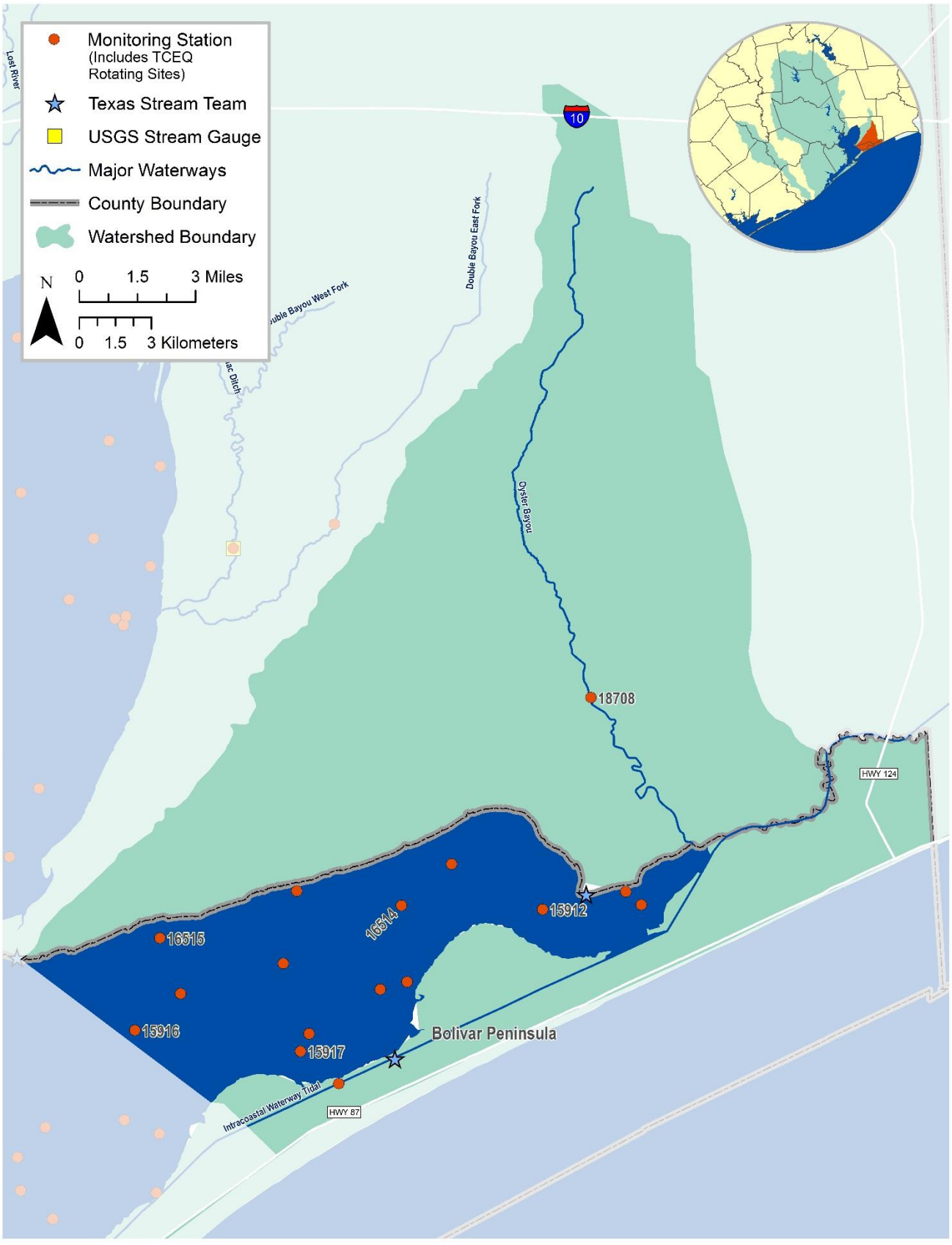
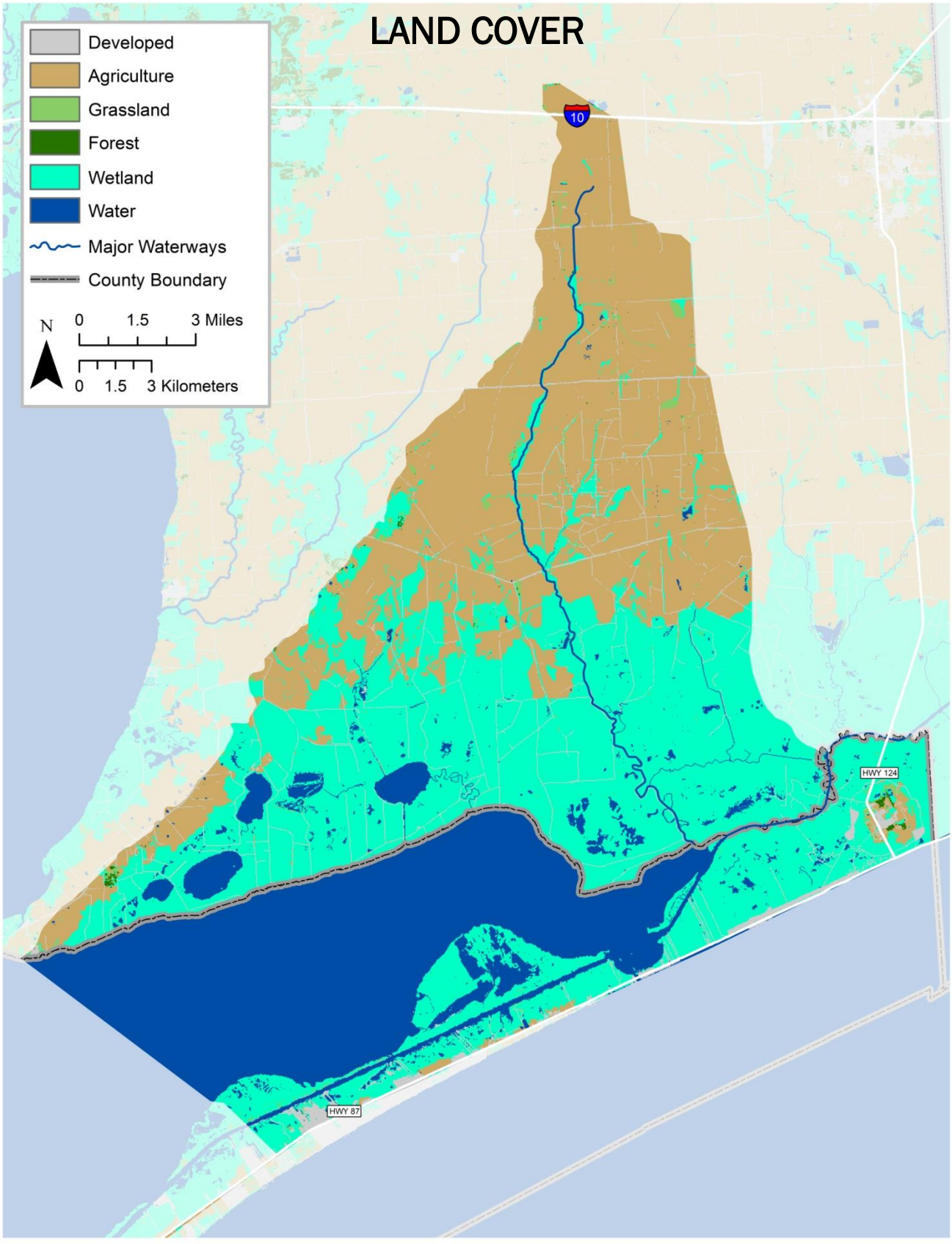
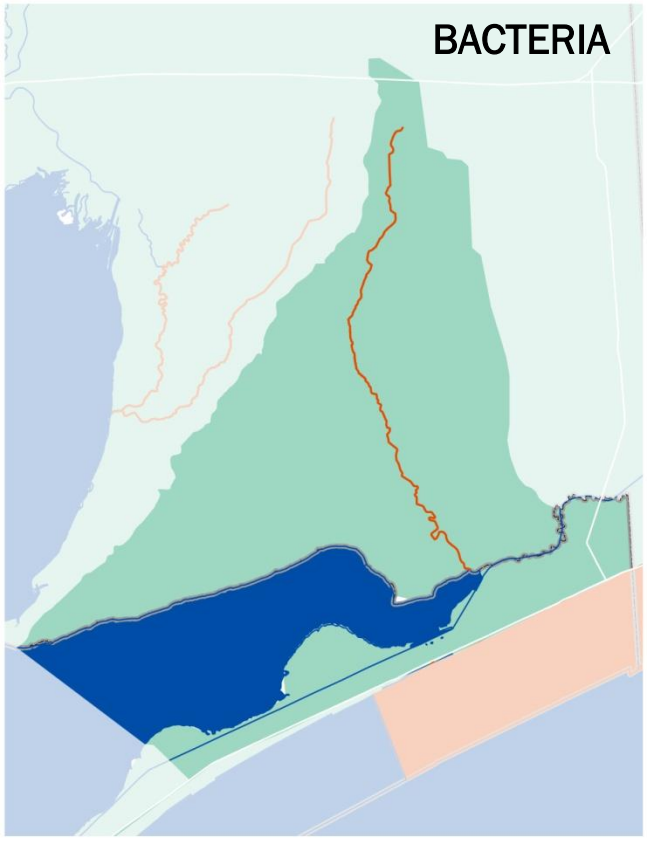
EAST GALVESTON BAY - SEGMENT 2423

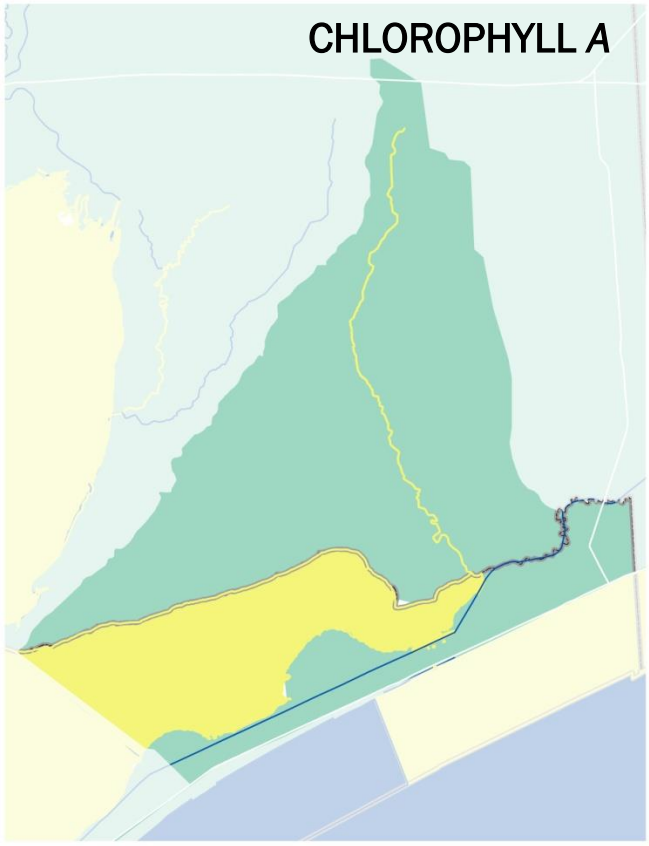


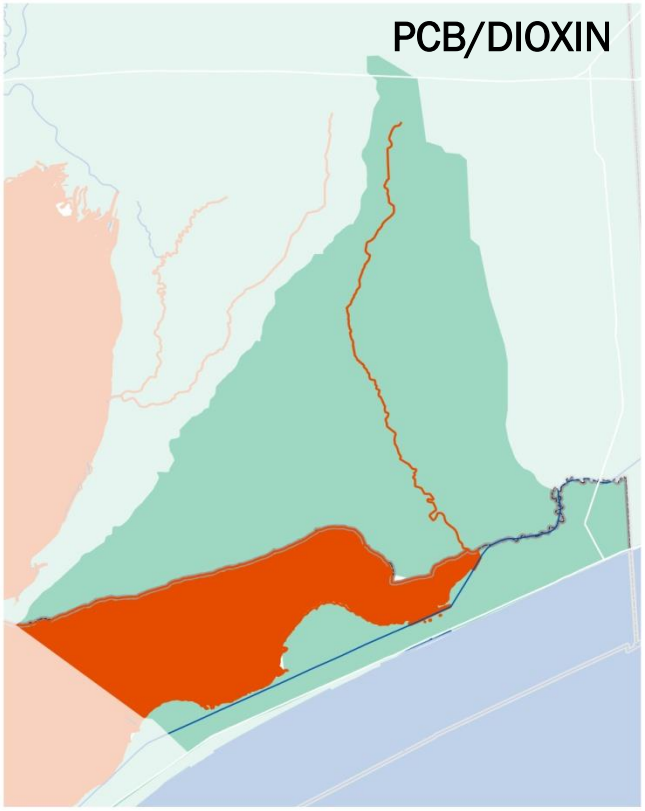
EAST GALVESTON BAY - SEGMENT 2423

LAND COVER









Impairment Concern No Impairments or Concerns

Segment Number:	2423	Name:	East Galveston Bay		
Area:	57 square miles	**Miles of Shoreline:**	51 miles	**Designated Uses:**	Primary Contact Recreation 1; High Aquatic Life Use; Oyster Waters
Number of Active Monitoring Stations:	4	**Texas Stream Team Monitors:**	2	**Permitted Outfalls:**	1
Description:	Segment 2423: A 134.9 square kilometer (52.1 square mile) portion of Galveston Bay located on the landward side of Bolivar Peninsula extending westward from the Galveston County line east of High Island to an imaginary north-south line extending from Smith Point southeast to approximately ½ mile east of Pepper Grove Cove on Elm Grove Point and east of Bluewater Subdivision on Bolivar Peninsula Segment 2423A (Tidal Stream w/ high ALU): Oyster Bayou (unclassified water body) — From the East Bay confluence to a point 2.2 km (1.4 mi) upstream from SH 65 in Chambers County Segment 2423OW (Oyster Waters)				

Percent of Stream Impaired or of Concern

Segment ID	PCBs/Dioxin	Bacteria	Dissolved Oxygen	Nutrients	Chlorophyll *a*	Other
2423	100	-	-	-	100	-
2423A	100	100	-	-	100	-
2423OW	-	100	-	-	-	-

Segment 2423

Standards	Bays & Estuaries	Tidal Streams	Screening Levels	Bays & Estuaries	Tidal Streams
Temperature (°C/°F):	35	35 / 95	Ammonia-N (mg/L):	0.10	0.46
Dissolved Oxygen *(24-Hr Average)* (mg/L):	4.0	4.0	Nitrate-N (mg/L):	0.17	1.10
Dissolved Oxygen *(Absolute Minima)* (mg/L):	3.0	3.0	Orthophosphate Phosphorus (mg/L):	0.19	0.46
pH (standard units):	6.5-9.0	6.5-9.0	Total Phosphorus-P (mg/L):	0.21	0.66
Enterococci (MPN/100mL) (grab):	89	104	Chlorophyll *a* (µg/L):	11.6	21
Enterococci (MPN/100mL) (geometric mean):	35	35			
Fecal Coliform in Oyster Waters (CFU/100mL) (median/grab):	14/43				

FY 2016 Active Monitoring Stations				
Site ID	**Site Description**	**Frequency**	**Monitoring Entity**	**Parameter Groups**
16213	East Bay at 98GB020	Quarterly	TCEQ	Field, Conventional, Bacteria, Chlorophyll a
16214	East Bay at 98GB021	Quarterly	TCEQ	Field, Conventional, Bacteria, Chlorophyll a
16214	East Bay at 97GB021	Once / Year	TCEQ	Benthics, Metals in Sediment
16515	East Bay at 98GB022	Quarterly	TCEQ	Field, Conventional, Bacteria, Chlorophyll a
10655	Oyster Bayou at Anahuac National Wildlife Refuge boat canal confluence	Quarterly	TCEQ	Field, Conventional, Bacteria, Chlorophyll a

Water Quality Issues Summary			
Issue	**2014 Assessment** *I – Impaired C – Of Concern*	**Possible Causes / Influences / Concerns Voiced by Stakeholders**	**Possible Solutions / Actions To Be Taken**
Elevated Levels of Indicator Bacteria and in Oyster Waters	2423A I 2423OW I	▪ Animal waste from agricultural production, ranches, hobby farms, and riding stables ▪ Rapid urbanization and increased impervious cover ▪ Constructed stormwater controls failing ▪ Bird rookeries on islands throughout the bay and along the shoreline ▪ Improper disposal of waste from boats ▪ Developments with malfunctioning OSSFs ▪ Improper or no pet waste disposal ▪ Waste haulers illegal discharges/improper disposal ▪ Direct and dry weather discharges ▪ Poorly operated or undersized WWTFs ▪ WWTF non-compliance, overflows, and collection system by-passes	▪ 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 ▪ Improve construction oversight to minimize TSS discharges to waterways ▪ Add water quality features to stormwater systems ▪ More public education on proper boat waste disposal ▪ More public education regarding OSSF operations 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 ▪ Increase monitoring requirements for self-reporting

			▪ Impose new or stricter bacteria limits than currently designated by TCEQ
PCBs/Dioxin in Edible Fish Tissue	2423 I 2423A I	▪ Concentrated deposits outside boundaries of the waste pits located adjacent to San Jacinto River and I-10 bridge ▪ Waste pits located along the San Jacinto River immediately upstream of I-10 bridge ▪ Unknown industrial or urban sources	▪ Encourage regulators and responsible parties to work together to remediate Superfund site ▪ Remove or contain contamination from locations already identified ▪ Participate in planning meetings, etc ▪ Encourage additional testing to locate all unknown sources/deposits
Elevated Chlorophyll *a* Concentrations	2423 C 2423A C	▪ Fertilizer runoff from surrounding watershed promotes algal growth in waterways ▪ Nutrient loading from WWTF effluent, sanitary sewer overflows, and malfunctioning OSSFs promotes algal growth	▪ Improve compliance and enforcement of existing stormwater quality permits ▪ Improve stormwater controls in new developments ▪ Reduce or manage fertilizer runoff from agricultural areas ▪ More public education regarding nutrients and consequences

Segment Discussion:

Watershed Characteristics: The East Bay watershed is primarily undeveloped and includes East Bay, the Upper Bolivar Peninsula, and part of Chambers County. Salt marshes, coastal prairies, and wetlands make up the majority of undeveloped land surrounding the shoreline of East Bay. On the peninsula, development is mostly limited to single family homes, most of which are vacation homes, and small commercial operations. There are several industrial areas on Bolivar Peninsula, including oil and gas production, commercial shrimping, and oyster harvesting. There are a few small unincorporated communities, such as Gilcrest, Crystal Beach, and High Island, located along the peninsula. Homes and businesses in the watershed are exclusively using on-site sewage facilities (OSSF). Chambers County, which drains to East Bay, maintains ranching as the primary activity in the area. There are also two wildlife refuges, a wildlife management area, and a bird sanctuary located in the watershed.

Water Quality Issues: The 2014 Texas IR lists Oyster Bayou (2423A_01) as impaired for contact recreation due to elevated levels of enterococci bacteria. Oyster Bayou is a new addition to the 303(d) list for bacteria. Assessment unit 2423OW_01, which is the east end area of the bay adjacent to the ICWW and the East Bay Bayou, is listed in the 2014 IR as impaired for oyster waters due to elevated levels of fecal coliform bacteria. This area is closed by the Seafood Safety Division of the Texas Department of State Health Services for the harvesting of oysters and other shellfish for direct marketing. Additionally, East Bay and Oyster Bayou are listed in the 2014 IR for fish consumption impairments due to elevated levels of dioxin and PCBs found in edible fish tissue. The Texas Department of State Health Services has issued a Limited Fish Consumption Advisory for these segments.

East Bay and Oyster Bayou also have chlorophyll *a* concerns based upon water quality screening criteria levels with a approximately 50% of samples in East Bay and 60% of samples in Oyster Bayou exceeding the screening criteria level of 11.6 micrograms per liter.

Special Studies/Projects: This segment is included in the TMDL for the Galveston Bay System Survey for Dioxin and PCBs, which is currently under way. East Galveston Bay is also included in the Oyster Waters I-Plan for bacteria which began in 2010 after the TMDL was approved by the EPA. The final draft I-

Plan was submitted to the TCEQ in August of 2014 and final approval of the draft was given in August of 2015. For more information about these projects, please refer to the detailed discussions located in the Public Involvement and Outreach section of the 2016 Basin Summary Report.

Trends: Regression analysis of water quality data for the East Galveston Bay segment identified ten statistically significant parameter trends including increasing total dissolved solids (TDS), sulfate, specific conductance (SPCond), salinity, pH, chloride, and alkalinity while a decrease in nitrate, total suspended solids (TSS), and total Kjeldahl nitrogen (TKN) was detected during the period of record. The East Bay watershed is currently impaired for elevated levels of indicator bacteria in oyster waters and for PCB and dioxin in edible fish tissue. Regression analysis of enterococci data for the main East Bay segment detected relatively stable conditions over time with the last exceedance occurring before 2004. Refer to the Water Quality Issues discussion above for more information about oyster water bacteria impairments.

The 2014 Texas Integrated Report also lists the East Bay watershed as having a concern for chlorophyll *a*. Regression analysis of chlorophyll *a* concentrations for East Bay revealed a stable trend over time, but nearly half of the samples collected since 2000 have exceeded the 11.6 µg/L screening criteria.

Recommendations
Continue collecting water quality data to support actions associated with any future watershed protection plan development and possible modeling.
Increase the frequency of sampling at representative stations in the watershed to decrease data gaps.
Pursue a new local partner to Clean Rivers Program to collect additional data that would help better isolate problem areas.
Work with local partner and contract labs to lower detection limits for nutrients since chlorophyll a concentrations are increasing and nutrient concentrations have an effect.