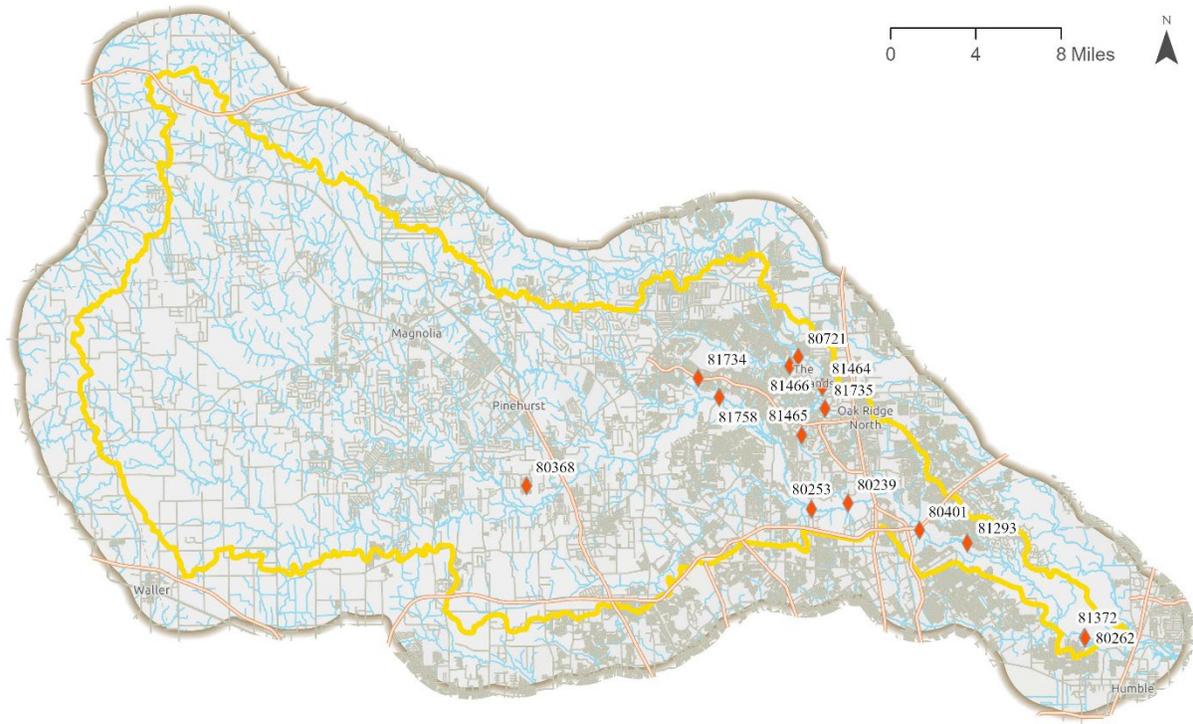
Quality involves more stringent monitoring methods and oversight than those used by community scientists and staff in this report. However, the Texas Stream Team data is intended to inform stakeholders about general characteristics and assist professionals in identifying areas of potential concern to plan future monitoring efforts. All data collected by community scientists in the study watersheds were exported from the Texas Stream Team database and grouped by site. Sites with 10 or more monitoring events were maintained in the dataset for analysis. Sites with fewer than 10 monitoring events were excluded from the analysis for this report but may be used in future watershed summary reports. Once compiled, data was sorted, and summary statistics were generated and reviewed. To ensure data quality and consistency, a custom [Water Quality Data Validation App](#) was developed using Python (Streamlit) to automatically identify and correct range violations, outliers, and QA/QC issues across all parameter groups. Validated datasets were then visualized using a custom [Watershed Summary Report Graph Generator App](#), built with Python (Streamlit and Matplotlib), which reproduces the official graphing style used in JMP Pro 14.0.0 (SAS Institute Inc., 2018). This tool automatically generates standardized figures and summary tables based on user-defined water quality standards. Together, these automated tools enhanced data reliability, ensured graphical consistency, and reduced manual processing time.

Best professional judgement was used to verify outliers. Outlier boxes or scatter plots were prepared to provide a compact view of the distribution of the data for each parameter and site(s). The horizontal line within the box plot represents the median sample value, while the ends of the box represent the 25th and 75th quantiles or the interquartile range. The lines extending from each end of the box, or whiskers, are computed using the 25th/75th quartiles  $\pm 1.5 \times$  (interquartile range). Outliers are plotted as points outside the box plot.

Riparian evaluation data were compiled and summarized by site and year. Riparian indicators were classified using the Texas Stream Team framework as Bull's-Eye (high), Mid Zone (at-risk), or Outer Zone (poor). For each site-year, when multiple assessments were available for a given indicator, the most conservative (worst-case) condition category was retained. Annual riparian condition trends were visualized using bar charts that display the number of indicators within each condition category for each year, displaying the comparison of riparian condition across sites and over time.

## DATA RESULTS

Water quality data from 14 Texas Stream Team and partner monitoring sites in the watershed were acquired for this report (Figure 5).



-  Stream
-  Spring Creek Watershed
-  Major Road
-  Monitoring Sites
-  Road

Figure 5. Texas Stream Team monitoring sites in the watershed in Grimes, Montgomery, Harris, and Waller Counties, Texas.

The period of record for the monitoring sites in the watershed extends from May 2004 through October 2025. Several sites were monitored primarily during the early years of the record, especially between 2004 and 2013, and then were discontinued, including Spring Creek @ 4130 Mossy Oaks Dr. W. (80253), Spring Creek, 200 ft east of canoe launch at Jesse H. Jones Park (80262), and Spring Creek @ Spring Creek Park (80368). In contrast, sites on Panther Branch, Bear Branch, and the Woodlands drainage network, such as Panther Branch @ Montgomery County Preserve (80239), Spring Creek @ Riley Fuzzel Rd (80401), Bear Branch @ Bear Branch Sportfields (80721), Bear Branch @ Bear Branch Sportfields (81466), Panther Branch @ Research Forest Drive (81464), and the Woodlands Drainage Channel and Waterway (81734 and 81735), continued to be monitored through 2024 and 2025, so the most recent monitoring data are concentrated in these subwatersheds.

A total of 385 monitoring events were conducted across 14 sites (Table 7). The number of monitoring events per site ranged from two to 88. Spring Creek @ 4130 Mossy Oaks Dr. W. (80253) had the highest number of monitoring events (88), followed by Bear Branch @ Bear Branch Sportfields (81466, 67 events) and the Woodlands Drainage Channel @ Woodlands Parkway (81734, 60 events). At the lower end of the range, Pundt Park Canoe Launch (81293)

and Spring Creek below Kuykendahl Bridge (81758) had the fewest monitoring events, with two and three events, respectively.

*Table 7. Texas Stream Team and partner monitoring sites in the watershed.*

<b>Site ID</b>	<b>Description</b>	<b>Number of Events</b>	<b>Period of Record</b>
80239	Panther Branch @ Montgomery County Preserve	29	Sep 2004 - Aug 2025
80253	Spring Creek @ 4130 Mossy Oaks Dr. W.	88	May 2004 - May 2013
80262	Spring Creek, 200 ft east of canoe launch (Jesse Jones Park)	10	Oct 2012 - Jan 2014
80368	Spring Creek @ Spring Creek Park	4	Apr 2006 - Sep 2006
80401	Spring Creek @ Riley Fuzzel Rd	34	Oct 2006 - Sep 2025
80721	Bear Branch @ Bear Branch Park	18	Aug 2011 - Sep 2025
81293	Pundt Park Canoe Launch	2	Feb 2019 - Feb 2019
81372	Spring Creek @ Jesse H. Jones Park	3	Jan 2019 - May 2025
81464	Panther Branch @ Research Forest Drive	44	Feb 2019 - Oct 2025
81465	Panther Branch @ Gogan's Mill Trail	9	Feb 2019 - May 2023
81466	Bear Branch @ Bear Branch Sportfields	67	Feb 2019 - Aug 2025
81734	Woodlands Drainage Channel @ Woodlands Parkway	60	Mar 2023 - Sep 2025
81735	Woodlands Waterway @ Woodlands Water Agency	14	Feb 2023 - Nov 2024
81758	Spring Creek below Kuykendahl Bridge	3	Oct 2023 - Apr 2025
Total		385	May 2004 - Oct 2025

## Site Analysis

Quality-controlled water quality monitoring data were analyzed and summarized to include the number of samples, mean (average) values, standard deviations, and observed ranges for each parameter. Sites with fewer than 10 monitoring events were removed from the analysis (80368, 81293, 81372, 81465, 81758). Additionally, not all water quality parameters were measured during every site visit, and some parameters were recorded for only a subset of sites. As a result, the number of valid measurements varies by parameter and by site, and sites with fewer than 10 valid observations for a given parameter were excluded from the statistical summaries (80262 and 81735). Consequently, although these locations are included in the total event count, they were excluded from parameter-specific analyses due to the absence of sufficient valid observations. A total of seven monitoring sites were included in this assessment (Table 8), encompassing 269 monitoring events conducted between May 2004 and October 2025. All available measurements were screened using Texas Stream Team quality control criteria.

Community scientists monitored standard core parameters at all sites, including air temperature, water temperature, dissolved oxygen, pH, conductivity (with total dissolved solids calculated from specific conductance), transparency tube depth, and total depth. Secchi disk transparency data were only available for three sites (80239, 80253, and 80401), and therefore Secchi results were summarized exclusively for these locations. Transparency tube

measurements, however, were consistently available across most sites and were used as the primary measure of water clarity. Additionally, bacteria parameters were collected at three sites: 81464, 81466, and 81734.

Table 8. Texas Stream Team data summary for sites in the watershed (May 2004 – October 2025).

<b>Parameter</b>	<b>Statistic</b>	<b>80239</b>	<b>80253</b>	<b>80401</b>	<b>80721</b>	<b>81464</b>	<b>81466</b>	<b>81734</b>
Air Temperature (°C)	Mean	23.28	24.13	21.34	21	23.74	18.22	20.84
	Std Dev	8.03	6.48	7.74	8.89	7.33	7.77	6.99
	Range	30.5	28	34	26.5	23.5	26	23.5
Water Temperature (°C)	Mean	22.18	21.88	20.1	22.92	22.53	20.05	21.05
	Std Dev	7.25	6.25	6.79	5.39	6.07	6.37	5.98
	Range	23.5	24	22	16	20.2	20.5	20
Dissolved Oxygen (mg/L)	Mean	7.56	7.73	7.22	5.15	5.62	6.03	4.93
	Std Dev	1.25	1.6	1.65	1.04	1.53	1.94	1.81
	Range	4.9	6.9	5.4	2.8	5.6	7.6	6.6
pH (standard units)	Mean	7.68	7.36	7.26	6.58	7.18	7.2	6.97
	Std Dev	0.59	0.34	0.5	0.3	0.25	0.24	0.2
	Range	2.7	2.3	2	1	0.6	1.2	1
Conductivity (µS/cm)	Mean	507.62	399.2	475.94	653.5	505.32	336.02	527.19
	Std Dev	144.18	181.71	160.32	207.43	168.4	130.09	126.49
	Range	515	760	713	561	687	597	637
Secchi Disk Transparency (m)	Mean	0.33	0.47	0.31	ND	ND	ND	ND
	Std Dev	0.1	0.29	0.16	ND	ND	ND	ND
	Range	0.35	0.95	0.5	ND	ND	ND	ND
Transparency Tube (m)	Mean	0.52	ND	0.32	0.76	0.48	0.56	1.06
	Std Dev	0.19	ND	0.19	0.33	0.19	0.27	0.26
	Range	0.5	ND	0.61	0.87	0.68	0.98	0.88
Total Depth (m)	Mean	0.4	1.91	1.26	0.49	0.55	0.47	0.34
	Std Dev	0.26	0.86	1.35	0.12	0.16	0.41	0.08
	Range	1.36	5.5	6.85	0.42	0.5	1.86	0.32
Total Dissolved Solids (mg/L)	Mean	329.95	259.48	309.36	424.78	328.46	218.42	342.68
	Std Dev	93.71	118.11	104.21	134.83	109.46	84.56	82.22
	Range	334.75	494	463.45	364.65	446.55	388.05	414.05

<i>E. coli</i> (CFU/100 mL)	Geometric Mean	ND	ND	ND	ND	461.05	166.52	254.66
	Std Dev	ND	ND	ND	ND	809.35	551.53	1300.19
	Range	ND	ND	ND	ND	3380.0	2083.0	5484.0

## Air and Water Temperature

Average air temperatures across all sites ranged from 18.22°C to 24.13°C. The lowest average (18.22°C) occurred at Bear Branch @ Bear Branch Sportfields (81466), whereas the highest (24.13°C) was recorded at Spring Creek @ 4130 Mossy Oaks Dr. W. (80253).

Average water temperatures ranged from 20.05°C to 22.92°C, with the lowest value (20.05°C) observed at Bear Branch @ Bear Branch Sportfields (81466) and the highest (22.92°C) at Bear Branch @ Bear Branch Park (80721) (Table 8). Average water temperatures remained below the water quality standard of 32.2°C. However, discrete water temperature measurements ranged from 8.0°C to 33.5°C, with two exceedances recorded at Panther Branch @ Montgomery County Preserve (80239) (Figure 6). This corresponds to about 7% of monitored sites and approximately 0.8% of all discrete observations.

Seasonal variation in water temperature was evident, with higher values during summer and lower values during winter across the dataset, indicating climatic control rather than widespread thermal exceedance concerns.

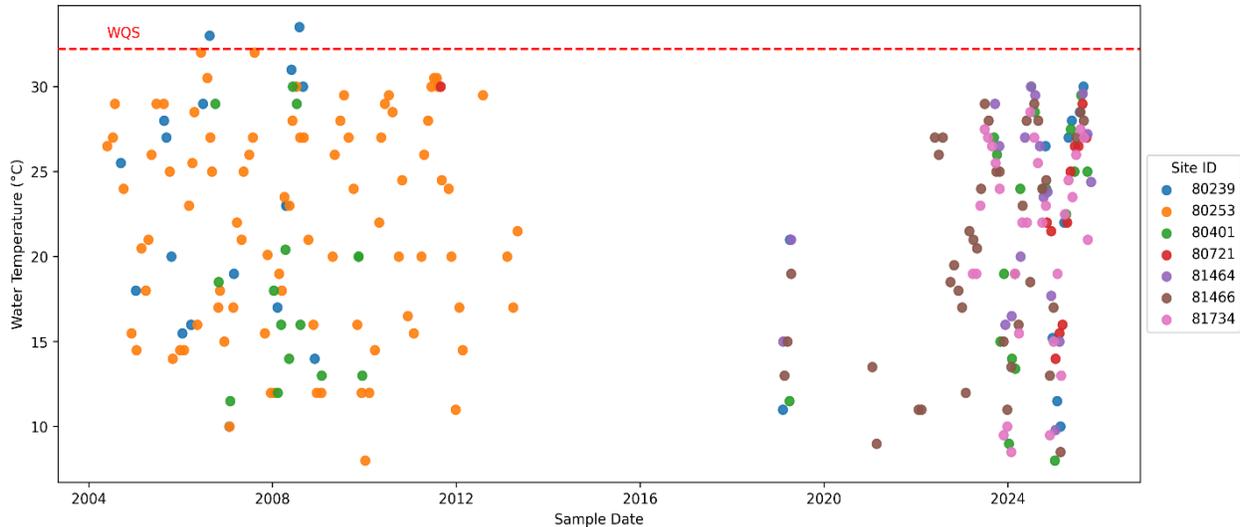


Figure 6. Water temperature for Texas Stream Team sites in the watershed (May 2004 through October 2025). WQS = Water Quality Standard.

## Total Dissolved Solids

Average total dissolved solids concentrations across all sites ranged from 218.4 mg/L to 424.8 mg/L. The lowest average (218.4 mg/L) occurred at Bear Branch @ Bear Branch Sportfields (81466), whereas the highest (424.8 mg/L) was recorded at Bear Branch @ Bear Branch Park (80721) (Table 8). Average total dissolved solids concentrations at all sites remained below the water quality standard of 450 mg/L. However, discrete measurements ranged from 71.5 mg/L to 617.5 mg/L, with 21 of 251 observations exceeding the 450 mg/L threshold across all seven monitored sites (Figure 7). These results indicate that while long term average conditions meet the standard, short term episodes of elevated dissolved solids occur throughout the watershed, likely associated with periods of reduced flow or other hydrologic stress.

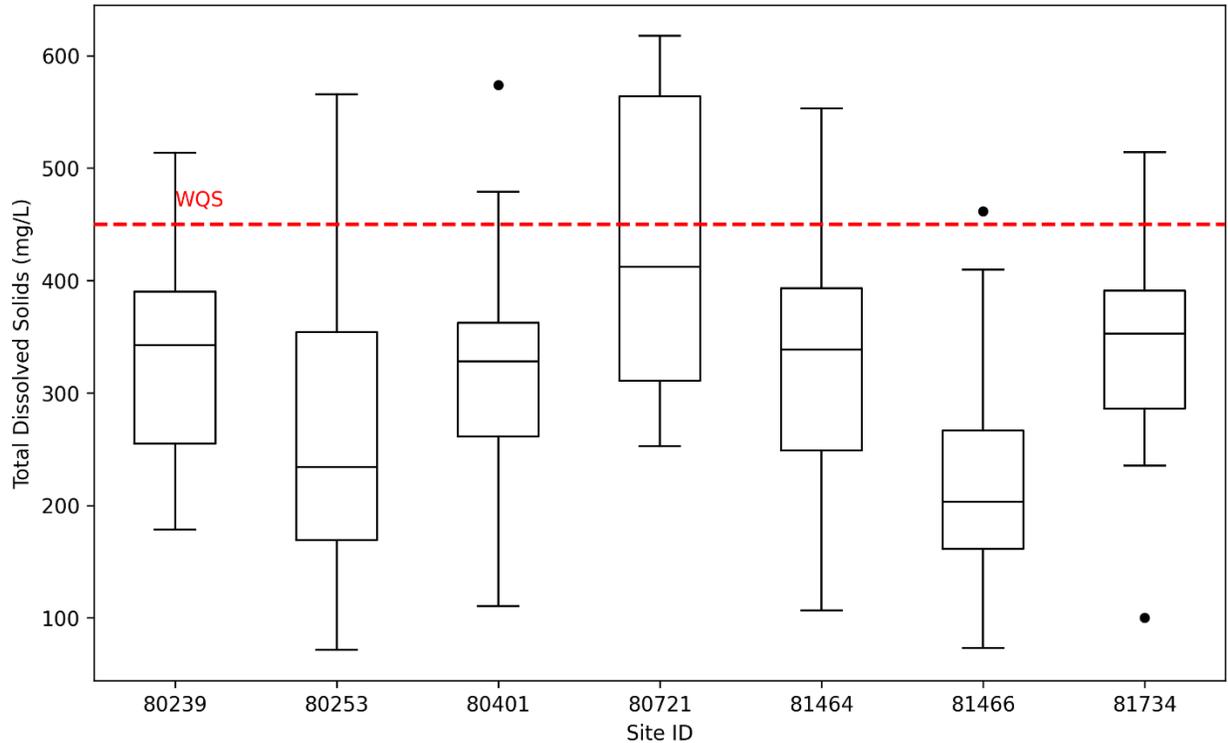


Figure 7. Total Dissolved Solids for Texas Stream Team sites in the watershed (May 2004 through October 2025). WQS = Water Quality Standard.

### Dissolved Oxygen

Across monitoring sites, average dissolved oxygen concentrations ranged from 4.93 mg/L to 7.73 mg/L (Table 8). The lowest average (4.93 mg/L) occurred at Woodlands Drainage Channel @ Woodlands Parkway (81734), whereas the highest average (7.73 mg/L) occurred at Spring Creek @ 4130 Mossy Oaks Dr. W. (80253) (Table 8). Although several site averages approached the water quality standard of 5.0 mg/L, only one site (81734) fell below this threshold based on long-term averages. Discrete measurements showed a wider range, from 1.3 mg/L to 11.9 mg/L. A total of 51 readings (20.2% of all measurements) fell below the 5.0 mg/L standard, and four readings (1.6%) were recorded exactly at the threshold. These low-oxygen observations occurred at multiple sites across the watershed, including sites 80401, 80721, 81464, 81466, 81734, and 80253 (Figure 8).

Overall, dissolved oxygen levels did not consistently remain within healthy ranges for aquatic life across the monitored sites. Instead, the dataset indicates periods of reduced oxygen availability, suggesting episodic stress conditions rather than stable oxygen levels throughout the study period.

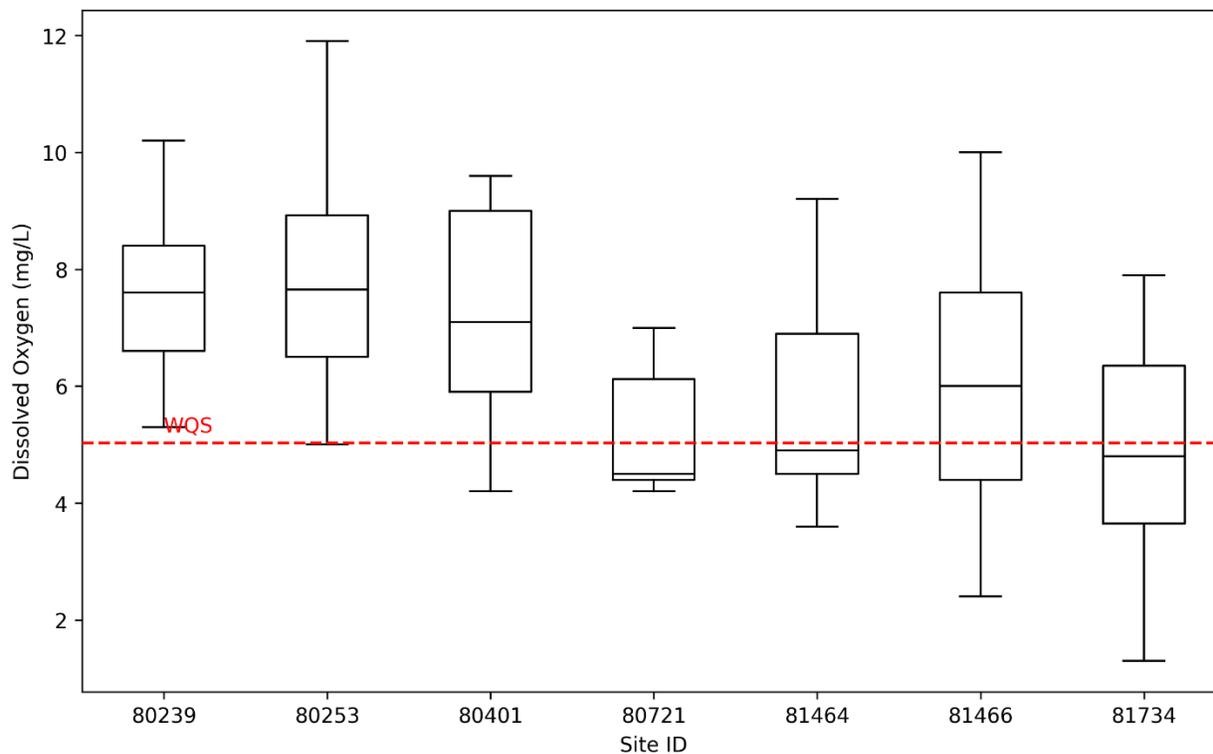


Figure 8. *Dissolved Oxygen* for Texas Stream Team sites in the watershed (May 2004 through October 2025). WQS = Water Quality Standard.

## pH

Across monitoring sites, average pH values ranged from 6.58 to 7.68 standard units (s.u.) (Table 8), remaining generally within the state water quality standard range of 6.5–9.0 s.u. (Figure 9). The lowest average (6.58 s.u.) was recorded at Bear Branch @ Bear Branch Park (80721), while the highest average (7.68 s.u.) occurred at Panther Branch @ Montgomery County Preserve (80239).

Discrete pH measurements ranged from 6.0 to 9.7 s.u., with the majority of observations falling within the state water quality standard range. A limited number of exceedances were observed, including values above 9.0 s.u. at site 80239 and values below 6.5 s.u. primarily at site 80721. Overall, pH conditions across sites were generally stable and well buffered during the monitoring period.

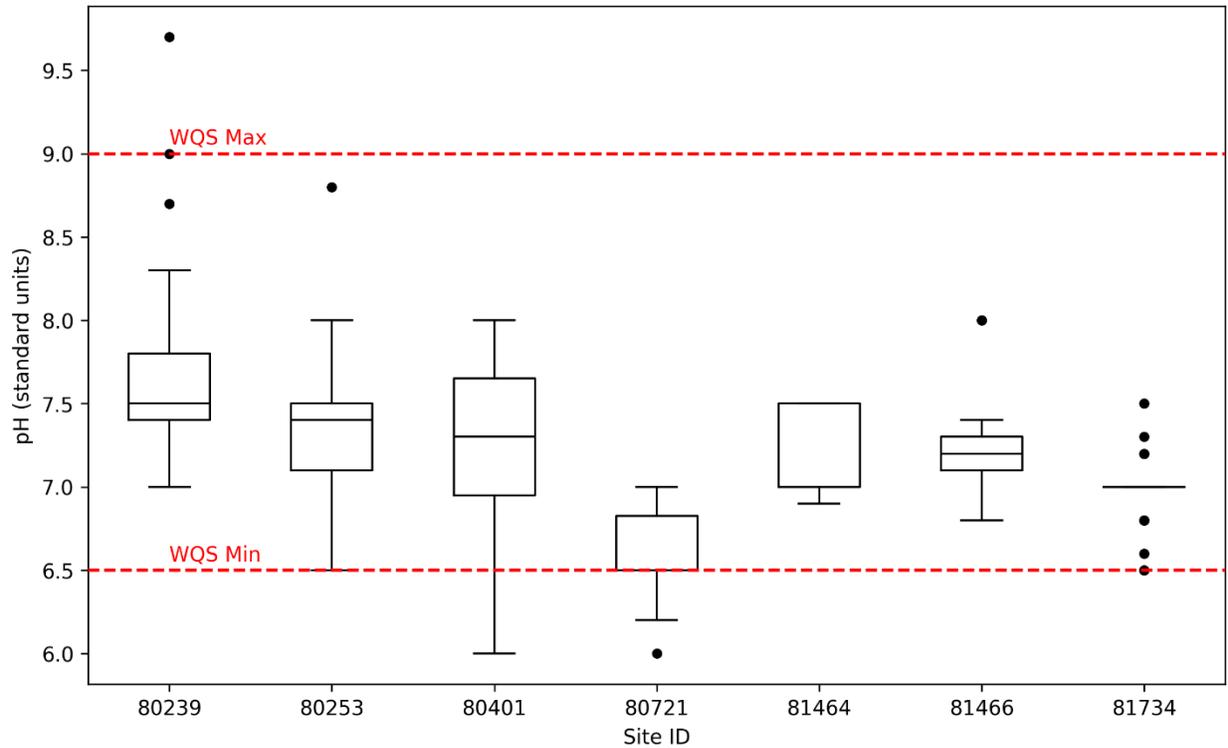


Figure 9. pH for Texas Stream Team sites in the watershed (May 2004 through October 2025). WQS = Water Quality Standard.

### Transparency and Total Depth

Across monitoring sites, water clarity was measured using transparency tubes and Secchi disks, providing a direct indicator of transparency across the watershed. For transparency tube, site averages ranged from 0.32 m at Spring Creek @ Riley Fuzzel Rd (80401) to 1.06 m at Woodland Drainage Channel @ Woodlands Parkway (81734) (Table 8 and Figure 10). Following quality control screening, values greater than 1.2 m (the maximum measurable length of the transparency tube) were excluded to remove potential data entry errors and ensure data integrity. For Secchi disk measurements, usable data were available only for sites 80239, 80253, and 80401. Secchi disk measurements showed a similar pattern, with site averages ranging from 0.31 m at Spring Creek @ Riley Fuzzel Rd (80401) to 0.47 m at Spring Creek @ Mossy Oaks Dr (80253) (Table 8 and Figure 10).

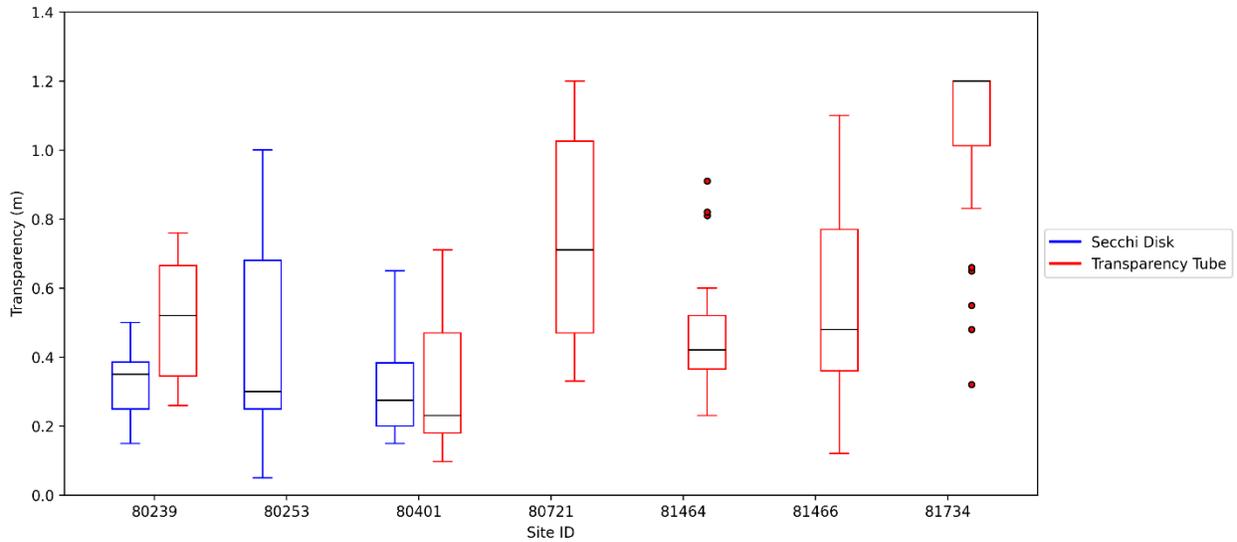


Figure 10. Transparency for Texas Stream Team sites in the watershed (May 2004 through October 2025).

Across monitoring sites, average total depth ranged from 0.34 m to 1.91 m. The lowest average depth (0.34 m) was observed at Woodlands Drainage Channel @ Woodlands Parkway (81734), whereas the highest average depth (1.91 m) was observed at Spring Creek @ 4130 Mossy Oaks Dr. W. (80253) (Table 8). Occasional high-water events produced isolated deeper measurements (reaching up to 7.0 m), but long-term averages remained within this observed range (Figure 11). These results indicate that most monitored sites typically maintained shallow to moderately shallow flow conditions, with only temporary increases in depth during storm events.

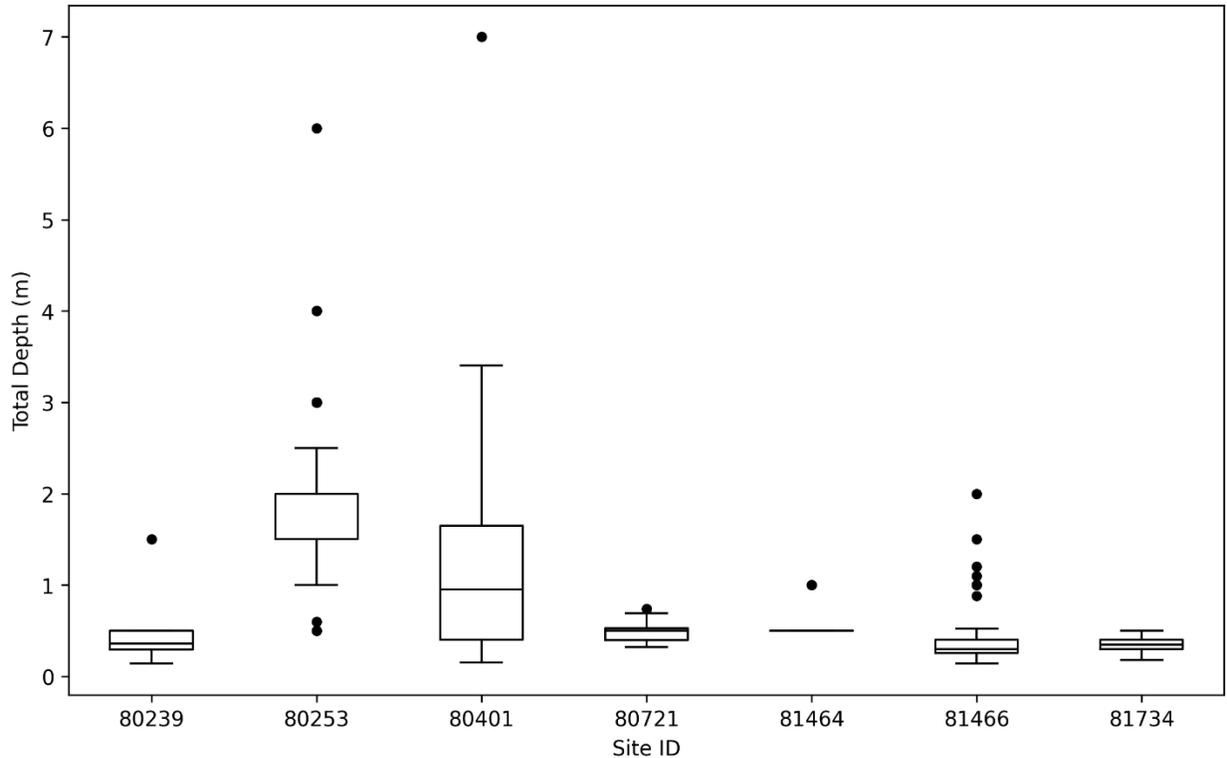


Figure 11. Total depth for Texas Stream Team sites in the watershed (May 2004 through October 2025).

### *E. coli*

Across monitoring sites, average (geometric mean) *E. coli* concentrations ranged from 166.52 CFU/100 mL to 461.05 CFU/100 mL and exceeded the state recreational water quality standard of 126 CFU/100 mL at two of the three monitored sites (Table 8). Average concentrations ranged from 166.52 CFU/100 mL to 461.05 CFU/100 mL, with the lowest average observed at site 81466 (Bear Branch @ Bear Branch Sportfields) and the highest average observed at site 81464 (Panther Branch @ Research Forest Drive) (Table 8).

Discrete measurements exhibited a wider range, from 16 CFU/100 mL to 5,500 CFU/100 mL. A total of 24 discrete samples (40.7% of all measurements) exceeded the single-sample state water quality standard of 399 CFU/100 mL with exceedances observed at all three monitored sites (Figure 12). These elevated observations were distributed across multiple monitoring events, indicating that exceedances were not isolated but recurred at specific sites within the watershed.

Overall, both average (geometric mean) concentrations and discrete sample results indicate that *E. coli* levels did not consistently meet state recreational water quality standards across the monitored sites. The observed pattern of episodic to recurring exceedances suggests periods of elevated bacterial concentrations that may increase potential risk to primary contact recreation

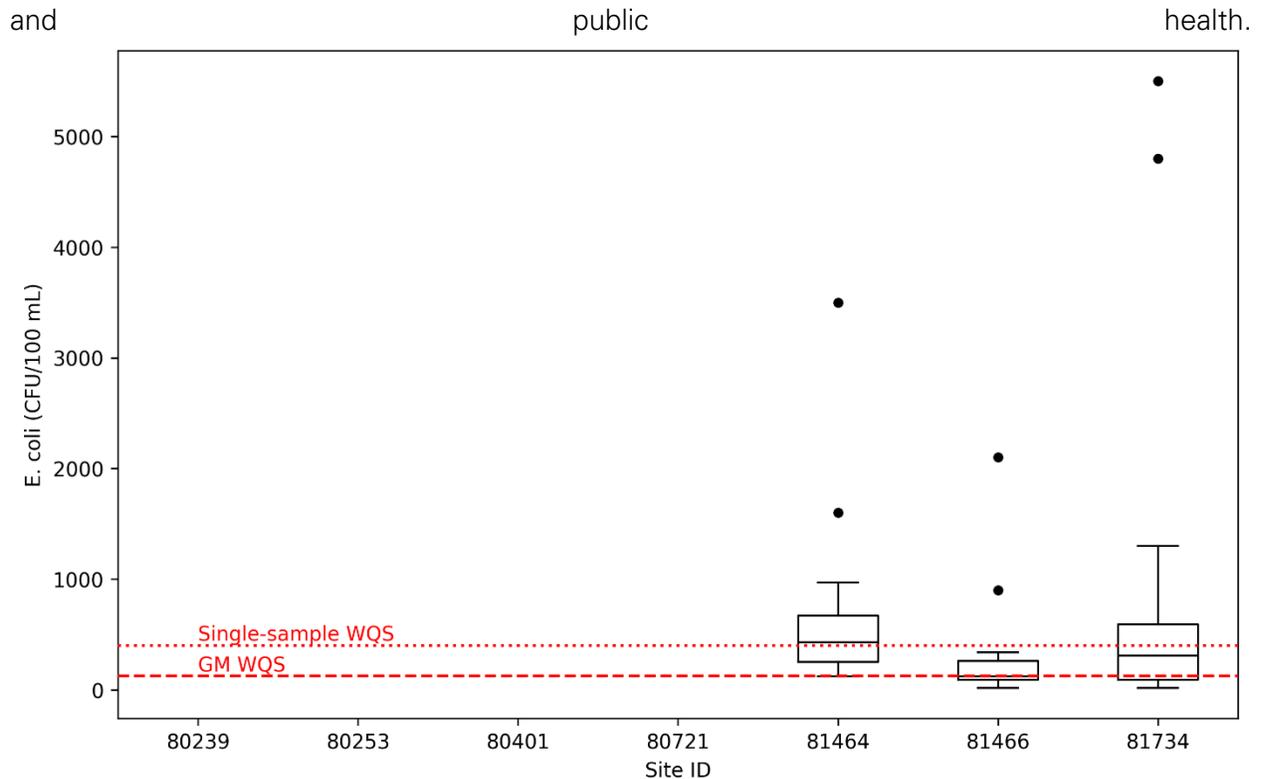


Figure 12. *E. coli* for Texas Stream Team sites in the watershed (May 2004 through October 2025). Single-sample WQS = Water Quality Standard for single sample. GM WQS = Geometric Mean Water Quality Standard.

### Riparian Evaluation

Riparian Indicators were evaluated annually for two sites (81466 and 81758) from 2023 to 2025. A comparison of riparian indicators at sites 81466 and 81758 shows distinct patterns between 2023 and 2025. At site 81466, bull’s-eye indicators were observed in 2023 during predominantly spring and summer monitoring (March-August) and again in 2025 during late winter through summer monitoring (February and May-August), with a reduction observed during late-year monitoring in December 2024, indicating a temporary decline followed by recovery. (Figure 13). In contrast, site 81758 maintained 10 bull’s-eye indicators consistently across all three years, demonstrating exceptionally stable and high-function riparian conditions (Figure 14).

Site 81466 shows a moderate baseline condition with a clear disturbance–recovery sequence: mid-zone indicators dominated in 2023, outer-zone indicators increased in 2024 (reflecting stress or destabilization), and bull’s-eye indicators re-emerged in 2025, suggesting potentially natural regenerative capacity. Meanwhile, Site 81758 exhibited no outer- or mid-zone indicators in any year, reflecting fully functional geomorphic processes, mature vegetation structure, and minimal disturbance.

Overall, these patterns indicate substantial spatial variability in riparian condition: site 81466 reflects an impacted corridor with evidence of both degradation and rebound, while site 81758 serves as a stable reference site maintaining consistently high ecological function.

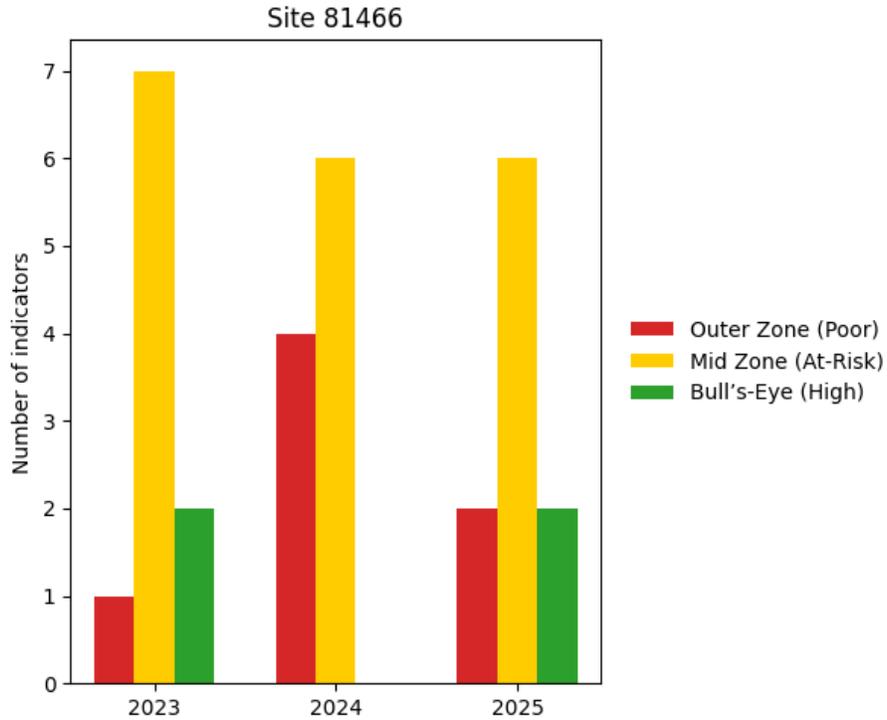


Figure 13. Annual counts of riparian indicators by condition category (Poor, At-Risk, High) at Texas Stream Team sites in the watershed

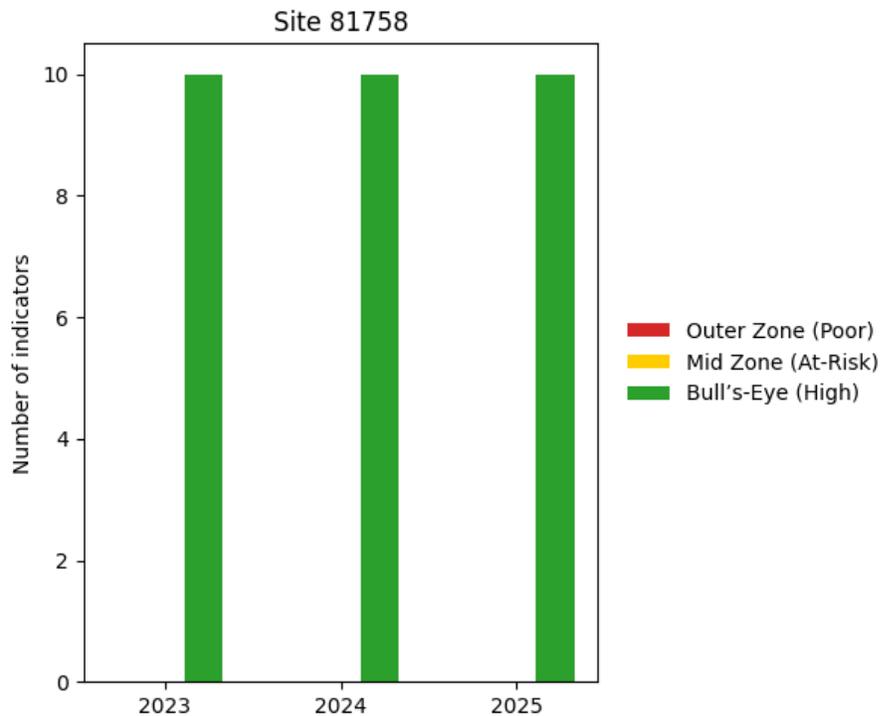


Figure 14. Annual counts of riparian indicators by condition category (Poor, At-Risk, High) at Texas Stream Team sites in the watershed

## WATERSHED SUMMARY

As of 2024, the watershed is predominantly developed, with developed land covering 43.5% of the total area, a substantial increase from 28.4% in 2004. During the same period, forest cover decreased from 33.2% to 23.7% and planted/cultivated land declined from 22.8% to 19.4%. Wetlands make up 9.1% of the watershed, showing a slight reduction from 10.4%. The remaining 4.3% consists of herbaceous cover (1.4%), barren land (1.0%), open water (1.1%), and shrubland (0.8%). Overall, the two-decade trend indicates steady urbanization and gradual reduction in natural land cover.

From May 2004 through October 2025, trained Houston-Galveston Area Council community scientists conducted 385 total monitoring events across 14 sites in the watershed. 7 sites with 10 or more valid sampling events (after quality-control screening) were included in the water-quality analysis. Parameters measured in the watershed included: air and water temperature, conductivity (with total dissolved solids calculated), dissolved oxygen, pH, transparency tube and Secchi disk, total depth, bacteria, and riparian indicators. All sites were monitored by Texas Stream Team-trained community scientists.

According to the 2024 Integrated Report of Surface Water Quality (Texas Commission on Environmental Quality, 2024), bacteria impairments remain the primary water quality issue in the watershed. Segment 1008 (Spring Creek) is listed under Category 4a with an approved Total Maximum Daily Load plan, while Mill Creek (Segment 1008A) is listed under Category 5r with an accepted Watershed Protection Plan. Other tributaries, including Willow Creek (1008H), Walnut Creek (1008I), and Brushy Creek (1008J), remain Category 4a for bacteria, with Total Maximum Daily Loads carried forward from previous cycles, reflecting the persistent nature of bacterial contamination in the watershed. Water quality standards for designated uses were compared to the monitoring results to evaluate overall conditions. Key findings include:

- Water Temperature: Two discrete exceedances at Panther Branch @ Montgomery County Preserve (80239).
- Total Dissolved Solids: Discrete measurements exceeded the 450 mg/L threshold 21 of 251 measurements across all sites.
- Dissolved Oxygen: While most averages met the 5.0 mg/L standard, site 81734 fell below it. Across all sites, 20.2% of discrete measurements (51 total) were below the standard, particularly at sites 80401, 80721, 81464, 81466, 81734, and 80253.
- pH: A few discrete exceedances above 9.0 s.u. were recorded at site 80239.
- *E. coli*: The highest average concentration (461.05 CFU/100 mL) occurred at site 81464, exceeding the 399 CFU/100 mL standard. A total of 24 readings (40.7%) exceeded the standard across all three monitored sites (81464, 81466, and 81734).
- Riparian Evaluation: At site 81466, bull's-eye indicators fluctuated (2023: present; 2024: none; 2025: partial recovery), indicating a potential dip and rebound in riparian health. Site 81758 maintained 10 bull's-eye indicators across all three years, showing consistently robust riparian conditions.

Bacteria pollution remains the most pressing water quality issue in the watershed. While some segments benefit from approved Total Maximum Daily Load plans or Watershed Protection Plan-based management strategies, others await sufficient data for eligibility review. These results emphasize the value of continued monitoring to track progress, confirm recovery in managed segments, and identify emerging risks in unlisted tributaries.

This report was made possible through the dedication of the Houston-Galveston Area Council and its long-standing partnership with the Texas Stream Team. As one of the program's earliest and most active collaborators, the Houston-Galveston Area Council has provided continuous support for community-based monitoring and led the coordination of the Spring Creek Watershed Protection Plan, approved by the U.S. Environmental Protection Agency in 2023. By integrating Texas Stream Team data into the Clean Rivers Program and other watershed initiatives, the Houston-Galveston Area Council ensures consistent insight into regional water quality. Its ongoing training and support for community scientists, including the development of certified trainers, highlight the lasting impact of collaborative watershed stewardship, and the Texas Stream Team extends its sincere appreciation for the Houston-Galveston Area Council's leadership and commitment to safeguarding Texas waterways.

For more details on the Texas Stream Team program or to find upcoming training opportunities, please email [TxStreamTeam@txstate.edu](mailto:TxStreamTeam@txstate.edu) or visit our events calendar at [TexasStreamTeam.org](https://TexasStreamTeam.org).

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## APPENDIX A

Table 9. Endangered species located within the watershed in Grimes, Harris, Montgomery, and Wallace counties, Texas.

Species Type	Common Name	Federal/State Listing
Amphibian	Houston toad	State Listed as Endangered
Bird	Whooping crane	State Listed as Endangered
	Interior least tern	State Listed as Endangered
	Red-cockaded woodpecker	State Listed as Endangered
Mammal	Tricolored bat	Federally Proposed as Endangered
	Sperm whale	State Listed as Endangered
	Finback whale	State Listed as Endangered
	Sei whale	State Listed as Endangered
	Blue whale	State Listed as Endangered
	Rice's whale	State Listed as Endangered
	Humpback whale	State Listed as Endangered
	North Atlantic right whale	State Listed as Endangered
Reptile	Atlantic hawksbill sea turtle	State Listed as Endangered
	Kemp's Ridley sea turtle	State Listed as Endangered
	Leatherback sea turtle	State Listed as Endangered
Plants	Texas prairie dawn	State Listed as Endangered
	Navasota ladies'-tresses	State Listed as Endangered

Table 10. Threatened species within the watershed in Grimes, Harris, Montgomery, and Wallace counties, Texas.

Species Type	Common Name	Federal/State Listing
Bird	Reddish egret	State Listed as Threatened
	White-faced ibis	State Listed as Threatened
	Wood stork	State Listed as Threatened
	Swallow-tailed kite	State Listed as Threatened
	White-tailed hawk	State Listed as Threatened
	Black rail	State Listed as Threatened
	Piping plover	State Listed as Threatened
	Rufa red knot	State Listed as Threatened
	Yellow-billed cuckoo	State Listed as Threatened
	Red cockaded woodpecker	Federally Proposed as Threatened
Fish	Paddlefish	State Listed as Threatened
	Chub shiner	State Listed as Threatened
	Western creek chubsucker	State Listed as Threatened
	Shortfin mako shark	State Listed as Threatened
	Oceanic whitetip shark	State Listed as Threatened
	Great hammerhead	State Listed as Threatened
	Giant manta ray	State Listed as Threatened
Mammal	Rafinesque's big-eared bat	State Listed as Threatened
	Gervais's beaked whale	State Listed as Threatened

	Cuvier's beaked whale	State Listed as Threatened
	Pygmy sperm whale	State Listed as Threatened
	Dwarf sperm whale	State Listed as Threatened
	Atlantic spotted dolphin	State Listed as Threatened
	Roughtoothed dolphin	State Listed as Threatened
	Killer whale	State Listed as Threatened
	False killer whale	State Listed as Threatened
	Short-finned pilot whale	State Listed as Threatened
	Pygmy killer whale	State Listed as Threatened
	West Indian manatee	State Listed as Threatened
Reptile	Loggerhead sea turtle	State Listed as Threatened
	Green sea turtle	State Listed as Threatened
	Alligator snapping turtle	Federally Proposed as Threatened, State Listed as Threatened
	Texas horned lizard	State Listed as Threatened
	Louisiana pine snake	State Listed as Threatened
Mollusk	Sandbank pocketbook	State Listed as Threatened
	Louisiana pigtoe	Federally Proposed as Threatened, State Listed as Threatened
	Brazos heelsplitter	State Listed as Threatened
	Texas fawnsfoot	State Listed as Threatened
Plants	Houston daisy	State Listed as Threatened