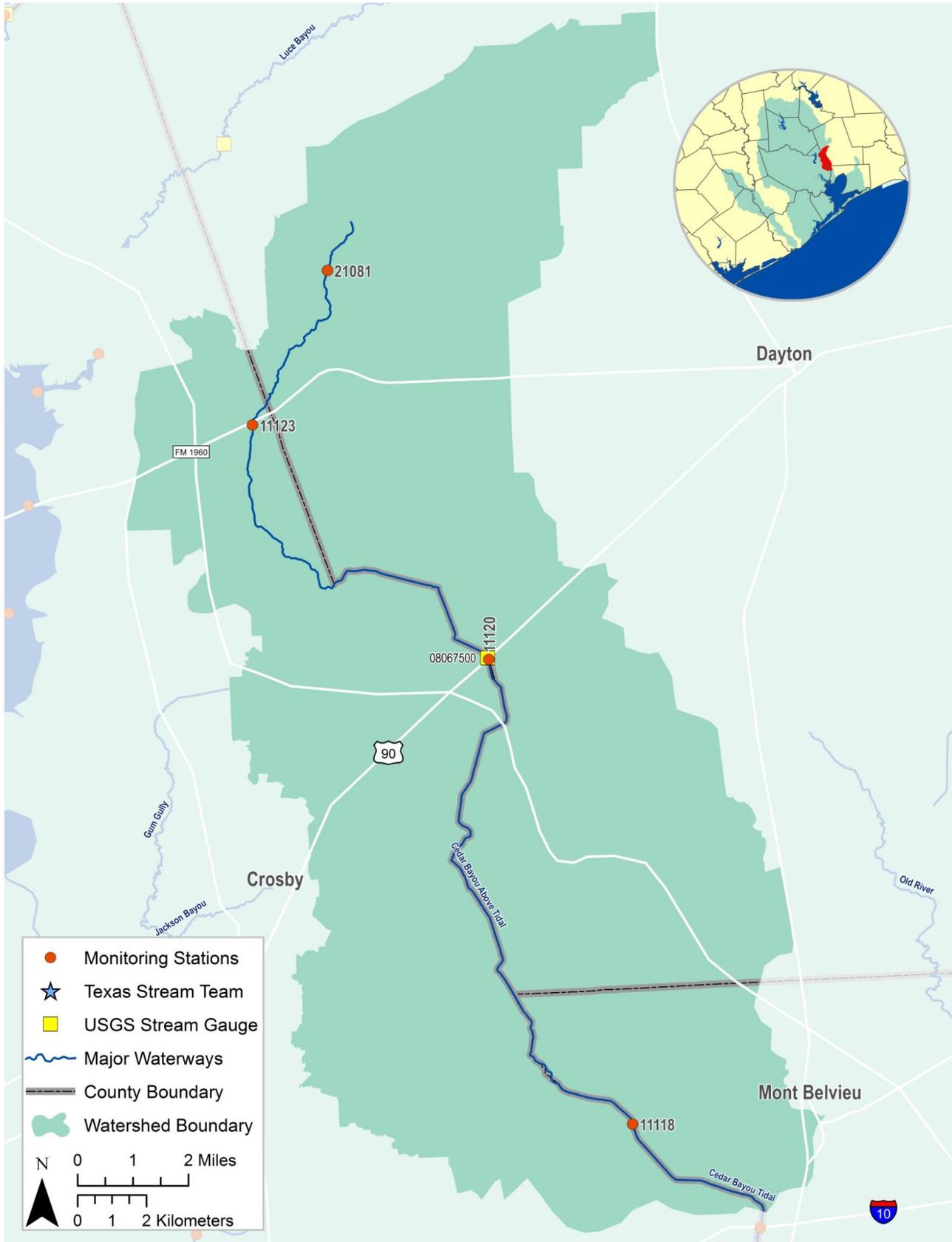
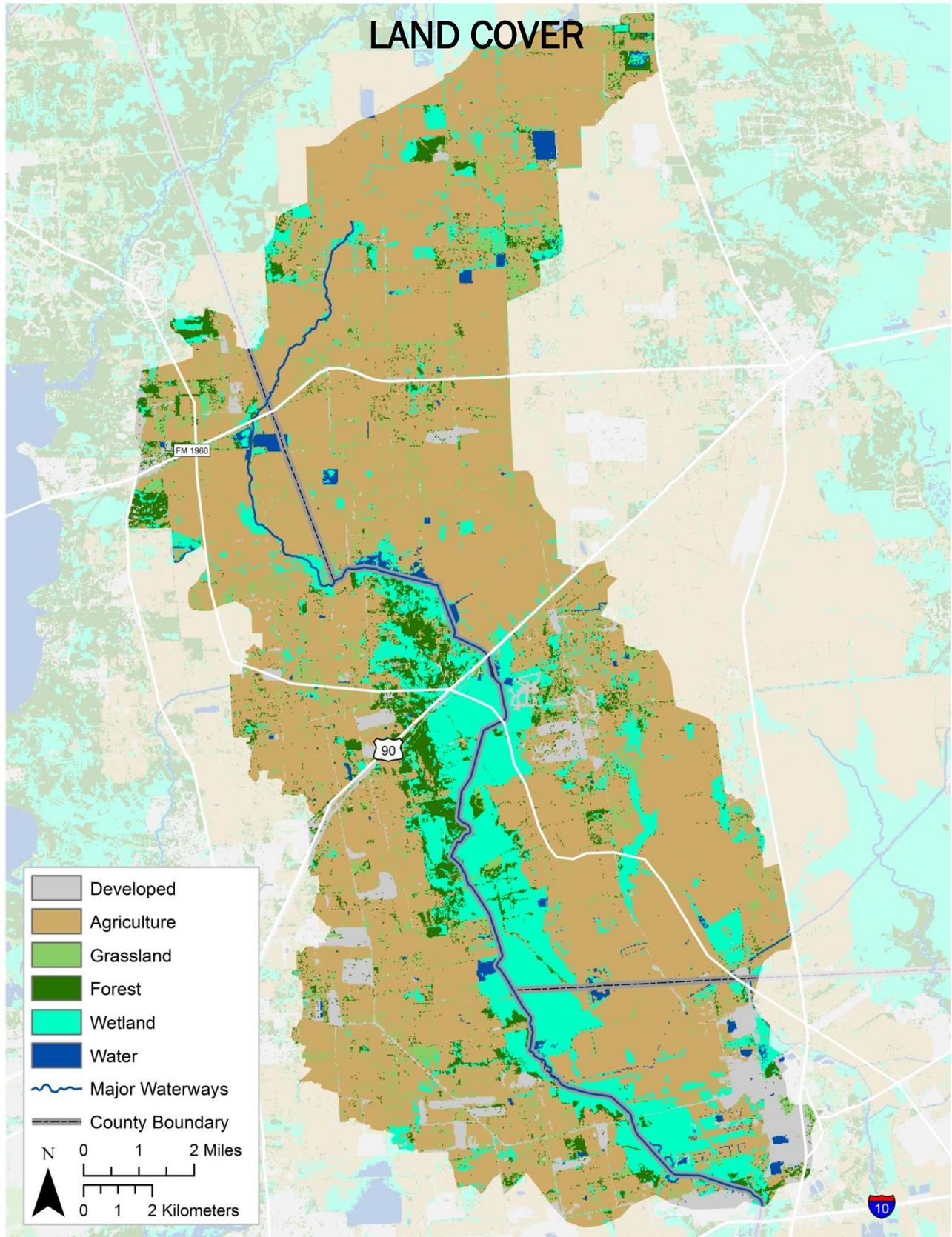


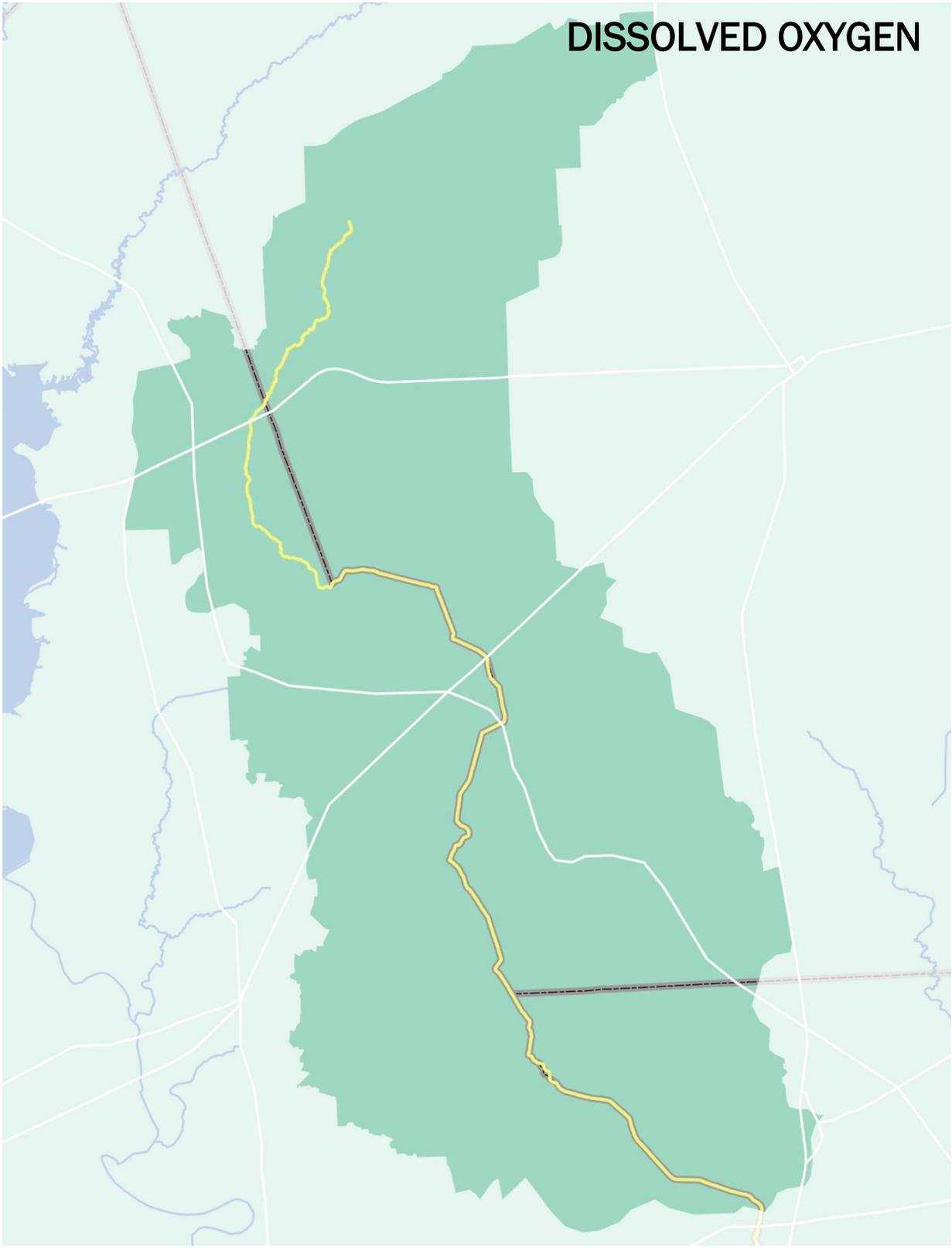
CEDAR BAYOU ABOVE TIDAL - SEGMENT 0902



CEDAR BAYOU ABOVE TIDAL - SEGMENT 0902



DISSOLVED OXYGEN



 Impairment  Concern  No Impairments or Concerns

Segment Number:	0902	Name:	Cedar Bayou Above Tidal		
Length:	26 miles	Watershed Area:	145.5 square miles	Designated Uses:	Primary Contact Recreation 1; High Aquatic Life; Public Water Supply
Number of Active Monitoring Stations:	3	Texas Stream Team Monitors:	0	Permitted Outfalls:	25
Description:	Segment 0902 (Perennial Stream): From a point 2.2 km (1.4 miles) upstream of IH 10 in Chambers/Harris County to a point 7.4 km (4.6 miles) upstream of FM 1960 in Liberty County				

Percent of Stream Impaired or of Concern						
Segment ID	PCBs/Dioxin	Bacteria	Dissolved Oxygen	Nutrients	Chlorophyll a	Other
0902	100	-	-	-	-	-

Segment 0902			
Standards	Perennial Stream	Screening Levels	Perennial Stream
Temperature (°C/°F):	32 / 90	Dissolved Oxygen (mg/L) (grab):	5.0
Dissolved Oxygen (24-Hr Average) (mg/L):	5.0	Ammonia (mg/L):	0.33
Dissolved Oxygen (Absolute Minima) (mg/L):	3.0	Nitrate-N (mg/L):	1.95
pH (standard units):	6.5-9.0	Orthophosphate Phosphorus (mg/L):	0.37
<i>E. coli</i> (MPN/100 mL) (grab):	399	Total Phosphorus (mg/L):	0.69
<i>E. coli</i> (MPN/100 mL) (geometric mean):	126	Chlorophyll a (µg/L):	14.1
Chloride (mg/L as Cl):	200		
Sulfate (mg/L as SO ₄):	150		
Total Dissolved Solids (mg/L):	700		

FY 2016 Active Monitoring Stations				
Site ID	Site Description	Frequency	Monitoring Entity	Parameter Groups
11118	Cedar Bayou downstream of FM 1942 NE of Crosby	Quarterly	EIH	Conventional, Field, Bacteria, Flow
11120	Cedar Bayou at US 90 NE of Crosby	Quarterly	TCEQ	Conventional, Field, Bacteria, Flow, Chlorophyll a
11120	Cedar Bayou at US 90 NE of Crosby	Semi-annually	TRA	Conventional, Field, Flow
11123	Cedar Bayou downstream of FM 1960 NE of Huffman	Quarterly	EIH	Conventional, Field, Bacteria, Flow

Water Quality Issues Summary

Issue	2014 Assessment <i>I – Impaired</i> <i>C – Of Concern</i>	Possible Causes / Influences / Concerns Voiced by Stakeholders	Possible Solutions / Actions To Be Taken
Dissolved Oxygen Concentrations (Grab)	Entire C segment	<ul style="list-style-type: none"> ▪ Excessive nutrients and organic matter from SSOs, malfunctioning OSSFs, agricultural operations, illegal disposal of grease trap waste, and biodegradable solid waste (e.g., grass clippings and pet waste) ▪ Vegetative canopy removed 	<ul style="list-style-type: none"> ▪ More public education about proper disposal of household fats, oils, and grease ▪ Increase OSSF maintenance and repairs ▪ More public education regarding OSSF operation and maintenance ▪ More outreach to farmers in watershed to minimize fertilizer runoff ▪ More public education on pet waste disposal ▪ Work with drainage districts and agencies to change practices of clear cutting and channelizing waterways to protect from solar heating ▪ Conserve or plant canopy trees and habitat along waterways to maintain/create vegetated riparian buffer zones

Segment Discussion:

Watershed Characteristics: Cedar Bayou Above Tidal lies in the coastal plain between the Trinity and San Jacinto rivers. Residential development is concentrated in the extreme southern portion of the watershed in the city of Mount Belvieu near Baytown. Rapid expansion of industrial operations, including refineries and oil and gas extraction operations, are currently underway in the southeastern portion of the watershed in and around the city of Mont Belvieu. Some residential development occurs northwest of U.S. Highway 90, but the majority of the watershed is used for agricultural purposes with small hobby farms scattered throughout. Principal crops include turf/sod, rice, and hay. OSSFs are the primary method used for disposing of sewage throughout the watershed.

Water Quality Issues: No water quality impairments are listed in the 2014 Texas Integrated Report. The segment is identified as having a concern for aquatic life use based on depressed dissolved oxygen (DO). The 2014 TCEQ assessment found that 14.1 percent of grab samples were below the grab screening criteria of 5.0 mg/L. Additionally, 24-hour DO monitoring has been underway in this segment for some time, and 14.3 percent of minimum and mean measurements were below the water quality standard (3.0 and 5.0 mg/L respectively). General, public water supply, and recreation uses are fully supported. The *E. coli* geomean during the TCEQ assessment period was 63.6 MPN/100 mL. H-GAC analysis found the 2001-2008 geomean was 96 MPN/100 mL and 21.2 percent of samples exceeded the grab standard of 399 MPN/100 mL, and 92 MPN/100 mL with 16.2 percent grab standard exceedance in the seven-year period ending 5/31/15. Roughly eleven percent of samples exceeded the screening level for total phosphorus between 2008 and 2015, and only five percent exceeded the chlorophyll *a* screening level. The [rolling seven-year geometric mean plot](#) suggests that bacteria levels in this watershed are fairly stable and have remained well below the water quality standard.

Special Studies/Projects: In December 2010, H-GAC began work with the Texas State Soil & Water Conservation Board (TSSWCB) to develop a Watershed Protection Plan (WPP) for Cedar Bayou. Through stakeholder participation, H-GAC addressed various concerns found in this segment summary, including efforts to determine why the trends are occurring. Malfunctioning OSSFs, sanitary sewer overflows, and runoff from animal waste were found to be the most prominent sources of bacteria and nutrient loadings to the waterway. The Cedar Bayou WPP is currently in the final approval stages with TSSWCB and the EPA.

Trends: Regression analysis of segment data revealed three significant increasing parameter trends for Cedar Bayou Above Tidal – [ammonia](#), [total Kjeldahl nitrogen \(TKN\)](#), and [total phosphorous \(TP\)](#). However, the majority of samples collected since 2000 have nutrient concentrations that fall below the set screening criteria. A total of four monitoring stations are located within this segment. Data collection began at stations 11118, 21080, and 21081 in 2012 for the Cedar Bayou WPP while stations 11120 and 11123 have been monitored since 2000 and 2007 respectively. All monitoring stations reflect the same increase in nutrient levels except for station [11118](#) which indicates a decrease in nitrate and TP since 2012. Additionally, chlorophyll a concentrations have shown a gradual decrease since monitoring began at stations 11118, 21080, and 21081 as well. No significant trend was observed for DO levels throughout the watershed and station [21081](#) was the only station with an increasing trend in *E. coli*. Additional data collection is necessary at station 11118, 21080, 21081 to better compare trends over time and improve our understanding of nutrient and bacteria sources in the watershed.

Recommendations

Continue collecting water quality data to support actions associated with any future watershed protection plan development and possible modeling.

Finalize watershed protection plan for Cedar Bayou which is currently in the final approval stages with TSSWCB and EPA.

Continue to utilize local partner to Clean Rivers Program to collect additional data that would help better isolate problem areas.