# Introduction

## Why a Watershed Protection Plan?

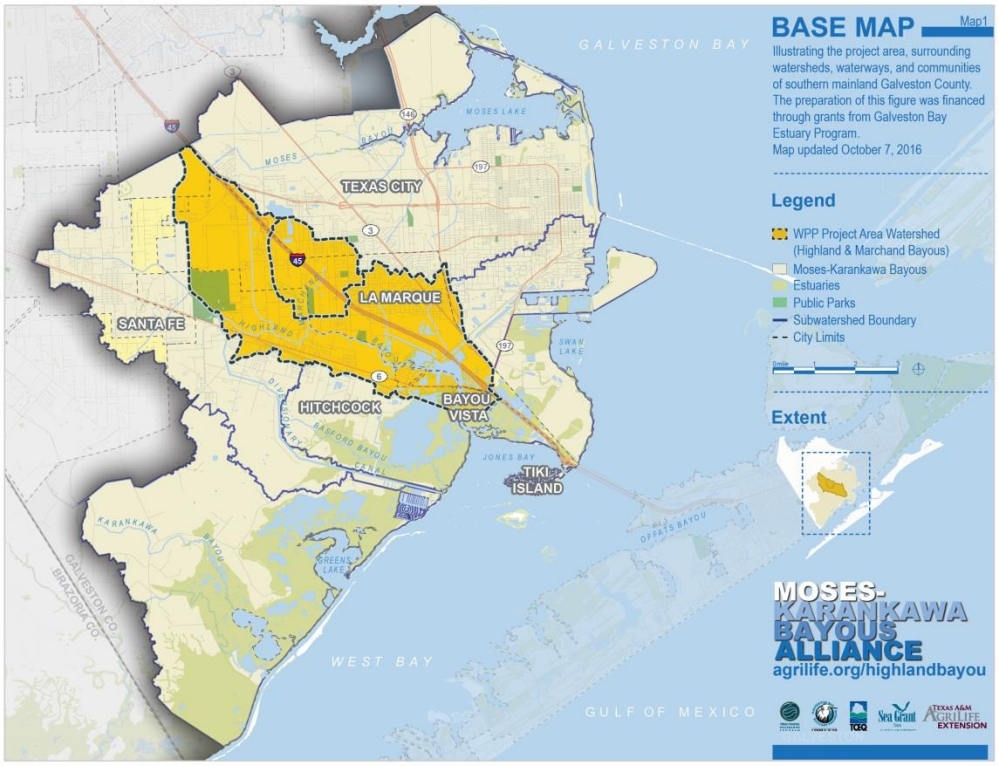
A watershed protection plan (WPP) is a stakeholder-driven, voluntary plan of action to address water quality issues in the watershed. Stakeholders bring to the planning process their local knowledge of their watershed, communities and projects. It is imagined that a voluntary plan developed through sustained stakeholder participation will lead to individual ownership and follow through of activities that will have a positive impact on the area's water quality. An EPA approved WPP also opens opportunities to bring in state and federal support for these projects. The WPP document is a community resource, compiling in one place the wide range of factors impacting water quality, estimated pollution loads and reductions, specific stakeholder concerns, and potential pathways for action. The plan includes narratives about how these issues and concerns relate and fit within the larger picture.

**What is a Watershed?**

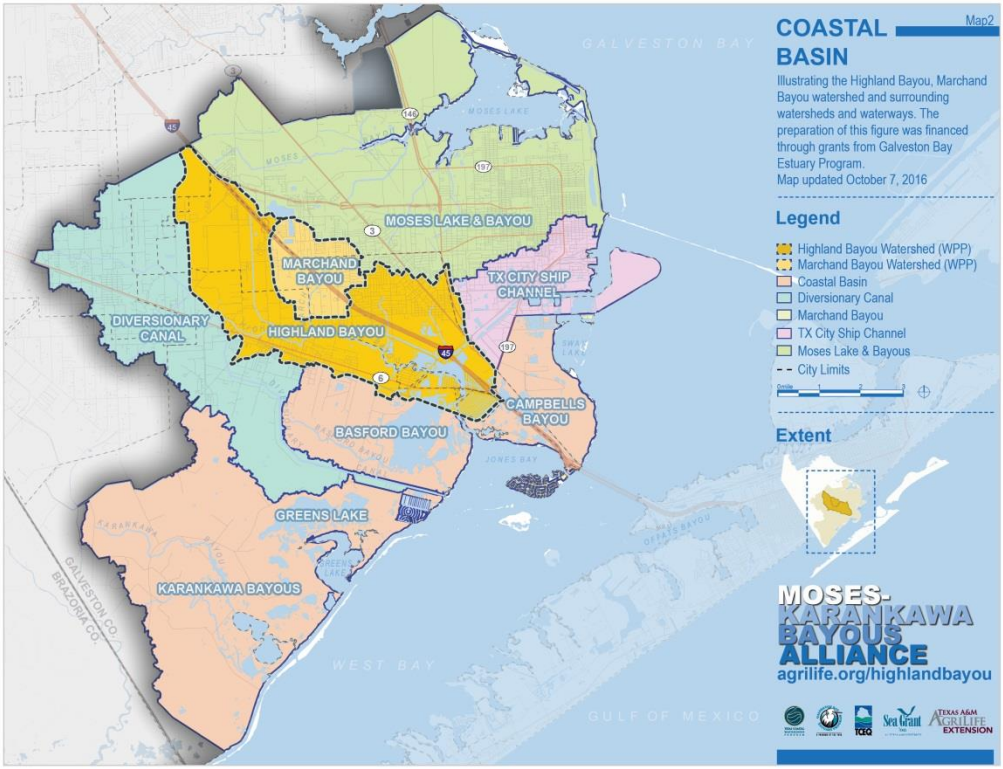
A watershed is the area of land drained by a water body, such as a river or bayou. As stormwater flows over the land, it collects into a system of ditches, creeks, bayous, and ultimately Galveston Bay. The water, from the time it hits the ground, transports all water-borne compounds it encounters along the way, such as bacteria, chemicals, paint, oil, sediment, fertilizers, lawn clippings, sewage, litter, and more. A popular misconception by average citizens is that stormwater is treated by the 'City.' This is not true. Stormwater is not sent to wastewater treatment plants, and instead flows into larger and larger stormwater systems and then into the bayou, untreated. What we do on the land ends up in the bayou. A watershed approach is a holistic way to deal with all the land-based factors that impact stormwater before it flows in to the bayou.

## The Highland & Marchand Bayous Watershed

The Highland Bayou and Marchand Bayou watershed are located in Galveston County's southern mainland. Marchand Bayou is a tributary that flows into Highland Bayou, which then drains into Jones Bay and the West Bay of Galveston Bay (Map-1). The Highland and Marchand bayous watershed covers almost 23 square miles of land, and are the focus of this WPP. Marchand and Highland Bayous are referred to in this plan as 'Highland Bayou' or the 'Highland Bayou Watershed,' or simply the *watershed*. Both bayous are listed by TCEQ for water quality impairments from high bacteria levels and low dissolved oxygen (DO) levels- these issues are the focus of this plan.



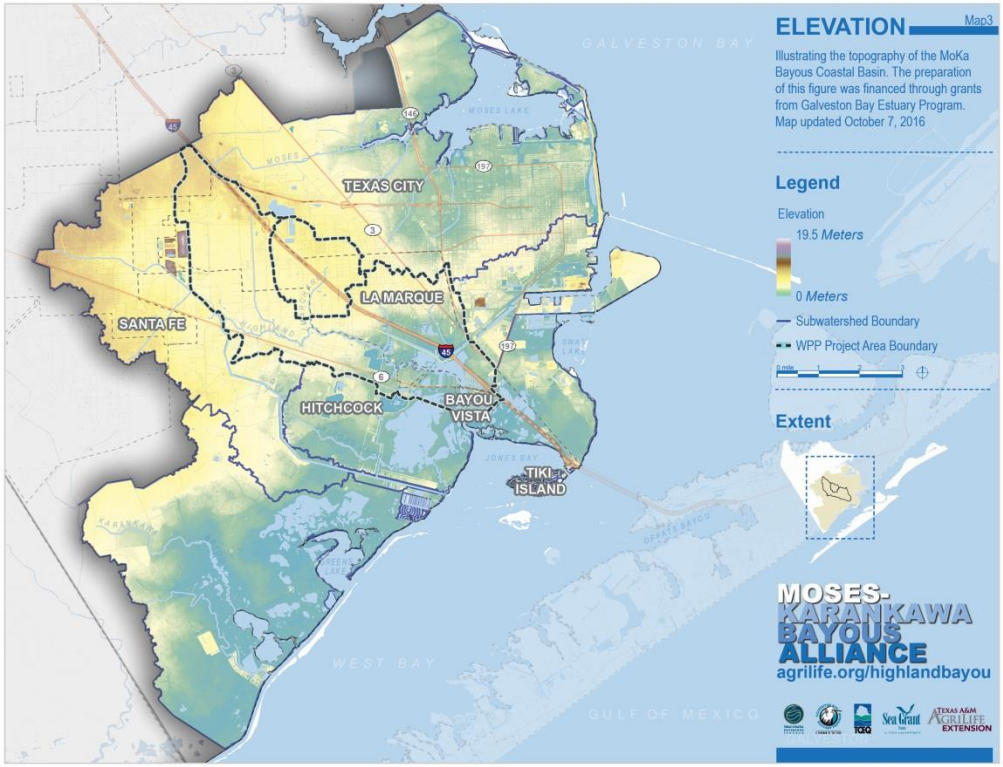

**Map- 1. (Above) Base Map of the Project Area**




**Map- 2. (Above) Coastal Basin Map Highland, Marchand, and Surrounding Bayou Watersheds**

Highland and Marchand Bayous are part of a larger *coastal basin*, a collection of separate, small bayous, each draining directly into Galveston Bay and West Bay. The coastal basin consists of Highland and Marchand Bayous, Moses Lake and Bayou, the Diversionary Canal, the Texas City Ship Channel, and the estuarial bayous of Campbell, Basford, Greens Lake, and Carancahua (alternatively spelled Karankawa) bayous. (Map-2) The coastal basin is referred to as the Moses-Karankawa coastal basin, or MoKa Bayous for short. The coastal basin is nearly 126 square miles in area in southern Galveston County. Most of the bayous in this basin are tidal or tidally influenced. Communities in the coastal basin include the cities of Santa Fe, Hitchcock, La Marque, Texas City, and Bayou Vista. The basin is bounded on the north by the Dickinson Bayou watershed and to the west by the Halls Bayou watershed. All of these watersheds drain into the Galveston Bay system.

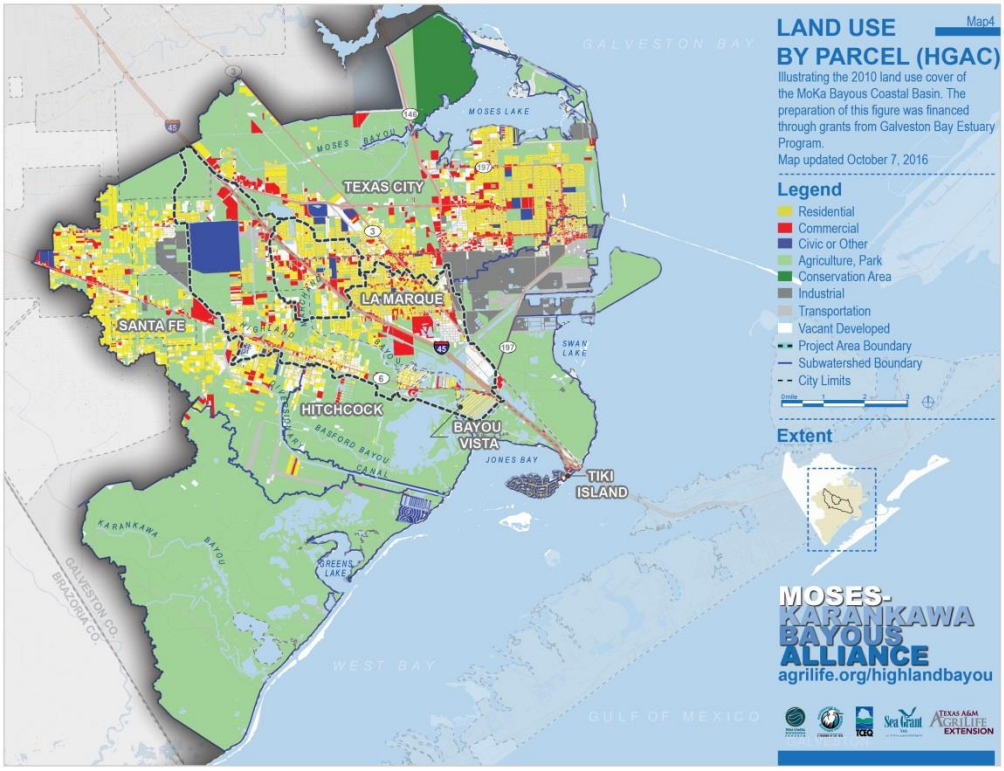
The Highland Bayou Watershed's boundaries have been altered by human activity. Historically, the headwaters of Highland Bayou were in Santa Fe. In the 1970's the Diversionary Canal was constructed, intercepting the headwaters of Highland Bayou at a point near Jack Brooks park, and diverting it southward through old Basford Bayou and into West Bay. These historical headwaters are now considered the Diversionary Canal watershed and are separate from the Highland Bayou Watershed. The diversion is visible on the coastal basin watershed map.




**Map- 3. Elevation Map**

Highland Bayou's original course below the interception point continues for approximately 7.5 miles through the communities of La Marque, Hitchcock, and Bayou Vista. Within the Highland Bayou

Watershed, the topography is flat (Map-3) and drained by a system of ditches and other drainage infrastructure maintained by the communities and Drainage District 2. Land in the study area is a mix of residential, industrial, and undeveloped lands, including farms, coastal prairies, wetlands and estuaries (Map- 4).




Map- 4. 2010 Parcel Land Use Map

In 2012, The Highland Bayou Watershed Characterization Report was prepared in anticipation of this WPP. The Report includes historical background about the habitats and communities in the basin. It includes summaries of physical and natural features in the watershed, along with observed and measured water quality conditions. The report also includes details about land development and demographic trends in the watershed. The report is available online at agrilife.org/highlandbayou.

## Elements of a Successful WPP

The following nine elements are identified by the US EPA as critical parts of a watershed protection plan to achieve water quality improvements. A Watershed Protection Plan must address these elements before it can be approved by the US EPA and thus be eligible for Clean Water Act section 319-funded projects (Environmental Protection Agency, 2008), along with other funding sources. All watershed protection plans are structured somewhat differently. The WPP planning team made a conscious decision early in the process to follow the sequence of the 9 Element Plan. This WPP and its sections are structured as follows:

**Element A. Identify Causes and Sources of Impairment**

Identify the causes of impairment and pollutant sources or groups of similar sources that need to be controlled to achieve needed load reductions. Sources that need to be controlled should be identified at the significant subcategory level along with estimates of the extent to which they are present in the watershed.

**Element B. Expected Load Reductions**

Estimate load reductions expected from management measures.

**Element C. Proposed Management Measures**

Describe the nonpoint source management measures that will need to be implemented to achieve load reductions, and include a description of the critical areas in which those measures will be needed to implement this plan. Management measures are referred to as Action Areas (AA) in this WPP.

**Element D. Technical and Financial Assistance Needs**

Estimate the amount of technical and financial assistance, associated costs, and authorities that will be relied upon to implement this plan.

**Element E. Information, Education, and Public Participation**

Include an information and education component to enhance public understanding of the project and encourage their early and continued participation in selecting, designing, and implementing the nonpoint source management measures that will be implemented.

**Element F. Implementation Schedule**

Prepare a schedule for implementing the nonpoint source management measures identified in this plan that is reasonably expeditious. For this plan, a 10 year time horizon is used for load reduction estimates.

**Element G. Milestones**

Prepare interim measureable milestones for determining whether nonpoint source management measures or other control actions are being implemented.

**Element H. Load Reduction and Evaluation Criteria**

Set forth water quality or other environmental criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made toward attaining water quality standards.

**Element I. Monitoring**

Propose a monitoring component to evaluate the effectiveness of the implementation efforts over time, measured against the criteria established under item H. above.

## Project Team: Lead Entity & Sponsor Agency

*Project Lead Entity:* The Texas Coastal Watershed Program (TCWP) is the project lead. TCWP is a Texas A&M University program housed within Texas AgriLife Extension Service and Texas Sea Grant. As lead entity, TCWP is responsible for the development and delivery of the Watershed Protection Plan and the coordination of public events and stakeholder involvement. All meetings in the work plan were held and conducted by TCWP and its staff.

*Sponsor Agency:* GBEP is a program of the TCEQ, is the sponsoring agency and administers the funds for the WPP. TCWP works in partnership with GBEP to inform them of the project's status through personal communications and progress reports. GBEP is also a potential partner on projects in the watershed and whose mission is to promote environmental awareness in the region and support projects that have a positive impact on water quality.

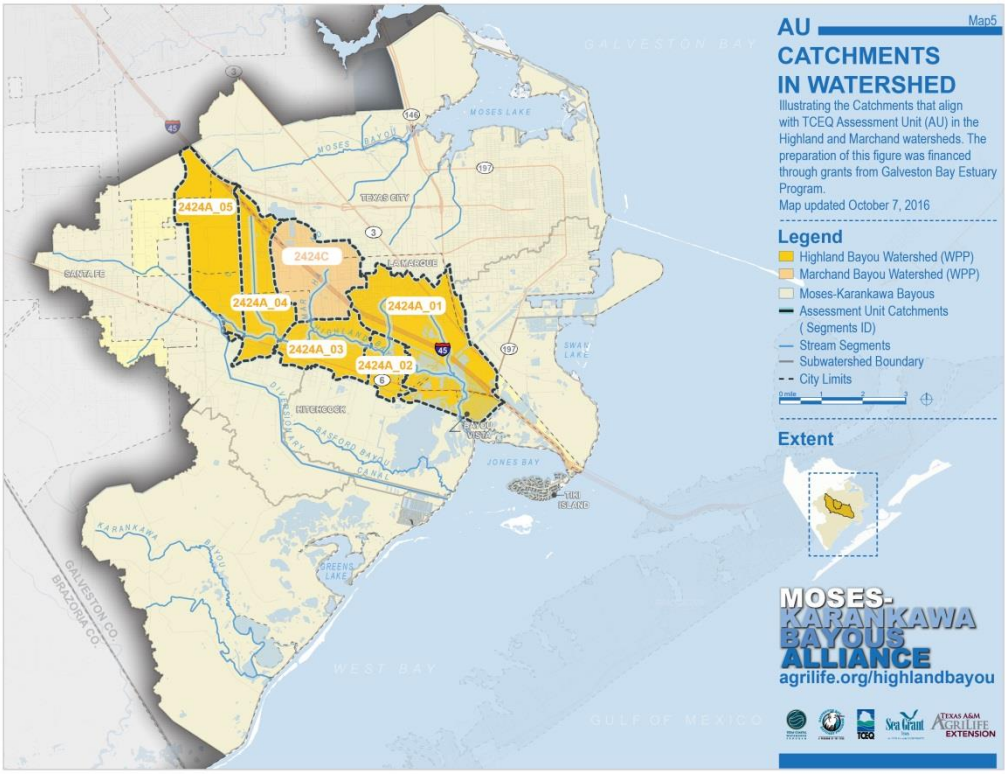
## Highland Bayou Stakeholder Working Group

This plan would not be possible without the stakeholder working group. The working roup was established with community stakeholders, regional organizations, and state agencies. Details of this process are included in Element E. Stakeholder outreach activities targeted municipal and county staff and officials, resource agencies, and private citizens. The ad hoc group was charged with identifying and sharing their concerns along with specific projects and project ideas. These activities were facilitated by the project team to support the development of this plan's objectives and goals. Nine workgroup meetings were held at the Galveston County Extension Office in La Marque from 2015-2016 to support the development of the watershed protection plan.

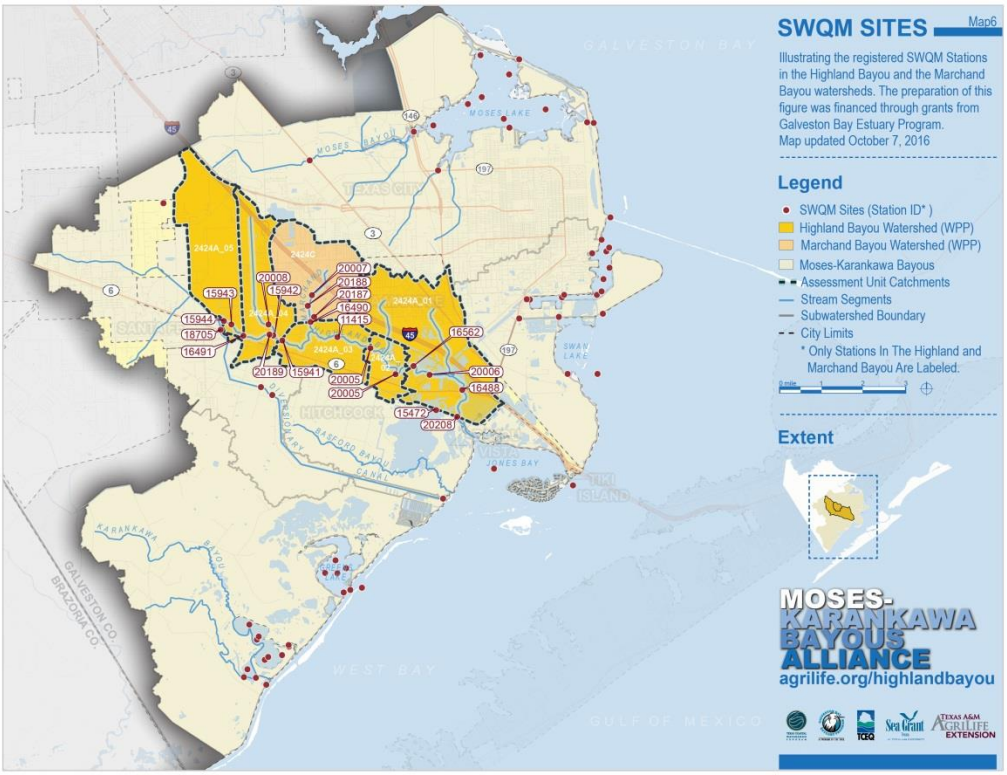
## Regulatory Standards and Water Quality

### Stream Segments and TCEQ Designation

How does the State of Texas classify these watersheds? All major waterbodies in Texas are classified by TCEQ into basins and segments. Both bayous are in Basin 24, 'Bays and Estuaries,' which includes all Texas bayous and inland surface waters that are tidally influenced through the Gulf of Mexico. The basin is dived into subbasin 2424, the West Bay subbasin. The TCEQ segment IDs are numbered using the subbasin id for Highland and Marchand Bayous, 2424A and 2424C, respectively. The segments are further divided by TCEQ into assessment units (AUs). AUs for Highland and Marchand Bayous are listed in Table 1 below. AUs are the smallest unit of analysis TCEQ uses for water quality issues in the watershed. All AUs are classified as tidally influenced by TCEQ. The catchment areas defined by these AUs are depicted in Map-5.




Map-5. Catchments that Align with TCEQ Assessment Units




Map- 6. Registered SWQM Stations and Assessment Units in the Watershed

**Table 1: Assessment Unit and Locations for Highland and Marchand Bayou Segments**

| Assessment Unit | Location Description |
|---|---|
| **Highland Bayou 2424A_01** | From the Jones Bay confluence upstream to Bayou Lane |
| **Highland Bayou 2424A_02** | From Bayou Lane upstream to Lake Road |
| **Highland Bayou 2424A_03** | From Lake Road upstream to FM 519 |
| **Highland Bayou 2424A_04** | From FM 519 upstream to FM 2004 |
| **Highland Bayou 2424A_05** | From FM 2004 to the headwaters just west of FM 1764 |
| **Marchand Bayou 2424C_01** | From Highland Bayou confluence 0.72 km (0.45 mi) north of IH-45 |

Each segment is assigned a designated use and a water quality standard associated with that use. The primary use for waterways in the watershed is primary contact recreation, the most stringent use class after drinking water sources. TCEQ assesses water quality in each segment using the standards and methods described in the *2010 Guidance for Assessing and Reporting Surface Water Quality* (SWQ) *in Texas* (Texas Commission on Environmental Quality, 2010a). When an evaluation of water quality samples results in a set number of exceedances, the agency determines that the segment has failed particular water quality standards. Water quality assessments are based upon a rolling 7-year period, and it is updated every two years. The latest assessment was released in 2014. Water quality sampling events must be taken from at least two years, and no more than two-thirds of the samples can be assessed from any one year. A minimum of ten samples are needed to calculate a use attainment, although smaller sample sizes can be considered.

### 303(d) Listing

The federal Clean Water Act (CWA) requires that states identify and list segments that do not attain their designated water quality standards. The name '303(d)' refers to the section of the Federal CWA that describes the process states must use to list impaired waterways. TCEQ publishes the Texas 303(d) list in the *2014 Texas Integrated Report - Texas 303(d) List*. Segments on the list are identified by the segment ID, the type of impairment, and the pollutant resulting in the impairment. Highland and Marchand bayous are currently listed on the 303(d) list of impaired waters, and this is the impetus behind the funding for this WPP. According to the 2014 Texas Integrated Report, Highland Bayou (2424A)—AUs 2-5—have been listed on the 303(d) list since 2002. Marchand Bayou (2424C_01) was also first listed in 2002. Highland Bayou segment 2424A_01 is listed as 'concerned' for low DO. The reason for the listing is depressed levels of DO and elevated levels of bacteria. The listed causes for the impairment are 'NPS' (EPA code 141) and 'Urban Runoff/Storm Sewers' (EPA code 177), and 'Source Unknown' (EPA code 140).

Table 2 summarizes the analyses done by TCEQ to justify the 303(d) listing of Highland and Marchand Bayous in the *2014 Texas Integrated Report*. 'Assessed' refers to the number of samples assessed. The table indicates a significant number of exceedances for bacteria, in particular *Enterococcus*. The inland segments generally have more exceedances than those downstream towards Jones Bay.

**Table 2: Assessment by Parameter for each Assessment Unit**

| Assessment Unit | | DO (grab screening) | DO (grab minimum) | DO (24hr average) | DO (24hr minimum) | *Enterococcus* (single) | *Enterococcus* (geomean) | Nitrate | Ammonia | Orthophosphorus | Total Phosphorus | Chlorophyll-a |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Criteria** | | 4 | 3 | 4 | 3 | 89 | 35 | 1.1 | 0.46 | 0.46 | 0.66 | 21 |
| **Highland Bayou** | | | | | | | | | | | | |
| **2424A_01** | Assessed | 70 | 70 | 5 | 5 | 72 | 72 | 38 | 35 | 29 | 35 | 19 |
| | Exceedances | 8 | 1 | 0 | 1 | 11 | -- | 0 | 0 | 0 | 1 | 2 |
| | Mean exceedance | 3.5 | 1.9 | -- | 2.3 | 2670.18 | -- | -- | -- | -- | 8.28 | 25.5 |
| **2424A_02** | Assessed | 31 | 31 | 6 | 6 | 27 | 27 | 17 | 16 | 7 | 13 | 5 |
| | Exceedances | 0 | 0 | 0 | 2 | 7 | -- | 0 | 0 | 0 | 1 | 5 |
| | Mean exceedance | -- | -- | -- | 2.25 | 810.86 | -- | -- | -- | -- | 10 | 35.6 |
| **2424A_03** | Assessed | 54 | 54 | 6 | 6 | 50 | 50 | 37 | 34 | 28 | 34 | 6 |
| | Exceedances | 8 | 3 | 1 | 2 | 18 | -- | 3 | 0 | 0 | 1 | 5 |
| | Mean exceedance | 2.83 | 1.7 | 2.6 | 1.85 | 1010.5 | -- | 2.08 | -- | -- | 1.89 | 40.4 |
| **2424A_04** | Assessed | 32 | 32 | na | na | 19 | 19 | 9 | 9 | 1 | 6 | na |
| | Exceedances | 6 | 2 | na | na | 9 | -- | 0 | 0 | 0 | 0 | na |
| | Mean exceedance | 3.13 | 2.85 | na | na | 1237 | -- | -- | -- | -- | -- | na |
| **2424A_05** | Assessed | 54 | 54 | 7 | 7 | 50 | 50 | 37 | 33 | 27 | 33 | 5 |
| | Exceedances | 26 | 19 | 7 | 7 | 37 | -- | 1 | 0 | 0 | 0 | 3 |
| | Mean exceedance | 2.13 | 1.66 | 2.17 | 1.07 | 527.68 | -- | 2.34 | -- | -- | -- | 34.67 |
| **Marchand Bayou** | | | | | | | | | | | | |
| **2424C_01** | Assessed | 68 | 68 | 7 | 7 | 36 | 36 | 38 | 28 | 34 | 34 | 6 |
| | Exceedances | 10 | 5 | 2 | 3 | 17 | -- | 0 | 0 | 0 | 0 | 2 |
| | Mean exceedance | 2.74 | 1.85 | 3.25 | 2.03 | 2132 | -- | -- | -- | -- | -- | 28.5 |

**"** – " No Value
NA – Not Assessed
DO – dissolved oxygen
Criteria – Value that the data is compared against to determine level of support.
Assessed - Number of samples assessed; some data are averaged, as with profile data, some are eliminated because criteria do not apply during certain conditions such as low flow.
Exceedances - The number of samples that exceed criteria for single sample, or binomial, methods (not averaged data).
Mean exceedance - The mean of the samples that exceeded criteria for the single sample, or binomial, methods (not averaged data).
Data Source - 2010 Texas Integrated Report

## Pollutant of Concern- Bacteria

Highland and Marchand Bayous are listed on the 303(d) list of impaired waters for high bacteria levels. Bacteria can enter the bayou from point sources like wastewater treatment plants and NPSs such as sewage collection systems, pet waste, urban runoff, and wildlife. These sources are described in more detail later in Element A. Bacteria usually enter waterways attached to sediment or other particles. Reductions in sediment loads could reduce bacteria loads.

High bacteria levels are a public health risk which can result in human sickness. The National Water Quality Inventory lists bacteria as the leading cause of water quality impairment in rivers and streams in the US (Environmental Protection Agency, 2000). Bacteria concentrations in stormwater samples from developed areas usually exceed limits for primary contact recreation. Bacterial infections occur through ingestion of water containing bacteria or via contact through cuts, the nose, eyes, and ears. Infections from waterborne bacteria can result in rashes, flu-like symptoms, nausea, diarrhea, vomiting, and gastroenteritis. In the elderly or infant populations with weakened immune systems, severe cases of bacterial infection can result in chronic illness and death. While no specific limit is a guarantee against infection, higher levels of bacteria increases the risk of infection.

There are many species of bacteria in contaminated water. Not all can be measured or counted. Water quality analysts test for certain bacteria species, referred to as *indicator bacteria*. The presence of indicator bacteria implies the presence of other bacteria in the water. In the case of tidally influenced waterways, the indicator *Enterococcus* bacterium is used. These bacteria are present in the intestines of warm-blooded animals and indicate the presence of human or animal waste in the water. *E. coli* is used as the fecal bacteria indicator in freshwater segments. All segments in Highland and Marchand Bayou are tidal segments, and *Enterococcus* is the indicator bacteria of concern.

Observed values for *Enterococcus* in Highland and Marchand bayous exceed Primary Contact Recreation limits established by TCEQ. Recreational uses include primary contact recreation such as swimming and other activities that have a high likelihood ingesting some water. Although exceedances were observed throughout the year, the highest values were observed during the warm season (April-October). There is also a clear trend of lower values as one travels downstream, likely due to greater mixing with tidal waters. The lowest values for Highland Bayou are at its confluence with Jones Bay, SWQM Station 16488, though exceedances have been observed there as well. The TCEQ limit for Primary Contact Recreation is 126 colony forming units (CFU) per 100 mL for *E. coli* in freshwater segments and 35 cfu per 100 mL for *Enterococcus* for saltwater segments (Texas Commission on Environmental Quality, 2010b)(Texas Administrative Code §307.7)

- Maximum *Enterococcus* counts on Highland Bayou ranged from 108 (stn. 16488) to 14,100 (stn. 16491) CFUs per 100mL for *Enterococcus*. Marchand Bayou's high value for *Enterococcus* was 3,200 CFU's per 100 mL.
- Maximum *E. coli* values on Highland Bayou range from 500 (stn. 16488) to 46,000 (stn 16491), and range from 20,000 (stn. 20007) to 24,000 (stn. 16490) CFU's per 100 mL for Marchand Bayou.

## Pollutants of Concern- Low Dissolved Oxygen and Nutrients

### Low Dissolved Oxygen

Oxygen levels are a measure of the overall health and the ability of waterways to support aquatic life. Low DO is not itself a pollutant, but it is correlated with excessive levels of nutrients and other pollutants. DO in water increases when aquatic plants and algae use sunlight and produce oxygen. Oxygenated water sustains other living organisms. For this reason, Texas regulatory limits for DO are defined as a standard

for *Aquatic Life Uses* (ALU). In healthy water quality conditions, DO concentrations should be between 7-10 milligrams per liter (mg/L), depending on the salinity and temperature. The minimum regulatory standard for DO in segments designated with a 'High' ALU is 4.0 mg/L for freshwater segments and 3.0 mg/L for saltwater segments. Below these levels, aquatic species are stressed and can die (discussion below).

From 2001-2011, water samples taken from Highland and Marchand bayou show that average values for DO are generally above standard minimums, ranging from 3.9-8.6 mg/L. However, there were numerous measurements of values below the standard minimum, ranging from 0.2-3.8 mg/L. DO impairments are most evident during the warm season months, while impairments during the cool season months are rare, measured once out of 133 cold season samples.

Fish kills are sudden die offs of large numbers of fish, and are observed or reported every year in the watershed. Many species of the Gulf fisheries spend phases of their life cycle in the bayous before migrating to Galveston Bay or the open waters of the Gulf. The water quality of the Bayous is tied to the health of fish populations along the Gulf Coast. Along the Upper Texas Coast, low DO is the most common cause for fish kills. Many aquatic organisms cannot survive when the oxygen levels fall below 2 mg/L for any significant period of time, and sensitive organisms or life stages cannot survive very long below 4 mg/l. TCEQ requires the DO level in a 24 hour period to be greater than 3mg/L and the average one day average value to be above 4 mg/L.

**Low Dissolved Oxygen Correlated to Nutrients and Other Phenomena**

It is highly likely that NPS is a factor explaining observed levels of oxygen. Nutrients including nitrates and phosphorous from a variety of activities and sources, including fertilizers, untreated sewage from Sanitary Sewer Overflow (SSO) discharges, organic decomposition, and even atmospheric deposition. Runoff rich in nutrients promotes the growth of algae and other plant life in the water. In turn, the eventual decay of the algae starts a chemical process that consumes oxygen from the water, resulting in a condition called eutrophication.

Evidence of these processes is seen in the water quality data analyzed in the 2012 Characterization Report, particularly through measurements for biological oxygen demand (BOD), chlorophyll-a, phosphorous, and nitrogen. For example, algal blooms, which can be observed as a milky green coloration in the water, is indicated as measurements of chlorophyll-a. Of 96 tests for chlorophyll-a, 27 tests showed values exceeding the state limit of 21 micrograms per liter (µg/L). Only three of those occurred during the cool weather season. Because algae uses phosphate as a growth nutrient, phosphate levels decline during summertime algae blooms and rebound during the cool season. This indicates that algae is consuming phosphorous nutrients in the water during the high growth season, lowering observed levels. Low algae growth in the cool season may explain the increase in measured phosphorous during the cool months.

*Ammonia.* Ammonia is very soluble in water. It is a primary and secondary plant nutrient, promoting excessive plant growth and eventual eutrophication of the waterway. Elevated levels of ammonia can interfere with fish health. Ammonia is produced in natural settings through decomposition of biological matter. Residential sources of ammonia are fertilizer and cleaning products.

*Nitrates*. Nitrate is a form of nitrogen usable by plant species. Nitrate can interfere with animal health by binding to blood and blocking the uptake of oxygen. In freshwater aquatic systems the limiting nutrient for plant growth is phosphorous, whereas in saline aquatic systems nitrate is the limiting nutrient. Algal blooms may occur at concentrations greater than 0.1 mg/L. Excessive nitrogen can promote plant and algal growth, resulting in eutrophic conditions, clogging of water channels, and lowered aesthetic quality. Sources from agriculture include animal waste, fertilizer, and irrigation return flows. Residential sources include septage, fertilizer, and pet waste. Industrial sources include water treatment plants and production activities relating to glass making, fertilizer, petrochemicals, and meat processing.

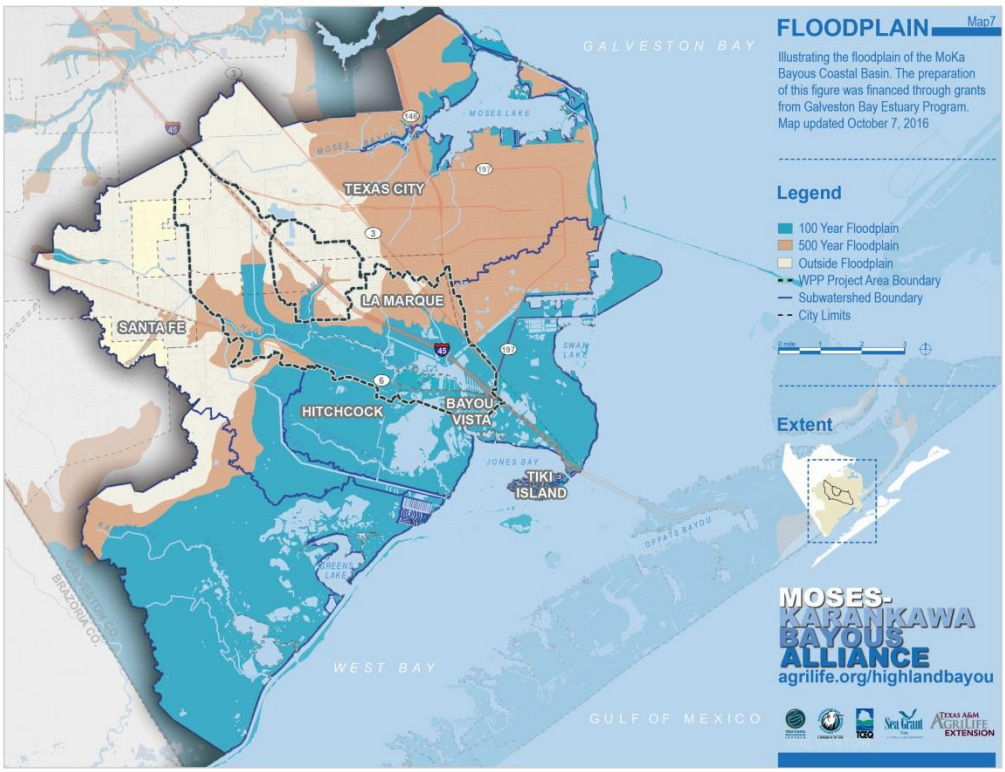
*Orthophosphate/Total Phosphorous.* Phosphorous is a commonly occurring element, and it can be found naturally in various chemical states and in combination with other elements. Orthophosphate refers to the water soluble form of phosphorous. Total phosphate includes organic P, precipitates, colloidal phosphorous, and phosphorus adsorbed to suspended solids and sediment. Soluble forms of phosphorous do not persist in the environment for much longer than five days, when they become incorporated into soil or taken up by plant life. There are several pathways for phosphorous to move through the environment, but phosphorous adsorption to the surfaces of suspended solids may account for a sizable portion of phosphorous transport. If soluble forms such as orthophosphate are measured in the environment, they are likely recent and indicate a nearby source, such as wastewater treatment plants, septic systems, and/or crops. Excessive phosphorous promotes excessive plant growth. Sources of phosphorous are fertilized fields and lawns, and domestic wastewater.

*Chlorophyll-a.* Chlorophyll is a green chemical compound found in algae and other plant life. It is the basic molecule in plant-based photosynthesis. The compound exists in several forms, but the most prevalent is chlorophyll-a. Its measurement in water provides a direct measure of phytoplankton in the water and provides a proxy measurement for other pollutants like nitrates and phosphorous. Excessive growth of algae can result in eutrophication and cause fish kills. High levels of chlorophyll can arise from anthropogenic sources of nitrogen and phosphorous.

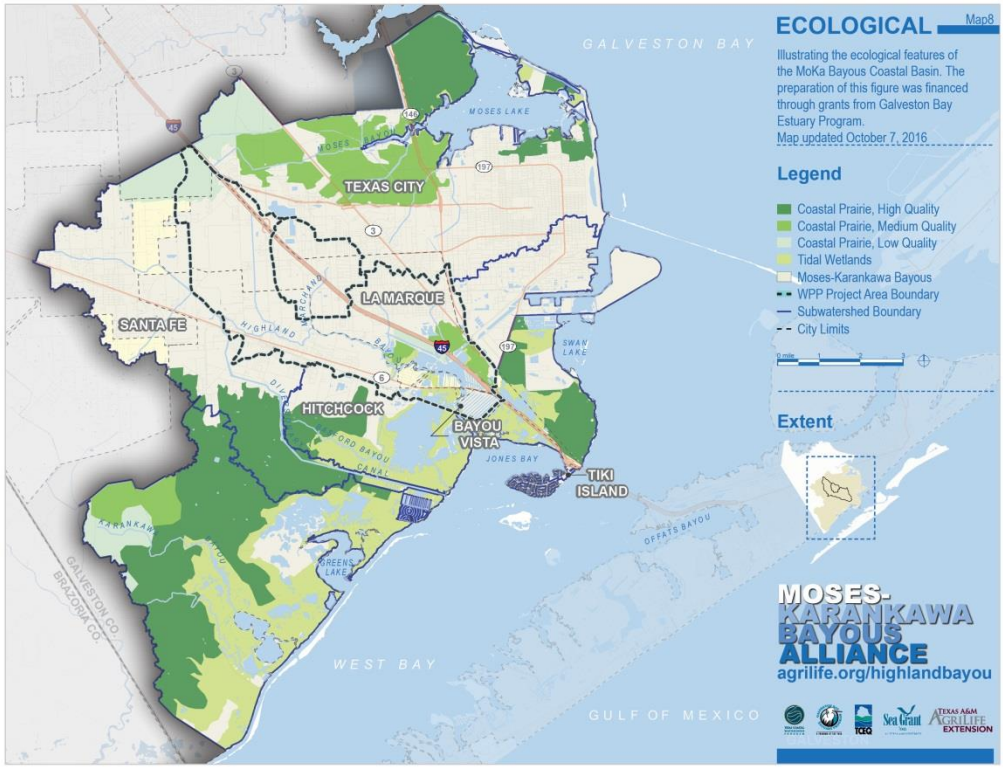
*Physical Conditions.* Levels of oxygen in the water are the result of several factors, but perhaps not all of them resulting from runoff. For example, cold water can hold more oxygen than warm water, a condition that can partially account for the seasonality of oxygen levels in the waterways. At the freezing point (0°C), fully saturated water can hold 14mg/L, a difference of 6.0 mg/L compared with what water can hold at 70°F (21°C), 8.0mg/L. Because Highland Bayou, like most coastal bayous, is a slow moving warm-water bayou, naturally depressed levels of DO might be the norm, although the 'normal' level in a bayou in its pristine state is not understood, and there is disagreement among experts about what that figure would be for waterways like Highland Bayou.

**Other Existing Conditions in the Bayou:**

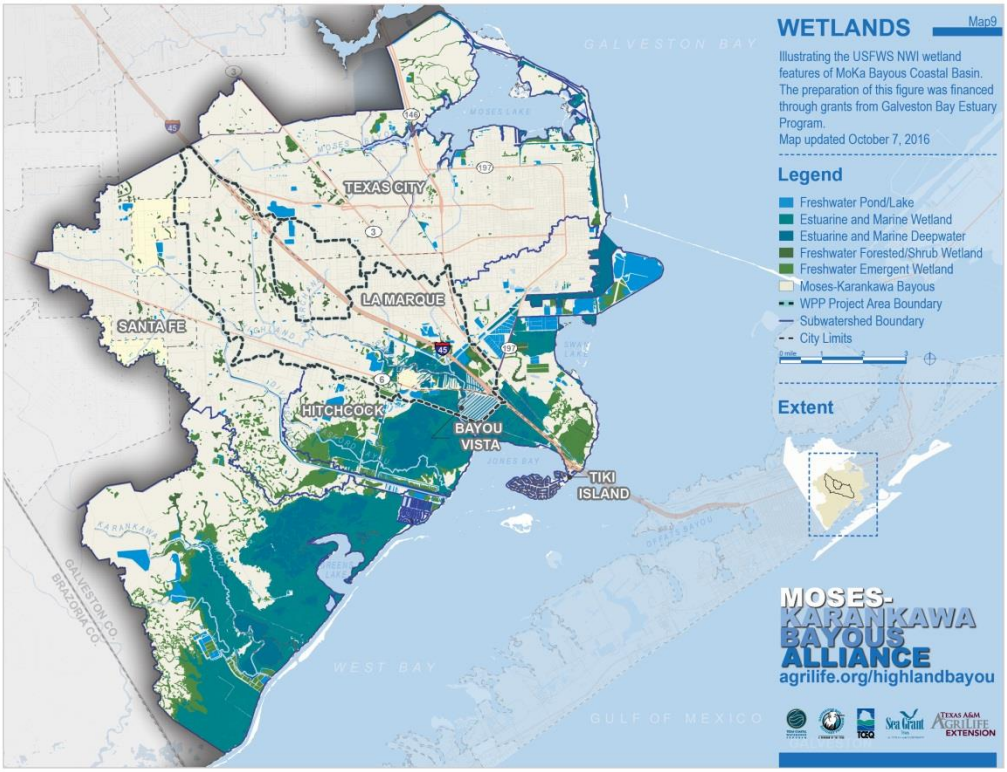
The following maps are included for informational purposes. The flood plain map (Map- 7) indicates the location of flood risk in the watershed. The Ecological map and the wetland map (Map- 8 & Map- 9) identifies the locations of medium and high quality prairies along with wetland areas, which may be candidate locations for conservation efforts. The final map is a population density map (Map- 10) showing areas of human settlement in the basin.



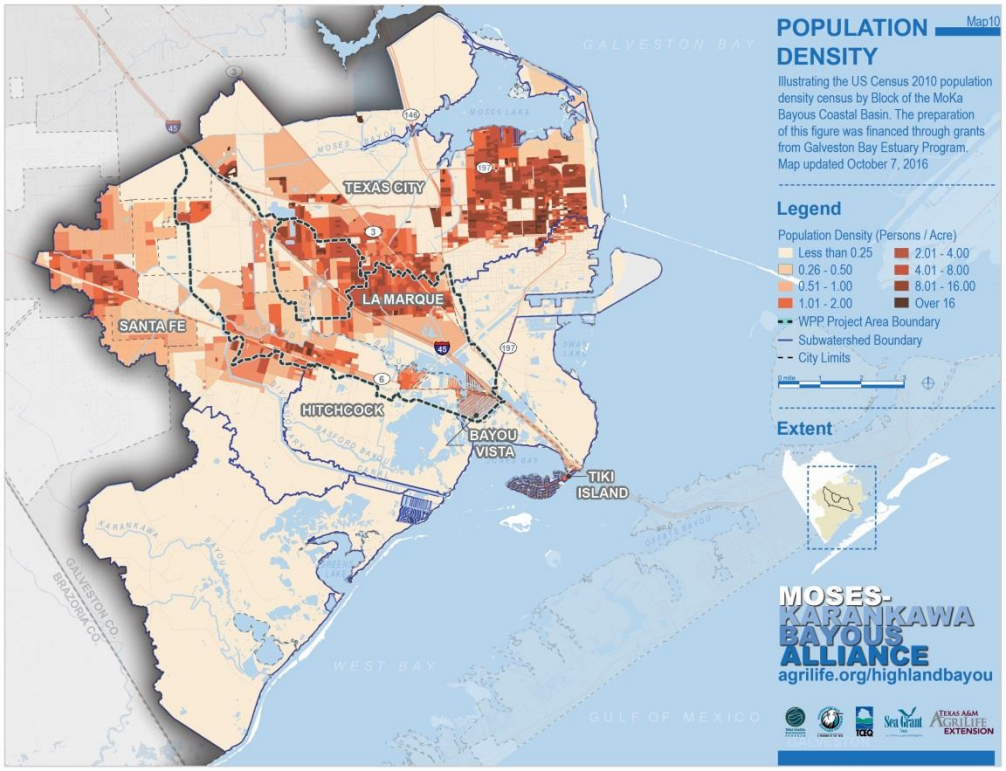

Map- 7. Floodplain within the MoKa Bayous Coastal Basin




Map- 8. Ecological Features of the MoKa Bayous Coastal Basin




**Map- 9. USFWS NWI Wetland Features of the MoKa Bayous Coastal Basin**




**Map- 10. US Census 2010 Population Density Census by Block of the MoKa Bayous Coastal Basin**