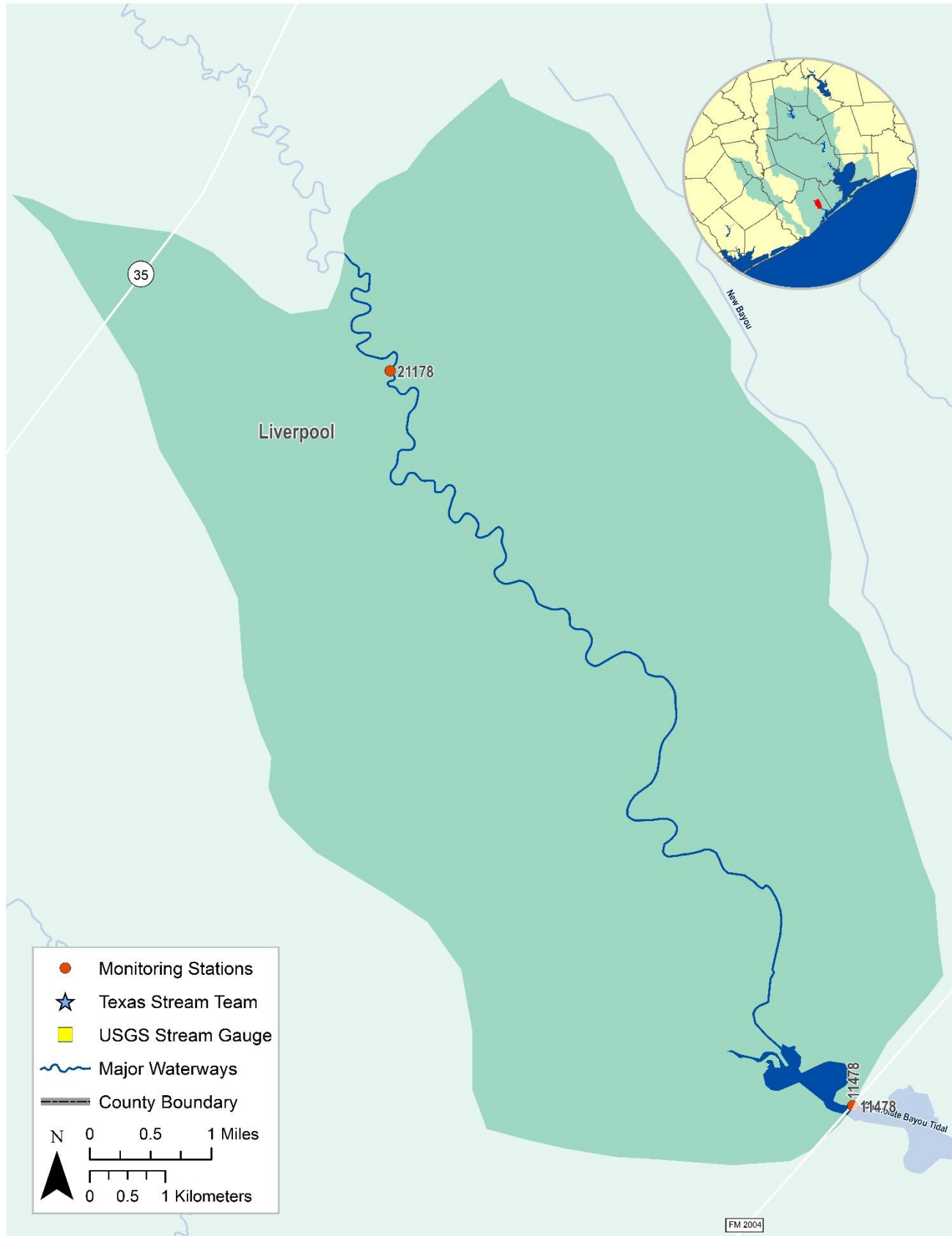
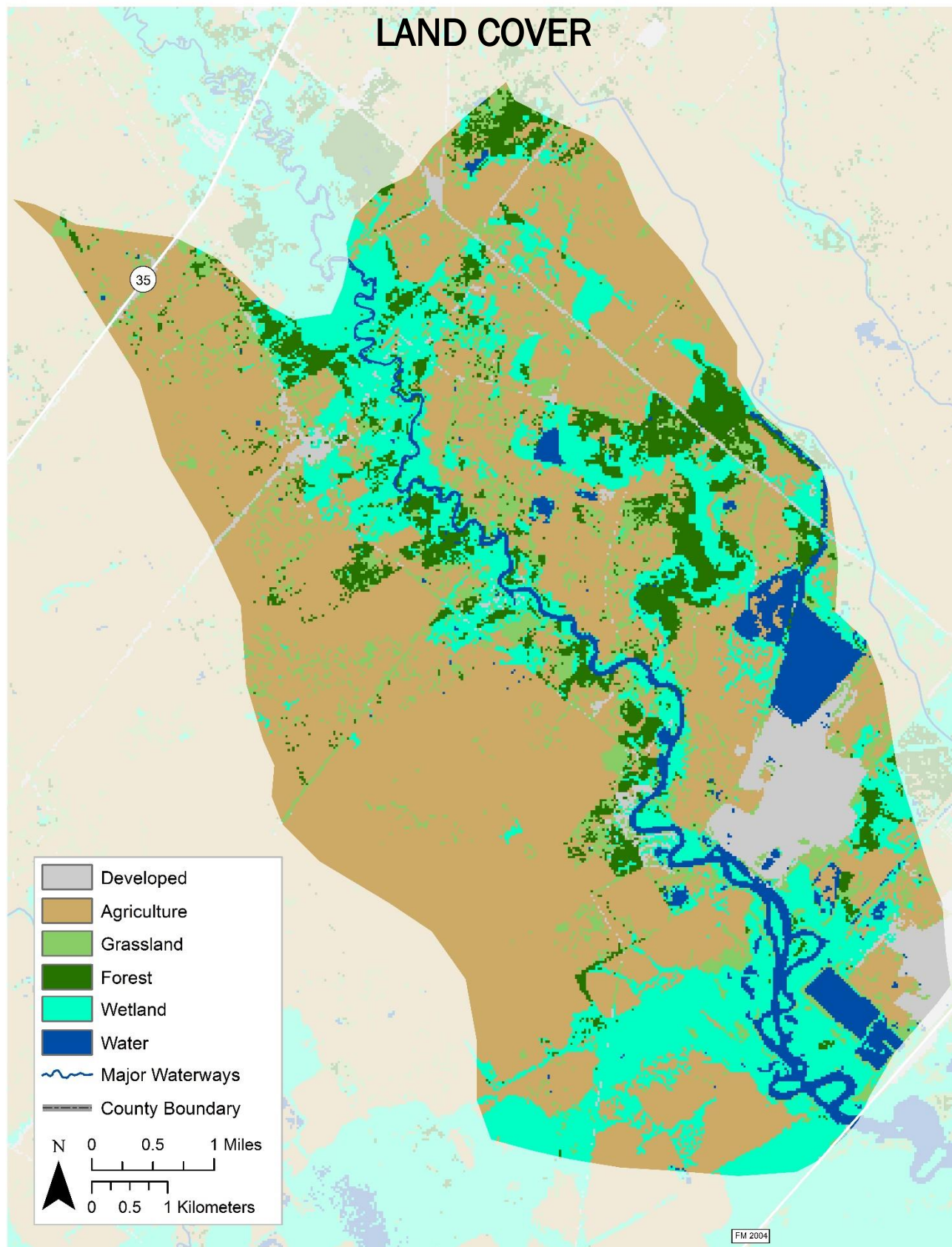


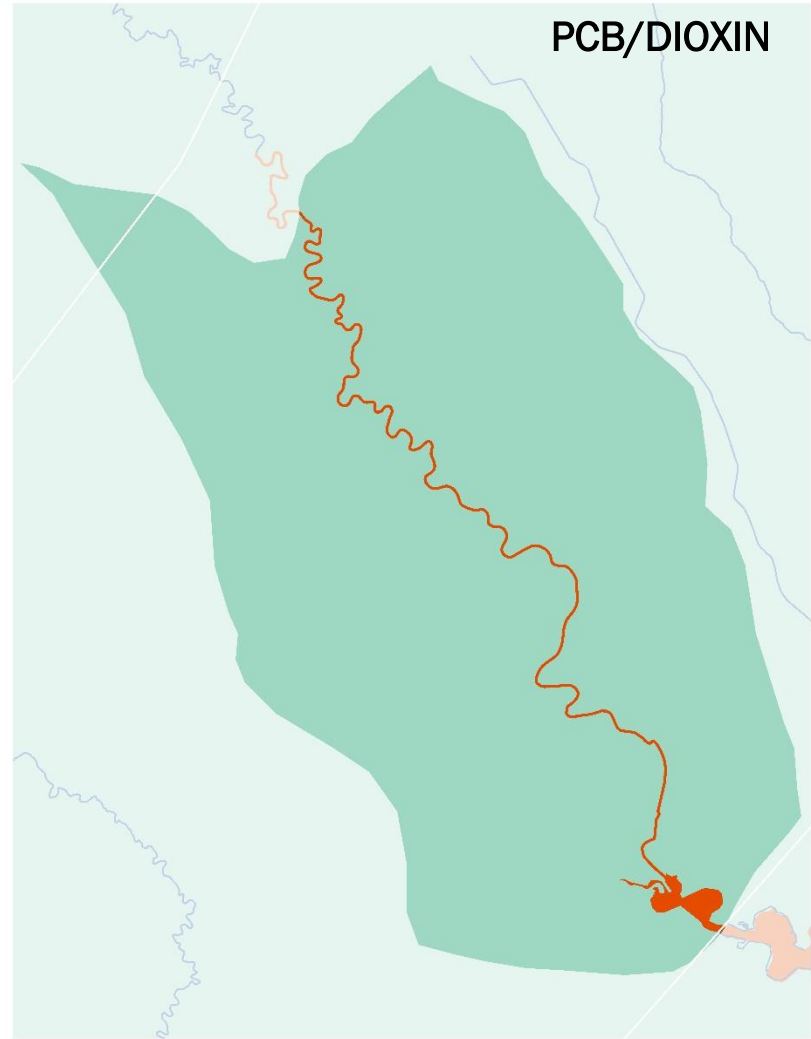
CHOCOLATE BAYOU TIDAL - SEGMENT 1107



CHOCOLATE BAYOU TIDAL - SEGMENT 1107

LAND COVER





 Impairment  Concern  No Impairments or Concerns

Segment Number: 1107		Name: Chocolate Bayou Tidal			
Length:	16 miles	Watershed Area:	37 square miles	Designated Uses:	Primary Contact Recreation 1; High Aquatic Life
Number of Active Monitoring Stations:	2	Texas Stream Team Monitors	0	Permitted Outfalls:	10
Description:	From the Chocolate Bay confluence 1.4 km (0.9 mi) downstream of FM 2004 to a point 4.2 km (2.6 mi) downstream of SH 35 in Brazoria County				

Percent of Stream Impaired or of Concern						
Segment ID	Dissolved Oxygen	Bacteria	Nutrients	PCBs/Dioxin	Chlorophyll a	Other
1107	-	100	-	100	-	-

Segment 1107

Standards	Tidal Stream	Screening Levels	Tidal Stream
Temperature (°C/°F):	35 / 95	Ammonia-N (mg/L):	0.46
Dissolved Oxygen (24-Hr Average) (mg/L):	4.0	Nitrate-N (mg/L):	1.10
Dissolved Oxygen (Absolute Minima) (mg/L):	3.0	Orthophosphate Phosphorus (mg/L):	0.46
pH (standard units):	6.5-9.0	Total Phosphorus-P (mg/L):	0.66
Enterococci (MPN/100mL) (grab):	104	Chlorophyll a (µg/L):	21
Enterococci (MPN/100mL) (geometric mean):	35		

FY 2016 Active Monitoring Stations				
Site ID	Site Description	Frequency	Monitoring Entity	Parameter Groups
11478	Chocolate Bayou at FM 2004	Quarterly	EIH	Field, Conventional, Bacteria, Chlorophyll a
11478	Chocolate Bayou at FM 2004	Quarterly	TCEQ	Field, Conventional, Bacteria, Chlorophyll a
21178	Chocolate Bayou at Brazoria CR 171/Mustang Chocolate Bayou Rd in Liverpool	Quarterly	EIH	Field, Conventional, Bacteria

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
Elevated Levels of Indicator Bacteria	1107 I	<ul style="list-style-type: none"> ▪ Animal waste from agricultural production, hobby farms, and riding stables ▪ Rapid urbanization and increased impervious cover ▪ Constructed stormwater controls failing ▪ Developments with malfunctioning OSSFs ▪ Improper or no pet waste disposal ▪ Direct and dry weather discharges ▪ Poorly operated or undersized WWTFs ▪ Waste haulers illegal discharges/improper disposal ▪ WWTF non-compliance, overflows, and collection system by-passes 	<ul style="list-style-type: none"> ▪ Implement stream fencing or alternative water supplies to keep livestock out of or away from waterways ▪ Create and implement Water Quality Management Plans for individual agricultural properties ▪ Install and/or conserve vegetative buffer areas along all waterways ▪ Improve compliance and enforcement of existing stormwater quality permits ▪ Add water quality features to stormwater systems ▪ More public education regarding OSSF operation and maintenance ▪ Ensure proper citing of new or replacement OSSFs ▪ More public education on pet waste disposal ▪ Require all systems to develop and implement a utility asset management program and protect against power outages at lift stations ▪ Impose new or stricter bacteria limits than currently designated by TCEQ ▪ Increase monitoring requirements for self-reporting
PCBs/Dioxin in Edible Fish Tissue	1107 I	<ul style="list-style-type: none"> ▪ Concentrated deposits outside boundaries of the waste pits located adjacent to San Jacinto River and I-10 bridge ▪ Unknown industrial or urban sources 	<ul style="list-style-type: none"> ▪ Remove or contain contamination from locations already identified ▪ Encourage additional testing to locate all unknown sources/deposits

Segment Discussion:

Watershed Characteristics: The Chocolate Bayou Tidal watershed is predominantly rural with pockets of urban and industrial development scattered throughout. The community of Liverpool is located in the northwest and a large industrial complex is located in the southeast portion of the watershed. Duck Lake and Monsanto Reservoir are impoundments used primarily for industrial purposes. The rest of the watershed is used for agriculture and contains a number of irrigation canals.

Water Quality Issues: The 2014 Texas Integrated Report lists the assessment unit 1107_01 as impaired for contact recreational use due to high levels of enterococci bacteria. The TCEQ assessment found the geomean for enterococci within this AU to be 82 MPN/100ml, which is more than twice the standard of 35 MPN/100ml. Additionally the State Department of Health Services has issued a Limited Consumption Fish Advisory for this water body due to high levels of PCBs and dioxin found in fish tissue.

Special Studies/Projects: H-GAC has been tasked by the TCEQ to implement a basin-wide approach for addressing bacterial impairments for the San Jacinto-Brazos Coastal Basin which includes Chocolate Bayou. Development for the basin-wide TMDL began in September of 2015 and will result in a final Basin 11 Summary Report in September of 2016 that will summarize basin characteristics, water quality impairments, potential bacteria sources, and recommendations for bacterial reduction.

Trends: Regression analysis of segment data revealed statistically significant trends for nine parameters including increasing chloride, enterococci, salinity, specific conductance (SPCond), sulfate, and total phosphorus (TP) while decreasing trends were observed for chlorophyll a, Secchi transparency, and total suspended solids (TSS). Station 11478 is located at the downstream most point of Chocolate Bayou Tidal and has been assessed for over two decades. Data trends for station 11478 reflect the nine parameter trends seen on the main segment. Data collection for station 21178, located further upstream adjacent to the watershed's urban center of Liverpool, began in 2004. Significant trends for increasing ammonia and salinity were observed for station 21178.

[Enterococci concentrations continue to increase](#) throughout the watershed, with nearly half the samples collected since 2000 exceeding the geometric mean standard of 35 MPN/100 mL. A statistically significant [increasing trend in TP](#) is also present, but concentrations are consistently below the 0.66 mg/L screening criteria. Runoff from agricultural areas, WWTF effluent, and malfunctioning OSSFs may be reasons for bacteria and nutrient loadings in the waterway. Increasing ammonia levels at station 21178 may be linked to nearby WWTF discharges serving the community of Liverpool. Another common trend seen throughout the watershed is a gradual increase in dissolved constituents in water. Increases in salinity and SPCond along with decreasing TSS and Secchi transparency may reflect higher contributions of effluent discharges and/or increased tidal influences during dry weather conditions.

Recommendations

Address concerns found in this segment summary through stakeholder participation during TMDL development.

Continue collecting water quality data to support actions associated with TMDL development and any future WPP development.

Pursue a new local partner to Clean Rivers Program to collect additional data that would help better isolate problem areas.