LOWER OYSTER CREEK WATERSHED SUMMARY REPORT

MARCH 2026

Photo Credit: Tim Bond

United States Environmental Protection Agency

The Meadows Center for Water and the Environment
Texas State University
Texas Stream Team

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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 or at 512.245.1346. Visit our website for more information on our programs at www.TexasStreamTeam.org.

Recognition of Field Contribution

As with our previous report, 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 Lower Oyster Creek

watershed (the watershed), the council has built a critical dataset that captures water quality trends and seasonal variability in the region. 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 within Brazoria County, encompassing approximately 518 square miles. Oyster Creek rises in north central Fort Bend County and flows southeast through Brazoria County for about 52 miles before reaching its mouth on the Gulf of Mexico (Texas State Historical Association, 1995).

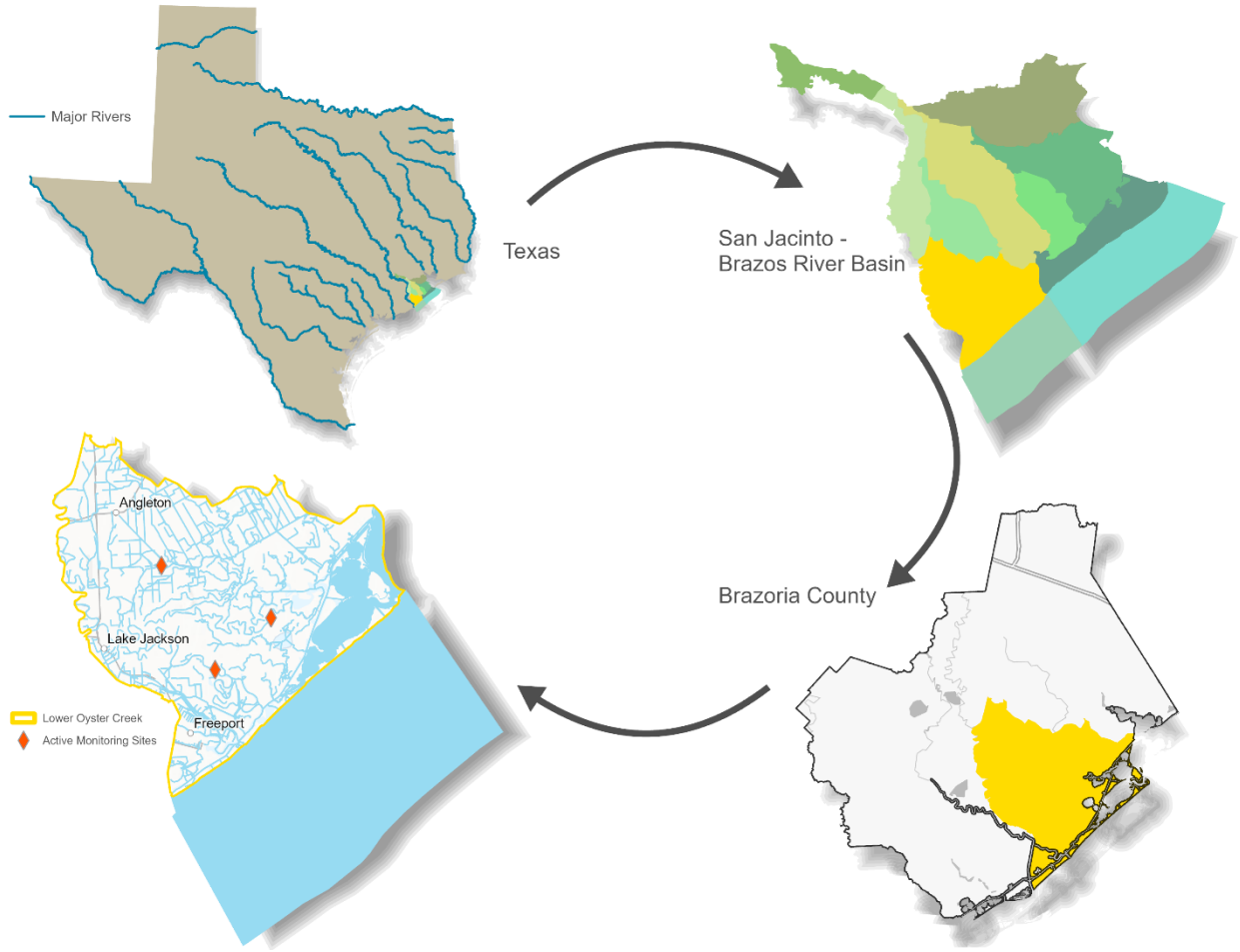

Figure 1. The watershed in Brazoria County, Texas.

The watershed lies within the Western Gulf Coastal Plain ecoregion of Texas and includes the Northern Humid Gulf Coast Prairies, Floodplains and Low Terraces, and Mid-Coast Barrier Islands and Coastal Marshes sub-ecoregions. The physiography in the region is described as having low, flat plains with low gradient rivers and streams and beaches, bays, estuaries, and tidal marshes on the coast. The substrate in this region is generally sandy, silty, and clayey. The flora in this area includes, but is not limited to, little bluestem, switchgrass, cordgrass, gulf saltgrass, live oak, pecan, elm, sugar hackberry, cedar, ash, and cottonwood. (Griffith et al., 2007). The fauna consists of wintering waterfowl, ducks, sandhill cranes, sparrows, heron, ibis, roseate spoonbill, alligators, frogs, salamanders, toads, turtles, deer, snakes, coyotes, and bobcats.

The Texas Commission on Environmental Quality designates classifications for streams, rivers, lakes, and bays throughout Texas, including those within the watershed (Table 1). One classified freshwater stream, three classified tidal streams, three unclassified freshwater streams, and one unclassified tidal stream were monitored by Texas Stream Team community scientists and are described in Table 1.

Table 1. Texas Commission on Environmental Quality segment classifications (Texas Commission on Environmental Quality, 2022).

Segment Number	Segment Name	Segment Description
1109	Oyster Creek Tidal	From the confluence with the Intracoastal Waterway in Brazoria County to a point 100 meters (110 yards) upstream of FM 2004 in Brazoria County
1110	Oyster Creek Above Tidal	From a point 100 meters (110 yards) upstream of FM 2004 in Brazoria County to a point 4.3 km (2.7 mi) upstream of Scanlan Road in Fort Bend County
1111	Old Brazos River Channel Tidal	From the confluence with the Intracoastal Waterway in Brazoria County to SH 288 in Brazoria County
1105	Bastrop Bayou Tidal	From the confluence with Bastrop Bay 1.1 km (0.7 mi) downstream of the Intracoastal Waterway in Brazoria County to a point 8.6 km (5.3 mi) upstream of Business 288 at Lake Jackson in Brazoria County
1105B	Austin Bayou Tidal	From the Bastrop Bayou Tidal confluence to the confluence with Brushy Bayou in Brazoria County
1105C	Austin Bayou Above Tidal	From the confluence of Bastrop Bayou upstream (Austin Bayou Tidal upper boundary) to 0.3 km (0.19 mi) upstream of SH 288 in Brazoria County
1105D	Unnamed Tributary of Bastrop Creek	From the Bastrop Bayou Tidal confluence to 0.57 km (0.35 mi) upstream of SH 288 Bus in Brazoria County
1105E	Brushy Bayou	From the confluence with Austin Bayou Above Tidal (1105C) upstream to end of canal approximately 0.4 mi upstream of FM 210 crossing east of the City of Angleton in Brazoria County.

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 from a weather station in Brazoria County, Texas and acquired from the National Data Center (National Oceanic and Atmospheric Administration, 2021). The average annual precipitation is 53.37 inches and typically occurs year-round (Figure 2). Long-term monthly precipitation shows a unimodal distribution, with peaks occurring in September and June, averaging 6.06 inches of rainfall during these months. The least amount of rainfall (2.83 inches) occurs in February. The warmest and coldest months of the year are August (28.83°C) and January (13.11°C), respectively.

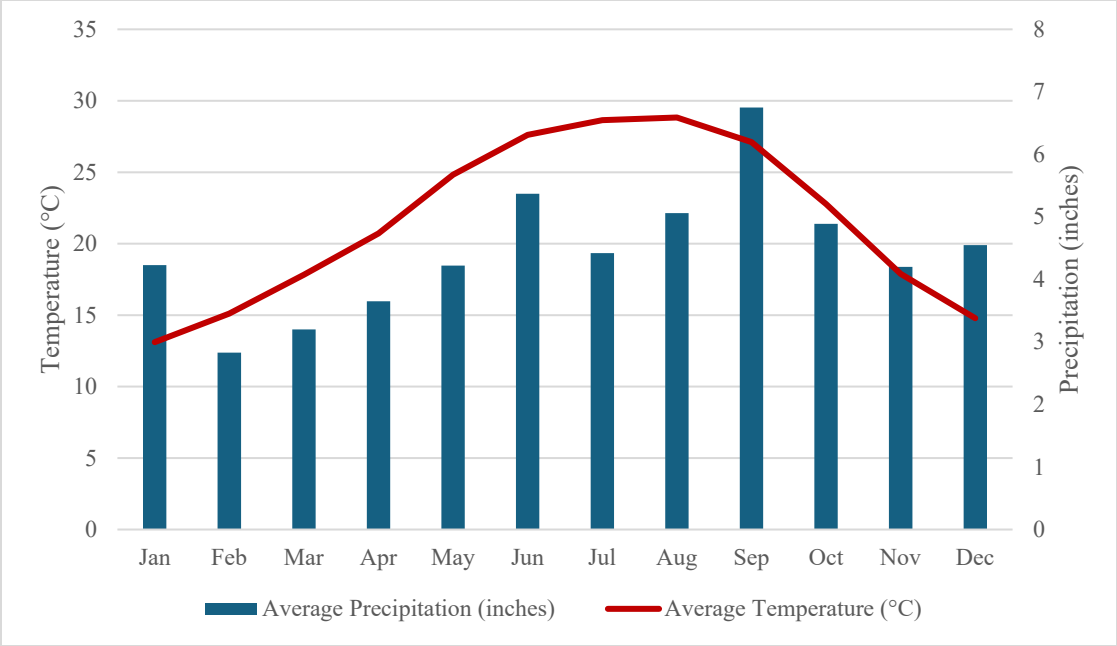

Figure 2. Long-term (1991-2020) monthly average precipitation (inches) and air temperature (°C) from Brazoria County, Texas (National Oceanic and Atmospheric Administration, 2021).

History

The Karankawa Native Americans were the first inhabitants of the land that now encompasses Brazoria County, stewarding the land until the arrival of Anglo settlers in the early 19th century. The area was first settled by Anglo Americans after Stephen F. Austin designated it as the site for 89 land grants awarded to members of his Old Three Hundred colony. The area was designated as Brazoria County in 1836 by the Congress of the Republic of Texas, taking inspiration from the Brazos River, which flows through the region. Early communities included Velasco (now Surfside Beach), East Columbia (later West Columbia), and Brazoria (Kleiner, 2021).

Agriculture, especially large cotton and sugar plantations, dominated the economy through much of the 19th century, supported by freight and passenger service on the Brazos River. Mineral development began in the early 1900s, with oil first produced in 1902 and sulfur mined beginning in 1912, eventually making the county a national leader in sulfur production. Throughout the 20th century industrial development around communities such as Freeport, Lake Jackson, and the Brazosport area diversified the economy, and population grew rapidly as manufacturing, petrochemical industries, tourism, recreation, and agribusiness became key economic drivers by the early 21st century (Kleiner, 2021).

Land Use

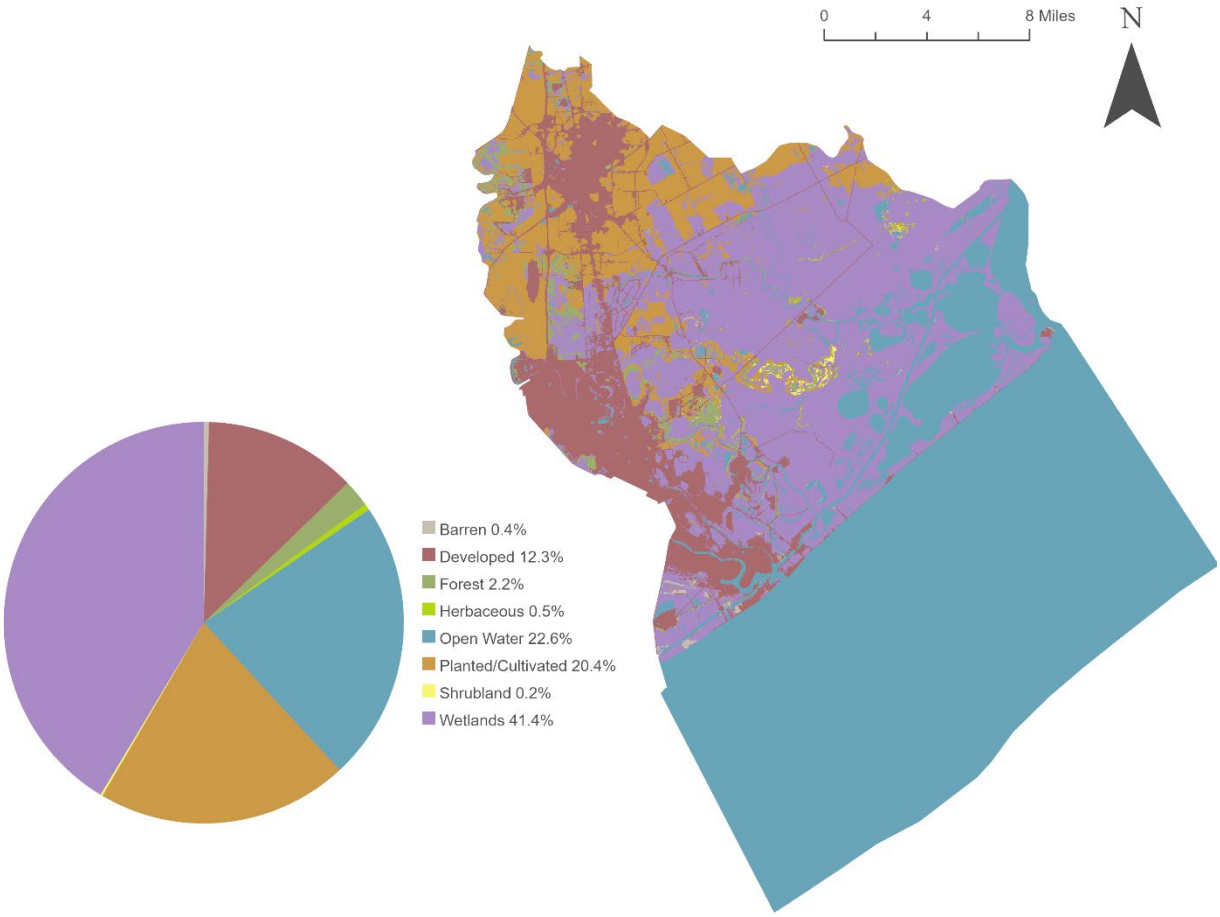

Figure 3. 2014 land use and land cover for the watershed in Brazoria County, Texas (National Land Cover Data, 2014).

In 2014, the watershed was primarily wetlands, with wetlands covering 41.4% of the area. Open water made up 22.6% of the watershed, while planted and cultivated land accounted for 20.4% and developed land for 12.3%. The remaining 3.3% consisted of forest (2.2%), herbaceous cover (0.5%), barren land (0.4%), and shrub land (0.2%).

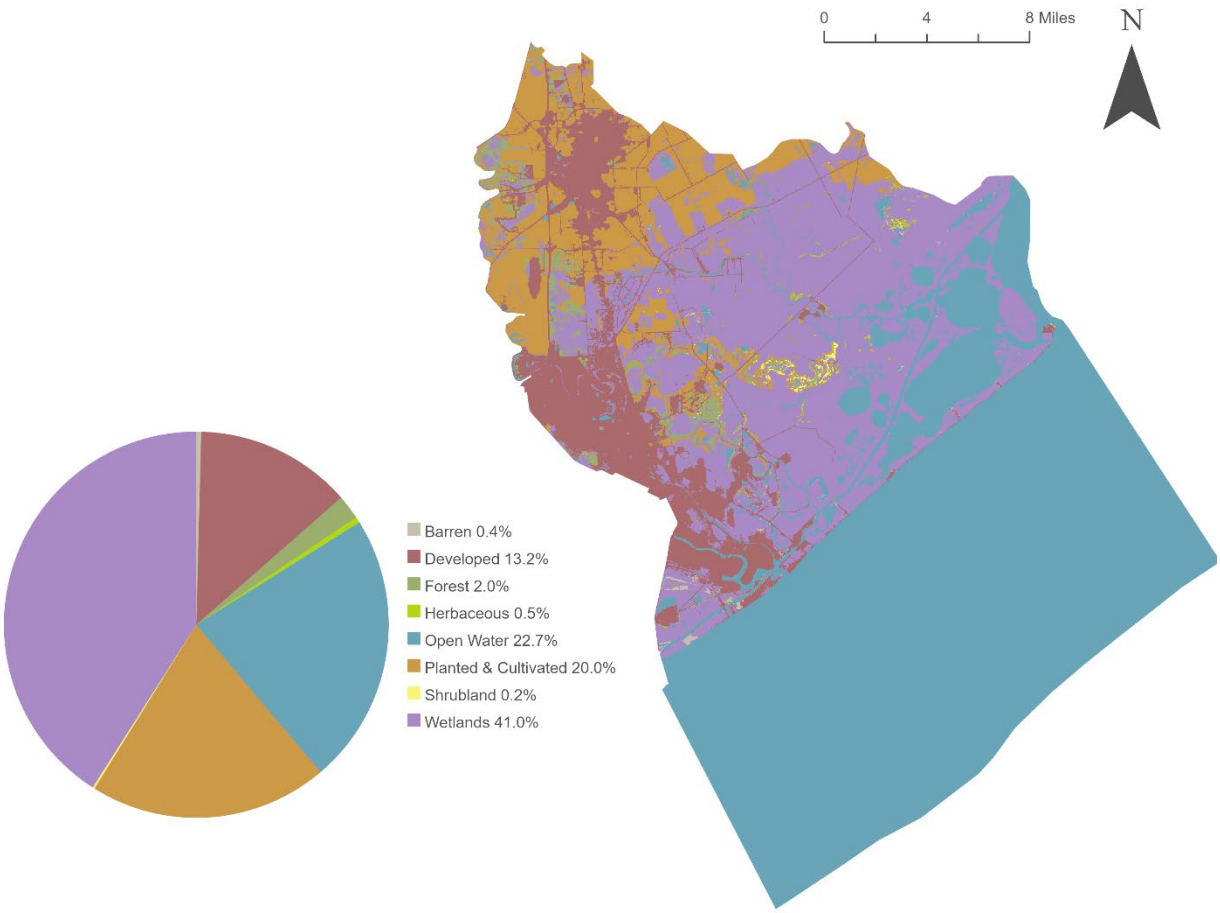

Figure 4. 2024 land use and land cover for the watershed in Brazoria County, Texas (National Land Cover Data, 2024).

In 2024, wetlands remained the predominant land use, covering 41.0% of the watershed. Open water slightly increased to 22.7%, and planted/cultivated land to 20.0%, while development comprised 13.2% of the area. The remaining 3.1% of the watershed consisted of forest cover (2.0%), herbaceous land (0.5%), barren land (0.4%), and shrubland (0.2%).

Table 2. Comparison of watershed land use categories by acreage and percentage in 2014 and 2024 (National Land Cover Data, 2014 and 2024).

Land Use	**2014 Acreage**	**2014 Percentage**	**2024 Acreage**	**2024 Percentage**	**Change in Land Use**
Forest	7,284.98	2.2%	6,778.58	2.0%	-7.0%
Developed	40,883.23	12.3%	43,599.77	13.2%	+6.6%
Planted/Cultivated	67,476.72	20.4%	66,471.05	20.0%	-1.5%
Wetlands	137,173.38	41.4%	135,785.63	41.0%	-1.0%
Shrubland	569.77	0.2%	562.88	0.2%	-1.2%
Open Water	75,024.56	22.6%	75,322.57	22.7%	+0.4%
Herbaceous	1,715.55	0.5%	1,658.40	0.5%	-3.3%

Barren	1,411.32	0.4%	1,360.61	0.4%	-3.6%

Endangered Species and Conservation Needs

The common names of 44 species listed as threatened or endangered (under 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 3.

Table 3. State and federally listed species in the watershed in Brazoria County, Texas.

Taxon	**Endangered (Federal or State) LE/E**	**Threatened (Federal or State) LT/T**	**G1 or G2 (Critically Imperiled/ Imperiled)**	**Species of Greatest Conservation Need (TPWD) (S1 or S2)**	**Endemic Total Count**
Amphibians	0	0	0	0	0
Birds	1	9	1	12	0
Fish	0	4	1	7	1
Mammals	9	12	3	24	0
Reptiles	3	4	3	8	1
Crustaceans	0	0	1	1	1
Insects	0	0	0	0	0
Mollusks	0	2	1	1	2
Plants	0	0	5	8	11
TOTAL	13	31	15	61	16

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. The standards are developed to maintain the quality of surface waters in Texas to support public health and protect aquatic life, while being consistent with the state's sustainable economic development. Water quality standards identify appropriate uses for the state's surface waters, including aquatic life, recreation, and sources of public water supply as drinking water. The criteria for evaluating support of these uses at monitoring sites in the watershed, included in this report, are provided in Table 4. Unclassified water bodies are not defined in the state's standards but are associated with a classified water body because they are in the same watershed. The dissolved oxygen criteria are for dissolved oxygen means at any site within the segment; the minimum and maximum values for pH apply to any site within the segment; the *E. coli* indicator bacteria for freshwater is a geometric mean; and the temperature criteria are a maximum value at any site within the segment.

Table 4. State water quality criteria for the watershed in Brazoria County, Texas (Texas Commission on Environmental Quality, 2022).

Segment	Dissolved Oxygen (mg/L)	pH Range (s.u.)	Total Dissolved Solids (mg/L)	E. coli (CFU/100 mL)	Temperature (°C)
1105 (Bastrop Bayou Tidal)	4.0	6.5-9.0	N/A	35	35
1109 (Oyster Creek Tidal)	4.0	6.5-9.0	N/A	35	35
1110 (Oyster Creek Above Tidal)	5.0	6.5-9.0	750	126	32.2
1111 (Old Brazos River Channel Tidal)	4.0	6.5-9.0	N/A	35	35

The monitoring sites evaluated with in this report are located on Segment 1105, Segment 1109, and an unclassified stream. Therefore, for the purpose of this report, the water quality standards associated with Segment 1109 and 1105 will be used for the analysis of the monitoring sites.

Water Quality Impairments

The 2024 Texas Integrated Report of Surface Water Quality for Clean Water Act Sections 305(b) and 303(d) (Integrated Report) includes an index of water quality impairments. Of the four classified water bodies and the four unclassified streams present in the watershed, six of the water bodies have impairments. Of the six impaired water bodies, which include classified segments 1105, 1109, and 1110, and unclassified segments 1105B, 1105C, 1105D, and 1105E, all of them are impaired for bacteria. Additionally, classified segment 1110 and unclassified segment 1105E are impaired for depressed dissolved oxygen. Table 5 describes each of the impairments and the status of a Total Maximum Daily Load (TMDL).

Table 5. Water Quality Impairments and Total Maximum Daily Loads Status of the watershed (Texas Commission on Environmental Quality, 2024).

Segment	Name	Impairment Parameter(s)	Category	TMDL Status
1105	Bastrop Bayou Tidal	Bacteria in water (Recreation Use)	5r	A Watershed Protection Plan has been developed or accepted by EPA; therefore, no separate TMDL is required
1105B	Austin Bayou Tidal	Bacteria in water (Recreation Use)	5r	A Watershed Protection Plan has been developed or accepted by EPA; therefore, no separate TMDL is required

1105C	Austin Bayou Above Tidal	Bacteria in water (Recreation Use)	5b	A review of the standards for the water body will be conducted before a management strategy is selected.
1105D	Unnamed Tributary of Bastrop Creek	Not listed in the 2024 Index	—	—
1105E	Brushy Bayou	Bacteria in water (Recreation Use), Depressed dissolved oxygen in water	5b, 5r	A review of the standards for the water body will be conducted before a management strategy is selected. A Watershed Protection Plan has been developed or accepted by EPA; therefore, no separate TMDL is required
1109	Oyster Creek Tidal	Bacteria in water (Recreation Use)	5a	A TMDL is underway, scheduled, or will be scheduled
1110	Oyster Creek Above Tidal	Bacteria in water (Recreation Use), Depressed dissolved oxygen in water	5a, 5c	A TMDL is underway, scheduled, or will be scheduled
1111	Old Brazos River Channel Tidal	Not listed in the 2024 Index	—	—

WATER QUALITY PARAMETERS

Dissolved Oxygen

Dissolved oxygen (DO) refers to the amount of oxygen gas present in water as tiny, dissolved molecules. It is typically measured in milligrams per liter (mg/L). 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.

Salinity

Salinity is a measure of the saltiness or the dissolved inorganic salt concentration in water. Salinity is often measured in ocean or estuarine waters, but in Texas there are some streams that have high salt content due to the local geology and require salinity measurements. Some common ions measured as salinity include sodium, chloride, magnesium, sulfate, calcium, and potassium. Seawater typically has a salt content of 35 parts per thousand (ppt or ‰). Like other measured water quality parameters, salinity affects the homeostasis or the balance of water and solutes of both plants and animals. Too much or too little salt can affect plant and animal cell survival and growth, therefore salinity is an important measurement.

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 with 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.

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.

DATA COLLECTION, MANAGEMENT, AND DATA 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 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.

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 watershed 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 reports. Once compiled, data was sorted, and summary statistics were generated and reviewed. Standardized figures and summary tables based on user-defined water quality standards were generated using JMP Pro 14.0.0 (SAS Institute Inc., 2018).

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 ± 1.5 x (interquartile range). Outliers are plotted as points outside the box plot.

DATA RESULTS

Water quality data from three Texas Stream Team Monitoring sites in the watershed were acquired for this report (Figure 5).

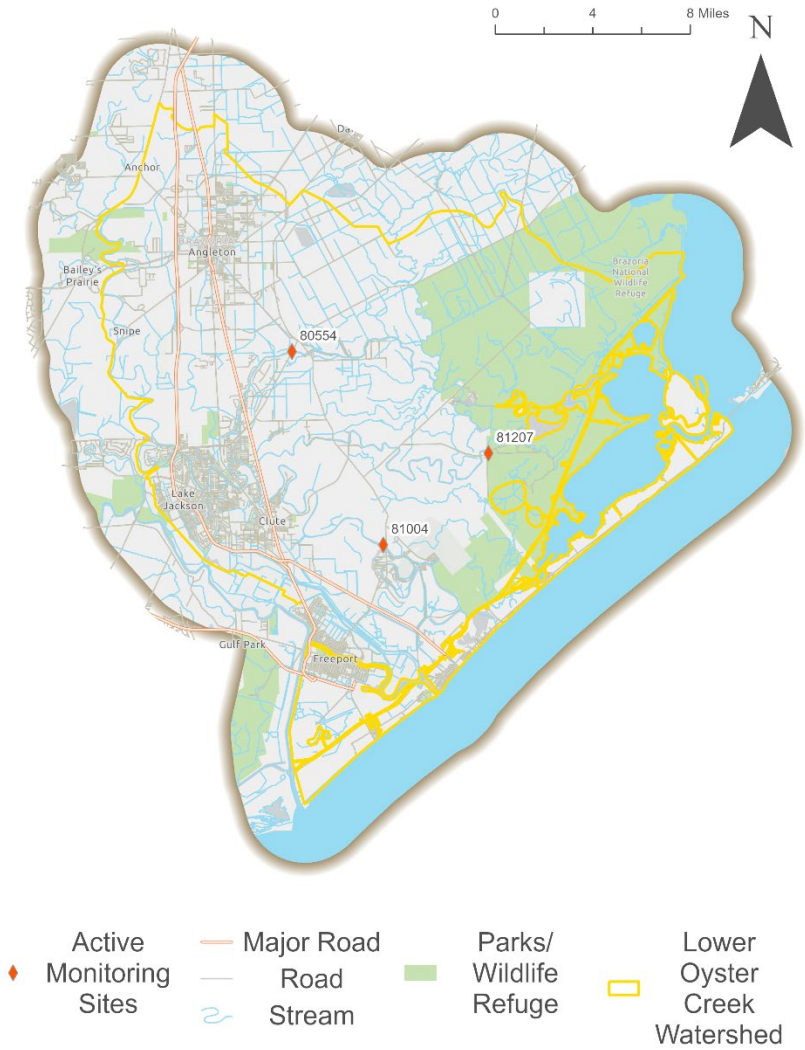

Figure 5. Texas Stream Team monitoring sites in the watershed in Brazoria County, Texas.

The period of record for the sampling events ranged from January 2014 through November 2025, with all sites experiencing temporal intermittent sampling. Trained community scientists conducted between 12 and 57 monitoring events at each site, for a total of 91 events (Table 6).

Table 6. Texas Stream Team and partner monitoring sites in the watershed (January 2014 – November 2025).

Site ID	Description	Number of Events	Period of Record
80554	H-GAC Site – Bastrop Bayou @ 2004 Bridge	22	Jan 2021 – July 2022; Aug 2024 – Aug 2025
81004	H-GAC Site – Oyster Creek near FM 523	57	Jan 2014 – Dec 2014; Jan 2018 – Feb 2019; Jan 2021 – Nov 2025
81207	H-GAC Site – Big Slough @ Brazoria NWR	12	Jan 2021 – July 2022; Sep 2025
	Total	**91**	**Jan 2014 – Nov 2025**

Site Analysis

Water quality monitoring data from sites with 10 or more sampling events were analyzed and summarized, including the mean, standard deviation, and range of values (Table 7). For the purpose of this watershed, all sites met the criteria of a minimum of 10 sampling events with site 81207 having the lowest number of sampling events at 12. Community scientists monitored all sites for standard core parameters, including air and water temperature, specific conductance (total dissolved solids were calculated based on conductance values), salinity, dissolved oxygen, pH, Secchi disk transparency, transparency tube, and total depth. Additionally, *E. coli* Bacteria and Advanced protocols, including nitrates, and phosphates, were also monitored at site 81004 only.

Table 7. Texas Stream Team data summary for sites in the watershed (January 2014 – November 2025).

Site ID	Statistic	80554	81004	81207
Air Temperature (°C)	Mean	26.30	22.43	23.71
	Std Dev	6.52	7.93	5.44
	Range	23.00	29.2	18.00
Water Temperature (°C)	Mean	24.73	21.92	20.88
	Std Dev	6.15	7.28	6.25
	Range	21.00	24.9	18.50
Salinity (ppt)	Mean	3.10	12.47	1.27
	Std Dev	2.85	7.86	0.73
	Range	10.00	41.1	2.00
Dissolved Oxygen (mg/L)	Mean	6.93	5.98	5.92
	Std Dev	1.55	2.25	1.83
	Range	6.00	12	6.20

pH (standard units)	Mean	7.79	8.21	6.79
	Std Dev	0.53	0.46	0.33
	Range	1.50	3	1.00
Secchi Disk	Mean	0.39	0.5	ND
	Std Dev	0.10	0.16	ND
	Range	0.25	0.69	ND
Transparency Tube (meters)	Mean	ND	0.29	1.13
	Std Dev	ND	0.06	0.16
	Range	ND	0.25	0.48
Total Depth (meters)	Mean	1.19	0.84	0.73
	Std Dev	0.43	0.23	0.21
	Range	1.31	1.01	0.69

ND = no data available.

If a water quality parameter did not have at least 10 separate data points, the parameter was removed from the analysis. Therefore, *E. coli* and nitrate values for site 81004 were removed from the analysis. Additionally, conductivity values for all three sites were removed as well. Due to the absence of conductivity values, total dissolved solids will not be analyzed in this report. Instead, since the sites are coastal, salinity will be analyzed in its place.

Air and Water Temperature

Average air temperature for all sites ranged from 22.43°C to 26.30°C (Table 7). The lowest mean air temperature (22.43°C) was observed at H-GAC Site – Oyster Creek near FM 523 (site 81004) whereas the highest mean air temperature (26.30°C) was observed at H-GAC Site – Bastrop Bayou @ 2004 Bridge (site 80554).

The average water temperature at all sites ranged from 20.88°C to 24.73°C (Table 7). The lowest mean water temperature (20.88°C) was observed at H-GAC Site – Big Slough @ Brazoria NWR (site 81207) whereas the highest mean water temperature (24.73°C) was observed at H-GAC Site – Bastrop Bayou @ 2004 Bridge (site 80554). Discrete water temperature measurements met the water quality standard of 35.0°C throughout the period of record at all three sites (Figure 6).

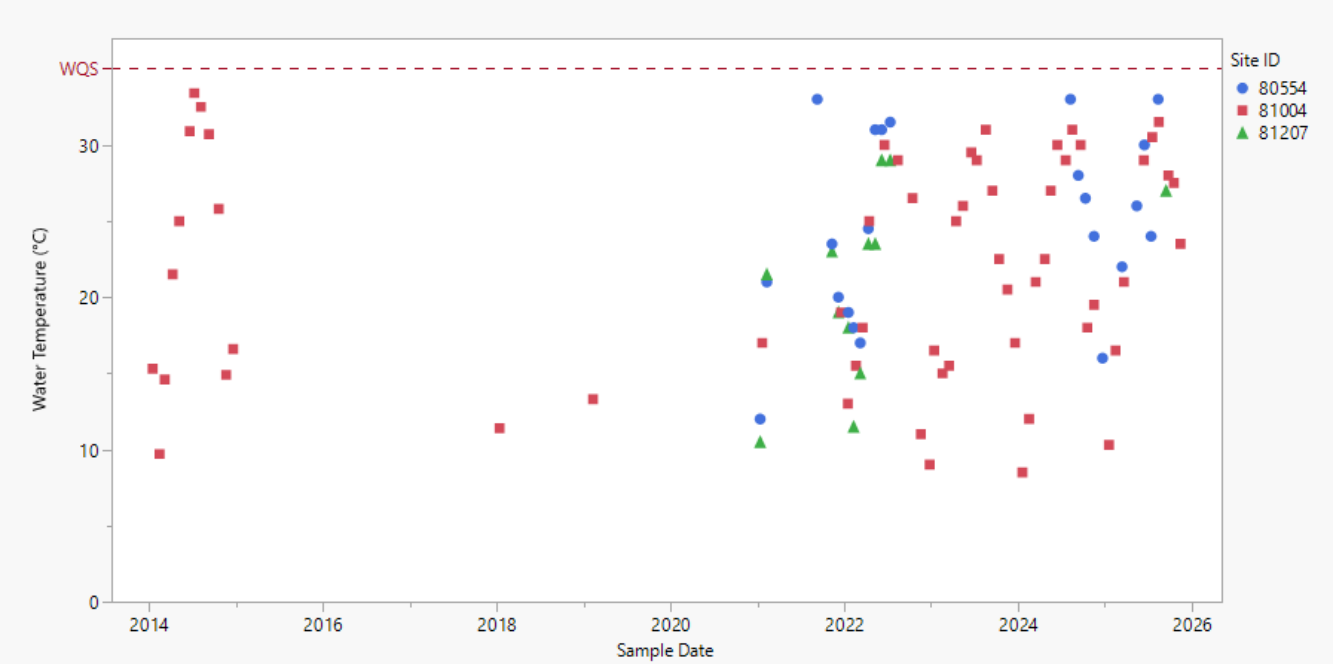

Figure 6. Water temperature for Texas Stream Team sites in the watershed in Brazoria County (January 2014 to November 2025). WQS = Water Quality Standard.

Salinity

The average salinity at all sites ranged from 1.27 to 12.47 ppt (Table 7). The lowest average salinity (1.27 ppt) was observed at H-GAC Site – Big Slough @ Brazoria NWR (site 81207) whereas the highest average salinity (12.47 ppt) was observed at H-GAC Site – Oyster Creek near FM 523 (site 81004). Although there is no water quality standard set for salinity for these stream segments, it should be noted that site 81004 had consistently higher salinity concentrations when compared to the other two sites. This may be attributed to the proximity of site 81004 to the coast.

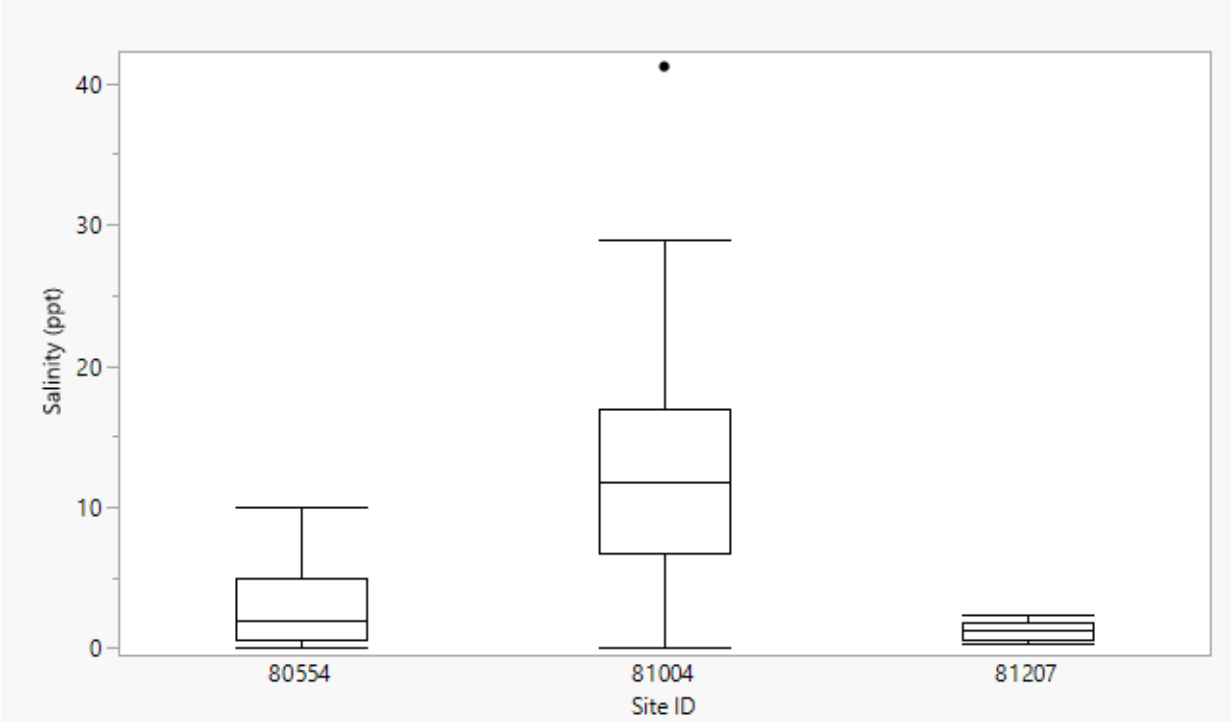

Figure 7. Salinity for Texas Stream Team sites in the watershed in Brazoria County (January 2014 to November 2025).

Dissolved Oxygen

The average dissolved oxygen for all sites ranged from 5.92 to 6.93 mg/L (Table 7). The lowest average dissolved oxygen (5.92 mg/L) was observed at H-GAC Site – Big Slough @ Brazoria NWR (site 81207) whereas the highest average dissolved oxygen (6.93 mg/L) was observed at H-GAC Site – Bastrop Bayou @ 2004 Bridge (site 80554). All three sites had average dissolved oxygen values above the water quality standard of 4.0 mg/L. However, each site had discrete measurements that fell below the water quality standard on multiple occasions, with site 81004 having the highest number of occurrences at a total of 11 events (Figure 8).

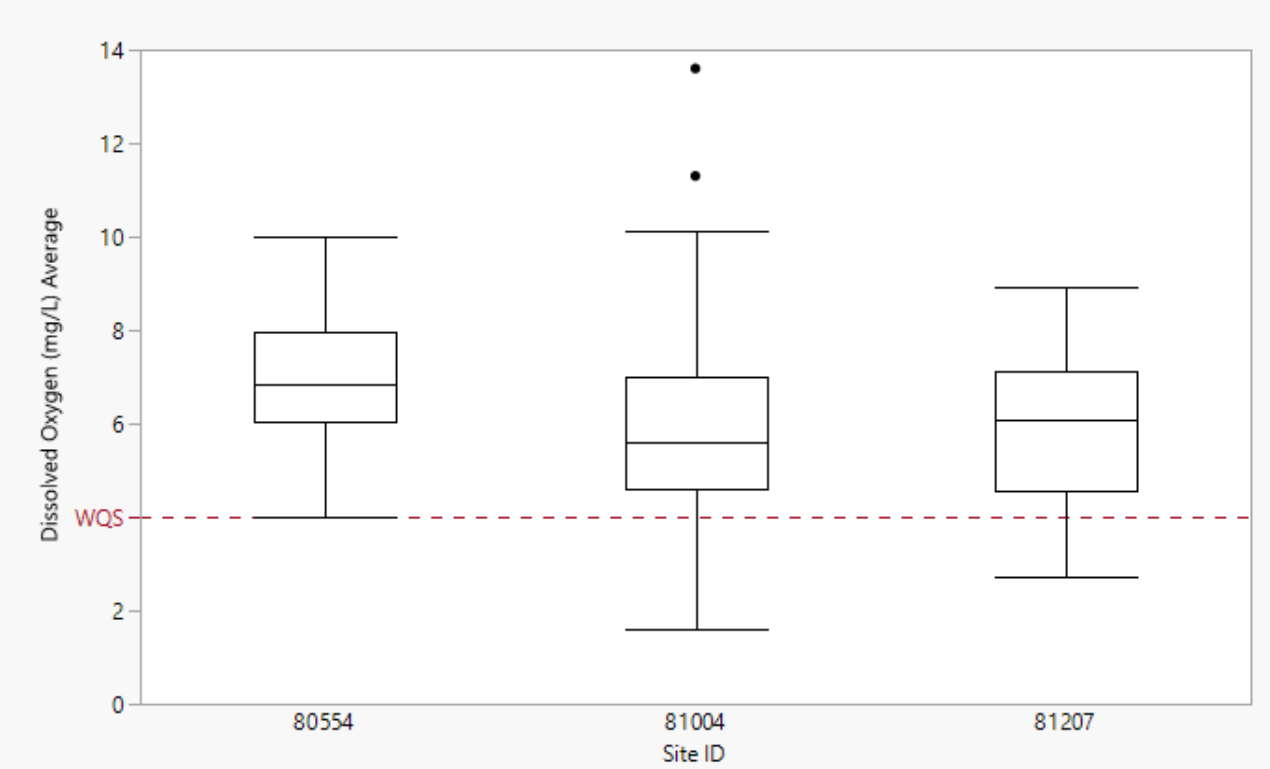

Figure 8. Dissolved Oxygen for Texas Stream Team sites in the watershed in Brazoria County (January 2014 to November 2025). WQS = Water Quality Standard.

pH

The average pH at all sites ranged from 6.79 to 8.21 standard units (s.u.) (Table 7). The lowest average pH value (6.79 s.u.) was observed at H-GAC Site – Big Slough @ Brazoria NWR (site 81207) whereas the highest average pH value (8.21 s.u.) was observed at H-GAC Site – Oyster Creek near FM 523 (site 81004). All three sites had average pH values within the water quality standard minimum and maximum. However, two sites had discrete measurements that fell below the water quality standard minimum of 6.5 s.u., with one occurrence taking place at site 81004 and site 81207 (Figure 9).

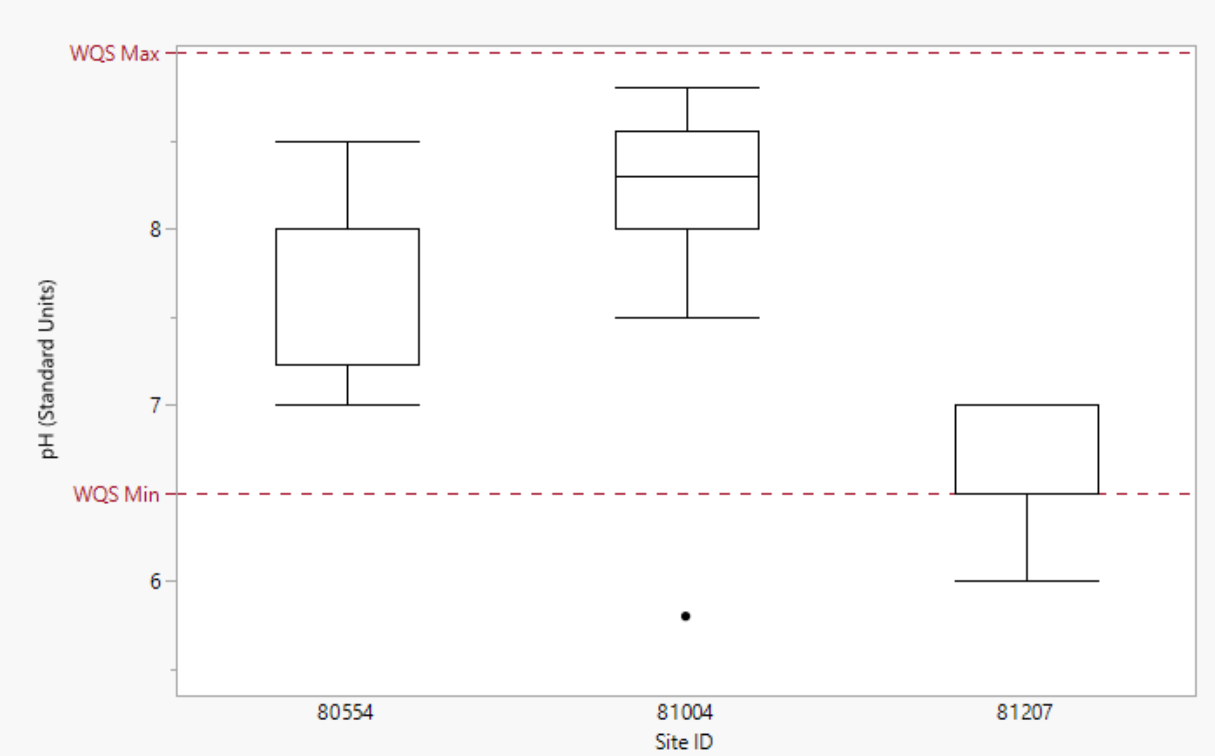

Figure 9. pH for Texas Stream Team sites in the watershed in Brazoria County (January 2014 to November 2025). WQS Min = Minimum Water Quality Standard; WQS Maz = Maximum Water Quality Standard.

Transparency and Total Depth

The average total depth at all sites ranged from 0.73 to 1.19 m (Table 7). The largest average depth (1.19 m) was observed at H-GAC Site – Bastrop Bayou @ 2004 Bridge (site 80554) whereas the smallest (0.73 m) was observed at H-GAC Site – Big Slough @ Brazoria NWR (site 81207).

Secchi disks and/or transparency tubes were used to measure transparency at all monitoring sites within the watershed. The Secchi disk was used at site 80554, the transparency tube was used at site 81207, and both the Secchi disk and transparency tube were used at site 81004 (Figure 10). Average transparency gathered via the transparency tube ranged from 0.29 to 1.13 m with the lowest average recorded at H-GAC Site – Oyster Creek near FM 523 (site 81004) and the highest at H-GAC Site – Big Slough @ Brazoria NWR (site 81207) (Table 7).

Average transparency gathered via the Secchi disk ranged from 0.39 to 0.50 m with the lowest average recorded at H-GAC Site – Bastrop Bayou @ 2004 Bridge (site 80554) and the highest at H-GAC Site – Oyster Creek near FM 523 (site 81004) (Table 7).

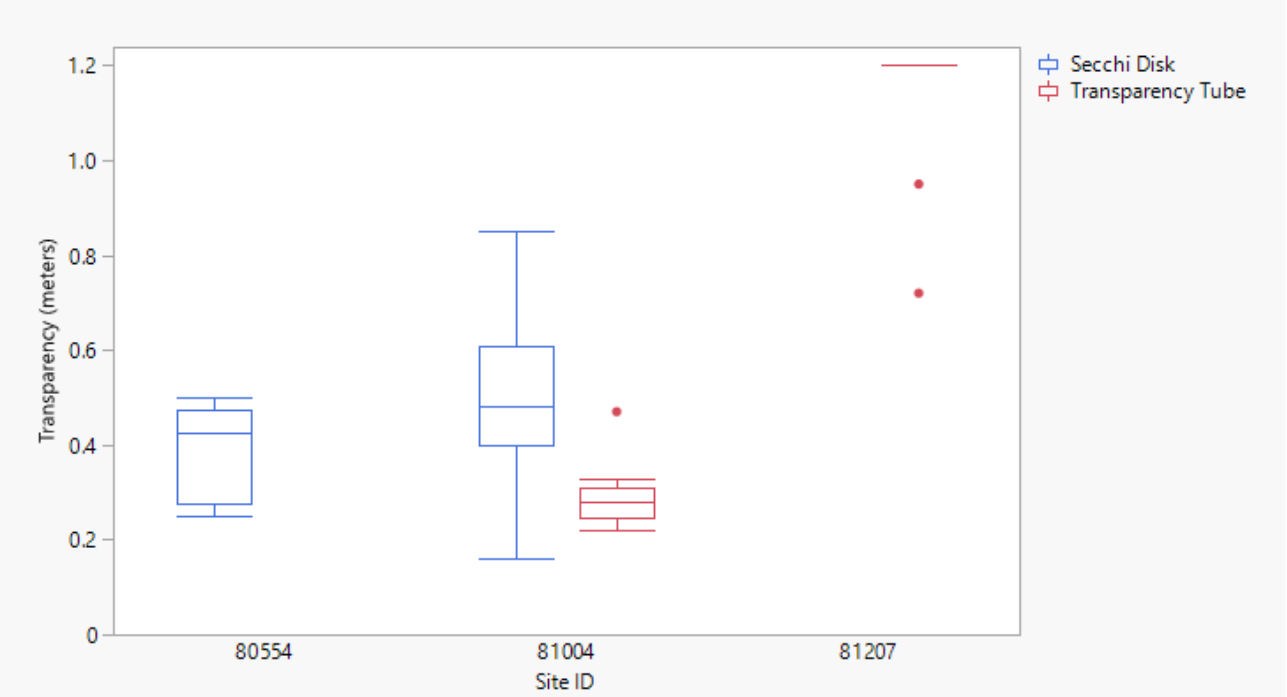

Figure 10. Transparency for Texas Stream Team sites in the watershed in Brazoria County (January 2014 to November 2025).

WATERSHED SUMMARY

As of 2024, the watershed is predominantly covered in wetlands. All major land use categories have stayed relatively consistent when looking at the change in land use percentage since 2014. However, all categories except for Developed and Open Water have decreased in coverage over the last decade.

From January 2014 through November 2025, trained Houston-Galveston Area Council community scientists conducted 91 total monitoring events across three sites in the watershed. All sites had 10 or more valid sampling events (after quality-control screening) however, not all the parameters tested met the minimum of 10 sampling events to be included in the analysis. Parameters measured in the watershed and used for the analysis included: air and water temperature, salinity, dissolved oxygen, pH, transparency tube and Secchi disk, and total depth. 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), Of the four classified water bodies and the four unclassified streams present in the watershed, six of the water bodies have impairments. Of the six impaired water bodies, which include classified segments 1105, 1109, and 1110, and unclassified segments 1105B, 1105C, 1105D, and 1105E, all of them are impaired for bacteria. Additionally, classified segment 1110 and unclassified segment 1105E are impaired for depressed dissolved oxygen. Water quality standards for designated uses were compared to the monitoring results to evaluate overall conditions. Key findings include:

- Dissolved Oxygen: All three sites had average values above the water quality standard of 4.0 mg/L. However, each site had discrete measurements that fell below the water quality standard on multiple occasions, with site 81004 having the highest number of occurrences at a total of 11 events
- pH: sites 81004 and 81207 had discrete measurements that fell below the water quality standard minimum of 6.5 s.u.

The watershed needs targeted actions to reduce bacteria loads, address low dissolved oxygen risk, and fill monitoring gaps, especially for *E. coli* bacteria community science data. Impaired segments should be prioritized, and data sharing with state and local agencies is encouraged. Watershed coordinators and/or local agencies are encouraged to identify and map likely bacteria sources that may be contributing to the impairment (failing septic systems, wildlife congregations).

Like the previous report, this report was made possible through the dedication of the Houston-Galveston Area Council, their community scientist, and their 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. 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. The Texas Stream Team extends its sincere appreciation for the Houston-Galveston Area Council's group.

For more details on the Texas Stream Team program or to find upcoming training opportunities, please email TxStreamTeam@txstate.edu or visit our events calendar at TexasStreamTeam.org.

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APPENDIX A

Table 8. Endangered species located within the Brazoria County, Texas.

Species Type	Common Name	Federal/State Listing
Birds	Whooping crane	State Listed as Endangered
Mammals	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
	Bryde's whale	State Listed as Endangered
	Humpback whale	State Listed as Endangered
	North Atlantic right whale	State Listed as Endangered
Reptiles	Atlantic hawksbill sea turtle	State Listed as Endangered
	Kemp's Ridley sea turtle	State Listed as Endangered
	Leatherback sea turtle	State Listed as Endangered

Table 9. Threatened species located within Brazoria County, Texas.

Species Type	Common Name	Federal/State Listing
Birds	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
Fish	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
Mammals	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 killer whale	State Listed as Threatened
	Pygmy killer whale	State Listed as Threatened

	West Indian manatee	State Listed as Threatened
Reptiles	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
Mollusks	Brazos heelsplitter	State Listed as Threatened
	Texas fawnsfoot	State Listed as Threatened