



**2019**

**Lower Neches River Basin &  
Neches-Trinity Coastal Basin**

**BASIN HIGHLIGHTS REPORT**

**PREPARED BY LOWER NECHES VALLEY AUTHORITY IN COOPERATION WITH THE  
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY**

**FINANCED THROUGH FUNDING FROM THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY**

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## Clean Rivers Program

### The Texas Clean Rivers Program

The Texas Clean Rivers Program was introduced in 1991 as a state-funded, non-regulatory program dedicated to developing a collaboration with local entities to help manage and improve water quality within each river basin in Texas. Lower Neches Valley Authority's Clean Rivers Program (CRP) is a partnership between the Texas Commission on Environmental Quality (TCEQ), Lower Neches Valley Authority (LNVA), and stakeholders working to assess, maintain, and improve the quality of surface waters within the Lower Neches Basin and Neches-Trinity Coastal Basin. The program uses a watershed management approach to identify and evaluate water quality issues, establish priorities for corrective action, and work to implement those actions. Specific goals for the program include: provide quality assured data to TCEQ for use in decision making, identify and evaluate water quality issues, promote cooperative watershed planning, recommend management strategies, inform and engage stakeholders, and maintain efficient use of public funds.

One of the ways used to inform stakeholders of Clean Rivers Program activities in their basin is by creating a Basin Highlights Report. The format for LNVA's 2019 Basin Highlights Report is a watershed characterization report. This type of report characterizes an impaired water body and includes information concerning the segment description including land use and natural characteristics, stream hydrology, the impairment the stream is listed for and potential causes, stakeholders that are impacted, and recommendations for improving the water quality.

After summarizing LNVA's Clean Rivers Program and its activities over the last year, this watershed characterization report will address the impairments of Segment 0607 Pine Island Bayou.

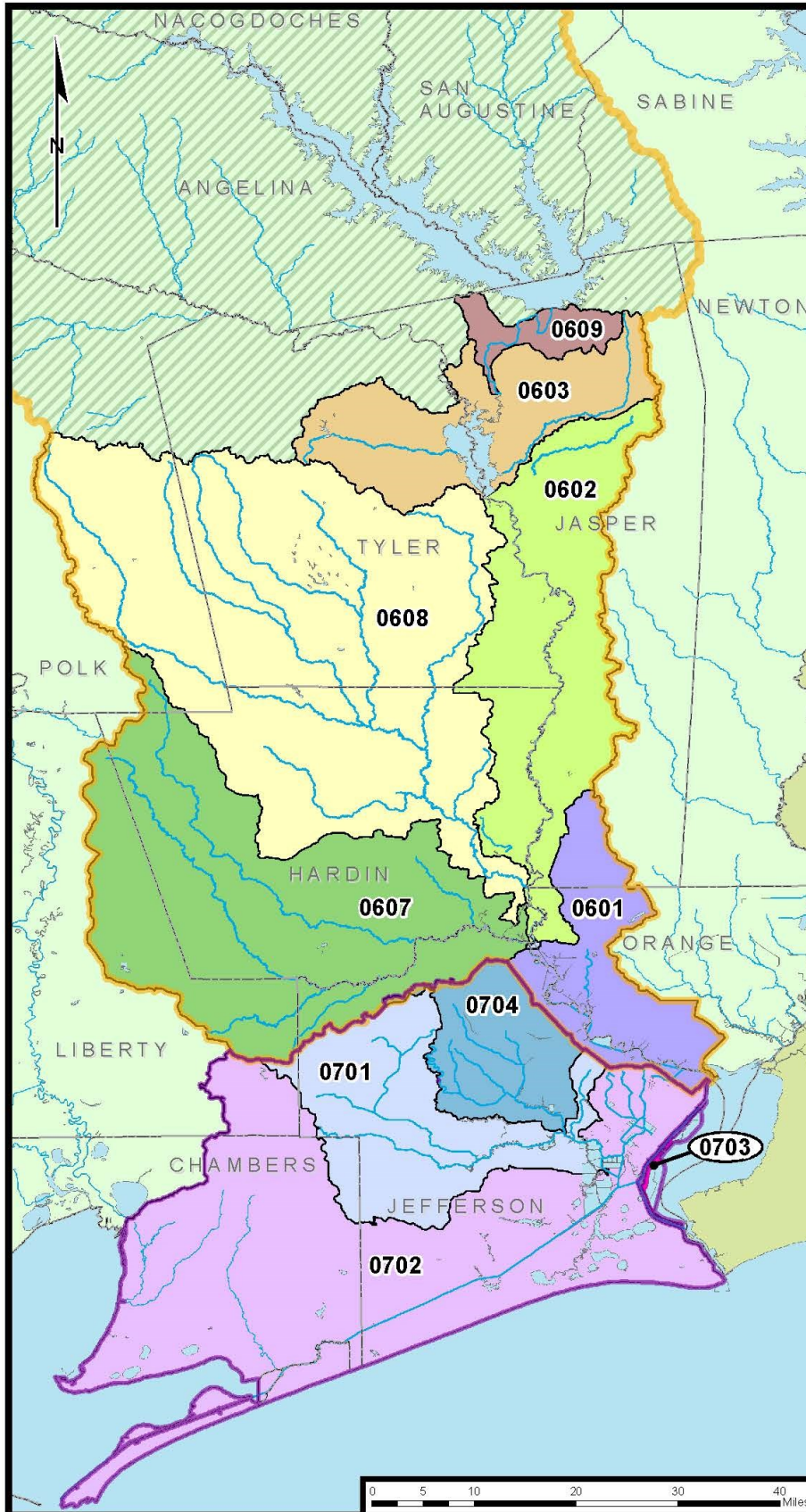
### LNVA's Basin-Wide Monitoring Program

LNVA's basin-wide CRP monitoring program includes 23 routine stations in the Lower Neches River Basin. Three of these stations are located on Lake Sam Rayburn. The other 20 stations are located in the Village Creek, Pine Island Bayou, B.A.Steinhausen, and Angelina River stream segments.

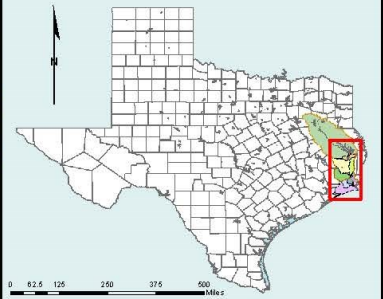
TCEQ Region 10 in Beaumont is monitoring 19 stations in the Lower Neches River and Neches-Trinity Coastal Basins. These segments include Pine Island Bayou, the Neches River Tidal, Star Lake Canal, the lower Neches river above tidal, Taylor Bayou above tidal, Intracoastal waterway tidal, Sabine-Neches canal, and Hillebrandt Bayou.

The Coordinated Monitoring Schedule (CMS) website at <https://cms.lcra.org> provides detailed information about each of these stations on the monitoring schedule including maps of the locations of each site. See the map on page 4 for the segments that LNVA currently monitors. A map of current sampling locations in the Pine Island Bayou Watershed can be found on page 13. Six routine stations are monitored by LNVA on Pine Island Bayou on a quarterly basis, and one station is monitored by TCEQ Region 10 on Boggy Creek. Boggy Creek is a tributary of Pine Island Bayou from the confluence of Pine Island Bayou south of Lumberton in Hardin County to the upstream perennial portion of the stream west of Lumberton in Hardin County.

# LNVA Assessment Area Map



**LNVA ASSESSMENT AREA SITE MAP**



**LNVA ASSESSMENT AREA**

- SEGMENT NUMBER: 0609**  
Angelina River below Sam Rayburn Reservoir
- SEGMENT NUMBER: 0603**  
B. A. Steinhagen Lake
- SEGMENT NUMBER: 0608**  
Village Creek
- SEGMENT NUMBER: 0602**  
Neches River below B.A. Steinhagen Lake
- SEGMENT NUMBER: 0607**  
Pine Island Bayou
- SEGMENT NUMBER: 0601**  
Neches River Tidal
- SEGMENT NUMBER: 0704**  
Hillebrandt Bayou
- SEGMENT NUMBER: 0701**  
Taylor Bayou above Tidal
- SEGMENT NUMBER: 0702**  
Intracoastal Waterway Tidal
- SEGMENT NUMBER: 0703**  
Sabine/Neches Canal Tidal

**ANRA ASSESSMENT AREA**



**BASINS**

- Neches River Basin
- Neches-Trinity Coastal Basin

**HYDROLOGY**

- Classified Segments
- Other Hydrology

## LNVA CRP Monitoring Parameters

### LNVA CRP Parameters

The following is a list of the Clean Rivers Program sampling parameters by type. The types are field, conventional, and bacteria. LNVA currently samples four times per year at each of its monitoring stations for the parameters listed. They are not all inclusive and may vary by sample site.

#### Field Parameters

- ◆ Dissolved oxygen—mg/L and % saturation
- ◆ Temperature
- ◆ Specific conductance
- ◆ pH
- ◆ Salinity (tidal waters only)
- ◆ Secchi-disk transparency
- ◆ Days since last precipitation (significant enough to influence water quality)
- ◆ Flow severity (freshwater streams and rivers)
- ◆ Flow Method (gage, electric, mechanical, weir, doppler)
- ◆ Stream discharge (freshwater streams and rivers)
- ◆ Method of stream discharge measurement (freshwater streams and rivers)

#### Conventional Parameters

- ◆ Total Alkalinity
- ◆ Sulfate
- ◆ Chloride
- ◆ Total Hardness
- ◆ Total Suspended Solids
- ◆ Turbidity
- ◆ Ammonia
- ◆ Nitrate + Nitrite
- ◆ Total Phosphorus

#### Bacteria

- ◆ *E. coli* (freshwater streams and rivers)
- ◆ Enterococcus (tidal waters only)

## LNVA CRP Basin Highlights 2018-2019

### Incorporating Panoramic Photography into LNVA's Monitoring Program

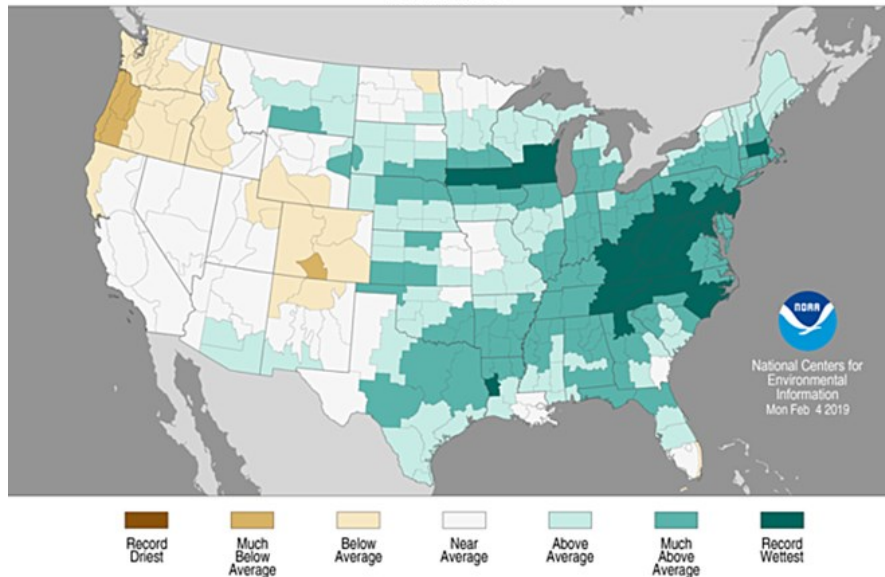


In October 2018, LNVA acquired a PANONO camera for generating panoramic photos. The PANONO contains 36 individual cameras to produce 360° x 360° images at 108 megapixels with just one click. These images allow for an enhanced viewing experience as compared to traditional photographs. Traditional panoramic photography requires photos to be stitched together. The PANONO does this automatically. When viewed on a computer, there is a virtual reality effect giving the viewer a sense of being immersed in the photo landscape. Traditionally, CRP staff relied on field notes and snapshot photography of the sample locations. The PANONO will allow them the ability to view the sampling site as if they are there in person in real time. These photos can be used for reference when data and field notes are entered into LNVA's Laboratory Information Management System prior to submittal to TCEQ's Surface Water Quality Information System. In the future, these photographs of monitoring locations may be accessible through LNVA's web page.

### Above Average Precipitation Totals in the Basin

Rainfall totals for 2018 and into 2019 were well above normal, according to information from the National Weather Service. Beaumont reported over 88.7 inches of rain for the 2018 calendar year, 28 inches over the typical year average. The image provided by the National Oceanic and Atmospheric Association (NOAA) shows National Precipitation Rankings from February 2018 through January 2019.

Divisional Precipitation Ranks  
February 2018–January 2019  
Period: 1895–2019



## LNVA CRP Basin Highlights 2018-2019 (continued)

### Flood Events in the Basin

Due to heavy rainfall north of the lower Neches Basin during the month of January 2019, the Neches River, as well as Pine Island Bayou, experienced flood conditions. According to USGS site 08041780-gage height data, the Neches River at the Saltwater Barrier crested January 8, 2019 at 8.46 feet. Anytime the Neches River elevation at the Salt Water Barrier exceeds 4.0 feet, the barrier is considered to be operating in flood mode. If the river elevation gets to 6.5 feet, the City of Beaumont is notified that the access road to the barrier is forecast to be flooded and the road is then closed to the public. During the first couple of weeks of January, LNVA staff were able to get to the Saltwater Barrier in LNVA fleet trucks. There have been times in previous flood conditions that staff has had to come in by boat. Pine Island Bayou near Sour Lake reaches flood stage at 25 feet. During this event in early January, the flood stage averaged around 27 feet. Pine Island Bayou above the BI Pumping Plant reaches flood stage at 11 feet. It crested at 11.9 feet during this January event.



**The three pictures above show the water over the access road at the Saltwater Barrier on the Neches River in early January 2019.**

## Public Outreach and Stakeholder Participation

### Public Outreach and Education

LNVA supports a dedicated group of volunteer monitors in the basin. As a partner in Texas Stream Team, LNVA provides water quality testing kits, supplies, and reagents to trained volunteers who are students, teachers, concerned citizens, and environmental stewards. Additional information about Texas Stream Team and how to get involved in the program is available on their website at the following link: <http://txstreamteam.meadowscenter.txstate.edu/>. LNVA staff attended a stream team training event at Texas State University: The Meadows Center for Water and the Environment in January 2019. LNVA staff received certification to train and recruit local Citizen Scientists interested in performing Core Water Quality Parameter Monitoring. Parameters include; temperature, field observations, conductivity, pH and dissolved oxygen.

Throughout 2018 and 2019, LNVA staff has presented information about the Clean Rivers Program at a number of different venues and events. In September 2018, LNVA staff presented CRP information to students at Lamar University. This provided an opportunity for local college students to learn about the Clean Rivers Program and LNVA employment opportunities. In January 2019, LNVA staff presented CRP and Texas Stream Team information to the Texas Master Naturalists' Sabine Neches Chapter in an effort to recruit members to undergo becoming local Certified Citizen Scientist. LNVA staff were presenters at the 2019 Neches River Festival that targets high school seniors to be more aware of how important water resources are to the area. In April 2019, LNVA staff provided a tour of the Salt Water Barrier Laboratory to Lamar University Biology students.

LNVA is a sponsor of the Major Rivers curriculum which is designed to help 4th and 5th grade students learn about the major water resources in Texas, how water is treated and delivered to their homes and schools, and how to care for water resources and use them wisely.

### Stakeholder Participation and LNVA's Steering Committee

LNVA's stakeholder participation process includes the basin steering committee. The steering committee consists of stakeholders representing local industry and municipalities, state and federal agencies, tribal groups, environmental groups, and the general public. A diverse basin-wide CRP steering committee insures that the different interests and priorities of each watershed are represented. The objectives of the committee are to assist with the creation of realistic water quality objectives and basin priorities, review basin water quality reports and recommended actions, and the establish monitoring priorities. Members are encouraged to voice any local or regional concerns they may have, as well as to consider the interests of the basin as a whole. LNVA recently reached out to area organizations to expand the current membership of this committee to ensure the needs of the entire basin are being met.

For more information on LNVA's CRP Steering Committee and how to become involved, please contact Jeannie Bowlen at LNVA, (409) 892-4011.



## Public Outreach and the Texas Integrated Report

### LNVA Website Updates

LNVA's web page provides an overview of the CRP statewide water quality program, and includes LNVA Basin Reports, Quality Assurance documents, Steering Committee Meeting minutes, and links to websites such as the Texas Stream Team Volunteer Monitoring Program and the TCEQ Surface Water Quality Data Viewer. It also includes a link to the Southeast Texas Regional Alerting & Information Network (SE Texas R.A.I.N.). This site was created by a cooperative of government agencies after Hurricane Harvey as a public service to provide information necessary to help make important decisions during threatening weather conditions. It displays rainfall, stream flow, and water levels in major streams, bayous, and reservoirs. The information is compiled from United States Geological Survey and the National Weather Service. To learn more about SE Texas R.A.I.N., LNVA and the Clean Rivers Program, please visit our website at:

<http://www.LNVA.dst.tx.us/>

### Texas Integrated Report

In order to determine monitoring priorities within the lower Neches basin, LNVA references the Texas Integrated Report of Surface Water Quality, which describes the status of the state's waters, as required by Sections 305(b) and 303(d) of the federal Clean Water Act. It summarizes the condition of the state's surface waters, including concerns for public health, quality for support of aquatic species and other wildlife, and specific pollutants and their possible sources. The Integrated Report consists of the Texas Water Quality Inventory and 303(d) List of impaired water bodies based on historical water quality data. TCEQ includes data collected during the most recent seven-year period. However, if needed, up to ten years of data are included to attain a minimum number of samples for assessment.

State water quality assessment reports are completed every two years, in even numbered years. They are generated by TCEQ and must be approved by the Environmental Protection Agency (EPA). The 2014 Texas Integrated Report is the most recent version approved by EPA. It was approved on November 19, 2015.

The draft 2016 version of the Texas Integrated Report is currently under review by the EPA and can be found at <https://www.tceq.texas.gov/waterquality/assessment/16twqi/16txir>. The draft 2016 Texas 303(d) List was adopted and approved for submission to the EPA by the TCEQ on October 17, 2018.

Water bodies that are included on the 303(d) List are not meeting current water quality standards and therefore do not support their designated uses. The Texas Surface Water Quality Standards (TSWQS) are state rules (Texas Administrative Code, Title 30, Chapter 307) written and adopted by the TCEQ under authority of the Clean Water Act. The Standards establish goals for the quality of streams, lakes, and bays throughout Texas. They also identify appropriate uses for the states' surface waters that include aquatic life, contact or non-contact recreation, and source of public water supply. Water bodies may have concerns for use attainment and established screening levels which is part of the Texas Integrated Report.

Pages 10-11 has a complete list of all of the current impairments listed in the 2014 Texas Integrated Report in the stream segments in the Lower Neches and Neches Trinity-Coastal Basins.

## Current Impairments in the Lower Neches and Neches-Trinity Coastal Basins

| Segment # | Segment Name                       | Impairment  | Reason for Impairment   |
|-----------|------------------------------------|---|---|
| 0601      | Neches River Tidal                 | Not support contact recreation use due to bacteria in Neches River Tidal          | Source Unknown  |
|           |                                    | Not supporting fish consumption due to polychlorinated biphenyls in edible tissue | Source Unknown  |
|           |                                    | Concern for aquatic life use due to malathion (lower segment only)                | Source Unknown  |
| 0601A     | Star Lake Canal                    | Not supporting contact recreation use due to bacteria                             | Source Unknown  |
|           |                                    | Concern for aquatic life use due to malathion                                     | Source Unknown  |
| 0602      | Neches River below B.A. Steinhagen | Not supporting fish consumption use due to mercury and dioxins in edible tissue   | Atmospheric Deposition-Toxics; Industrial Point Source Discharge;   |
|           |                                    | Concern for mercury in edible tissue  | Source Unknown  |
| 0603      | B.A. Steinhagen                    | Not supporting fish consumption use due to mercury and dioxins in edible tissue   | Atmospheric Deposition-Toxics; Industrial Point Source Discharge; Other Unknown Source  |
| 0603A     | Sandy Creek                        | Not supporting contact recreation use due to bacteria                             | Non point source-Agriculture and Grazing in Riparian Zone or Shoreline  |
| 0603B     | Wolf Creek                         | Not supporting contact recreation use due to bacteria                             | Non point source-Agriculture and Livestock Grazing or Feeding Operations  |
| 0607      | Pine Island Bayou                  | Not supporting aquatic life use due to depressed dissolved oxygen                 | Natural Conditions-Water Quality Standards Use Attainability Analyses Needed; Natural Sources   |
|           |                                    | Not supporting contact recreation use due to bacteria                             | Source Unknown  |
| 0607A     | Boggy Creek                        | Not supporting aquatic life use due to depressed dissolved oxygen                 | Natural Conditions-Water Quality Standards Use Attainability Analyses Needed; Natural Sources; Streambank Modifications/destabilization; Unknown Source |
|           |                                    | Concern for impaired habitat in Boggy Creek                                       | Non Point Source-Loss of Riparian Habitat   |
| 0607B     | Little Pine Island Bayou           | Not supporting aquatic life use due to depressed dissolved oxygen                 | Natural Conditions-Water Quality Standards Use Attainability Analyses Needed; Natural Sources; Source Unknown   |
| 0607C     | Willow Creek                       | Not supporting aquatic life use due to depressed dissolved oxygen                 | Natural Conditions-Water Quality Standards Use Attainability Analyses Needed; Natural Sources; Source Unknown   |
| 0608      | Village Creek                      | Not supporting fish consumption use due to mercury in edible tissue               | Atmospheric Deposition-Toxics; Natural Sources; Unknown Source  |

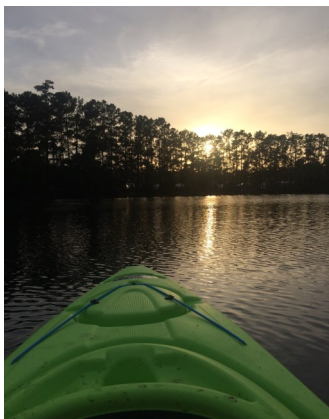
## Current Impairments in the Lower Neches and Neches-Trinity Coastal Basins

|       |  |  |  |
|-------|--|--|--|
| 0608A | Beech Creek                                | Not supporting aquatic life use due to elevated copper                               | Source Unknown   |
|       |  | Concern for impaired habitat   | Source Unknown   |
| 0608B | Big Sandy Creek                            | Not supporting contact recreation use due to bacteria                                | Source Unknown   |
| 0608C | Cypress Creek                              | Not supporting aquatic life use due to depressed dissolved oxygen                    | Natural Conditions-Water Quality Standards Use Attainability Analyses Needed; Source Unknown                               |
|       |  | Concern for impaired habitat   | Source Unknown   |
| 0608E | Mill Creek                                 | Not supporting aquatic life use due to depressed dissolved oxygen                    | Natural Sources; Industrial Point Source Discharge; Municipal Point Source Discharge                                       |
| 0608F | Turkey Creek                               | Not supporting contact recreation use due to bacteria                                | Non point source-Agriculture and Livestock Grazing or Feeding Operations   |
| 0608G | Lake Kimball                               | Not supporting fish consumption use due to mercury in edible tissue                  | Atmospheric Deposition-Toxics; Unknown Source  |
| 0609  | Angelina River below Sam Rayburn Reservoir | Not supporting fish consumption use due to mercury and dioxins in edible tissue      | Atmospheric Deposition-Toxics; Industrial Point Source Discharge; Source Unknown   |
| 0701  | Taylor Bayou Above Tidal                   | Not supporting aquatic life use due to depressed dissolved oxygen                    | Natural Conditions-Water Quality Standards Use Attainability Analyses Needed; Natural Sources; Source Unknown              |
|       |  | Concern for chlorophyll-a  | Source Unknown   |
| 0701D | Shallow Prong Lake                         | Concern for arsenic in edible tissue   | Source Unknown   |
| 0702  | Intracoastal Waterway Tidal                | Not supporting contact recreation use due to bacteria                                | Non-Point Source; Source Unknown   |
|       |  | Not supporting fish consumption due to polychlorinated biphenyls in edible tissue    | Industrial Point Source Discharge; Unknown Source  |
|       |  | Concern for chlorophyll-a in Taylor Bayou Tidal                                      | Source Unknown   |
| 0702A | Alligator Bayou                            | Not supporting aquatic life use due to acute toxicity in water and sediment toxicity | Petroleum/natural gas activities; Industrial Point Source Discharge; Source Unknown  |
|       |  | Concern for lead in sediment   | Petroleum/natural gas activities; Industrial Point Source Discharge; Source Unknown  |
|       |  | Concern for chlorophyll-a  | Source Unknown   |
| 0703  | Sabine-Neches Canal Tidal                  | Not supporting contact recreation use due to bacteria                                | Source Unknown   |
| 0704  | Hillebrandt Bayou                          | Not supporting contact recreation use due to bacteria                                | Urban Runoff/Storm Sewers  |
|       |  | Not supporting aquatic life use due to depressed dissolved oxygen                    | Natural Conditions-Water Quality Standards Use Attainability Analyses Needed; Unspecified Urban Stormwater; Source Unknown |
|       |  | Concern for chlorophyll-a and ammonia-nitrogen                                       | Source Unknown   |
|       |  | Concern for depressed dissolved oxygen (screening level/DO minimum)                  | Natural Conditions-Water Quality Standards Use Attainability Analyses Needed; Source Unknown                               |

## PIB Watershed Characterization

The Pine Island Bayou Watershed has been the focus of a number of studies and projects over the years by multiple agencies including TCEQ and LNVA. Based on these activities and the bayou's importance to stakeholders in the community, LNVA chose this watershed to be the focus of the 2019 Basin Highlights Watershed Characterization Report. Pages 11-15 go into detail about bayou history, watershed characteristics, land use, and stakeholders.

### Pine Island Bayou Historically



Pine Island Bayou has a rich history in the Lower Neches Basin. Lumber, cattle, and rice were all major industries in the area in the mid 1800's, which was over 50 years before the oil boom in the area. The lower part of Pine Island Bayou borders the city of Beaumont to the north. Beaumont was founded as a town in 1835. In 1892, Joseph Eloi Broussard opened the first commercially successful rice mill that helped stimulate the development of rice farming in the area. He also cofounded an irrigation company, in 1898, called the Beaumont Irrigation Company in order to encourage rice production in the area. The initial canal, along with holdings from four other companies formed around the same time, helped lead to the formation of Lower Neches Valley Authority (LNVA) in 1933 by the State Legislature.

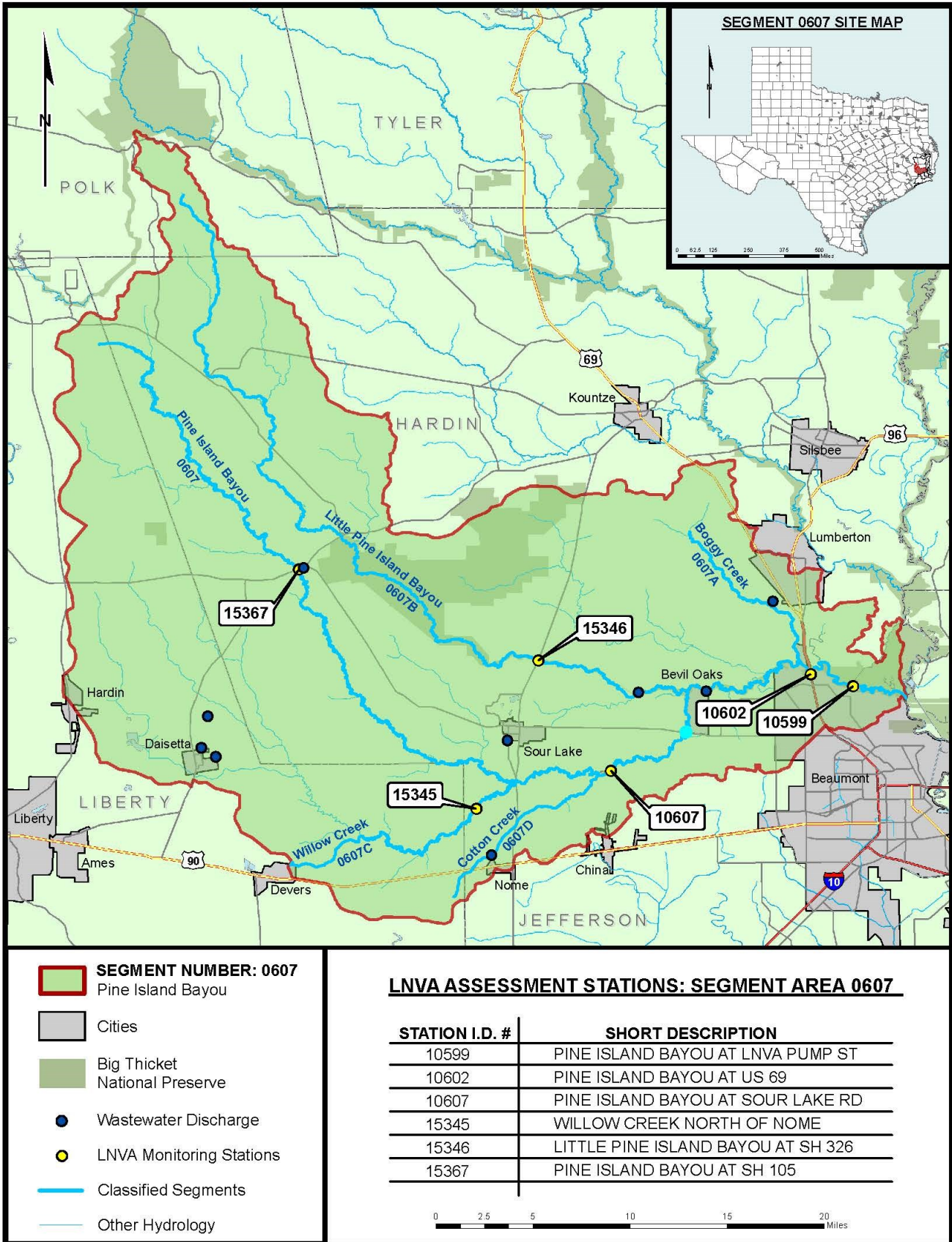
These other companies were the Port Arthur Rice and Irrigation Company, the McFaddin-Weiss-Kyle Canal Company, the Treadaway (later named Neches Canal Company), and the Taylors-Hillebrand complex. Today, LNVA's Beaumont Irrigation (B.I.) canal system still pulls water from Pine Island Bayou to supply customers in the area.

Lumber baron J. Frank Keith built a sawmill along Pine Island Bayou's southern shore in what is now northern Beaumont. The lumber town that built up around the sawmill in 1903 was known as Voth and the mill was known as Old Voth Mill. Voth Road and Old Voth Road, in Beaumont, are named for them today. In 1922, the sawmill was expanded, adding hardwood machinery when it was acquired by Kirby Lumber Company. Production would frequently exceed 80,000 board feet per day. Board feet is a unit of timber equal to 144 cubic inches, twelve by twelve by one. The cut logs were placed into Pine Island Bayou until they were needed. The land the sawmill was on was eventually purchased by the Big Thicket National Preserve. One concrete structure remains of the mill, making it a candidate for the National Register of Historic Places.

Parts of Pine Island Bayou have traditionally been a popular destination for canoers and kayakers. According to the Texas Parks and Wildlife publication: *An Analysis of Texas Waterways* (PWD RP T3200-1047), the bayou is scenic and the almost impenetrable thicket provides excellent cover for many wildlife species. Periodic white sand and gravel bars offer a place for day use and camping to outdoor enthusiasts. The bayou is narrow, so overhanging brush and limbs can be a problem. The main channel can be hard to distinguish during periods of high water. High summer temperatures and insects can be an issue as well.

The North American Wood Ape Conservancy website boasts a Big Foot sighting on the bayou in the fall of 1984, with another eyewitness sighting a few years later. So far, LNVA staff have had no Big Foot run-ins on the bayou during CRP sampling events.

# Pine Island Bayou Site Location Map



## Pine Island Bayou Watershed Characterization

### Pine Island Bayou Segment Descriptions

Pine Island Bayou (PIB) is located from the confluence of the Neches River in Hardin/Jefferson County and FM 787 in Hardin County and is approximately 81 miles in length. Two major tributaries include Little Pine Island Bayou, Segment 0607B, and Willow Creek, Segment 0607C. Little Pine Island Bayou runs from the confluence of PIB southwest of Lumberton in Hardin County to the upstream perennial portion of the stream west of Kountze in Hardin County. Willow Creek runs from the confluence of PIB north of Nome in Jefferson County to the upstream perennial portion of the stream east of Devers in Liberty County. Another tributary of PIB is Boggy Creek that runs from the confluence of PIB upstream to the confluence with an unnamed tributary downstream of the crossing of the Southern Pacific Railroad.

Pine Island Bayou has a drainage area of 657 square miles. The upper portions of this segment are comprised of mostly forestland. The lower portions drain the communities of Sour Lake, Pinewood Estates, Bevil Oaks, and the northern section of the City of Beaumont. The bayou is slow and consists of cypress/tupelo swamps and mixed pine hardwood forests. Common vegetation in this segment is loblolly pine, sweetgum, a variety of oak species, southern magnolia, and an understory of holly, yaupon, sweet bay, wax myrtle, and American beauty berry. The streambed consists of sand and clay substrate. The soils around PIB are acidic and drain poorly after heavy rainfall events. Land use in the PIB watershed is primarily timber production, pastureland, cattle production, crops, and oil and gas production. A complete land use map can be found on page 17 of this report.



In June 2008, TCEQ, in cooperation with LNVA, installed a Continuous Water Quality Monitoring Network (CWQMN) station on Pine Island Bayou near the Hwy 69 bridge at LNVA's BI canal pump station. LNVA proposed the real-time monitoring station in 2006 to address water quality concerns in Pine Island Bayou. LNVA operates and maintains the station (CAMS 749), which uses YSI Instruments equipped with multiple probes including optical dissolved oxygen and turbidity. The station collects and transmits real-time data for the following parameters:

dissolved oxygen, pH, water temperature, conductivity, total dissolved solids, turbidity, and water depth. Pine Island Bayou CWQMN Station (CAMS 749) displays real-time water quality data online at the following:

[https://www.tceq.texas.gov/cgi-bin/compliance/monops/water\\_daily\\_summary.pl?cams=749](https://www.tceq.texas.gov/cgi-bin/compliance/monops/water_daily_summary.pl?cams=749)

## Pine Island Bayou Watershed Characterization

In December 2018, the TCEQ provided LNVA with a new multi-probe sonde and display unit for use in CAMS 749 monitoring activities. The new YSI EXO-3 sonde is capable of measuring depth, pH, temperature, dissolved oxygen, conductivity, and turbidity. The new equipment allows for reduced ongoing maintenance costs, better data storage/transfer/management capabilities, and faster response times.



In addition to the CAMS 749 project, a variety of other projects to address impairments have taken place on Pine Island Bayou. A Use Attainability Analysis (UAA) took place on PIB from 2005-2011. TCEQ sampled for 24 hour dissolved oxygen, habitat, benthics, nekton, conventionals, flow, and field parameters. A UAA was also conducted on Willow Creek, Cypress Creek, and Boggy Creek from 2007-2010. The results from the PIB UAA as well as limited 24 hour dissolved oxygen were used in these UAA's. The time length of the UAA's were due to several heavy rainfall events that would have delayed sampling. A UAA is a two year study conducted to find out if established aquatic life use designation and dissolved oxygen criterion are suitable for a particular segment. If not, it can be recommended that the stream standard be adjusted accordingly after review and approval by the EPA.

Pine Island Bayou has been on the 303(d) list since 2000 for dissolved oxygen. The low dissolved oxygen levels are likely due to natural causes that are influenced by high ambient summer temperatures, low flow conditions, and decaying organic material present in the water. The Pine Island Bayou segment near the confluence with Willow Creek was added to the list of 303(d) impairments in 2008 for bacteria. The Integrated Report lists the source for the Ecoli bacteria as unknown. Willow Creek is located in a large, rural area dominated by cattle grazing and oil/gas productions. Wildlife is abundant in this area as well. Deer, hogs, and otters have been observed at or near the CRP monitoring stations on this stream. Pages 18-20 show pictures of all of LNVA's PIB monitoring stations.

Interested stakeholders of the PIB watershed include land owners, industry, local ranchers and farmers, oil and gas companies, and several municipalities. Other stakeholders would include citizens and business owners that live in communities around the Pine Island Bayou watershed.

One event that took place in 2018 concerning the PIB watershed and stakeholders involved a complaint of a possible fish kill in a gully that runs through a local golf course. The complainant was advised to contact TCEQ Region 10 by LNVA staff. No dead fish were observed by LNVA or TCEQ during the investigation. LNVA provided water quality data to assist TCEQ. This data showed higher than usual conductivity, turbidity and low dissolved oxygen. It was discovered that the source of the water quality issues were agricultural activities associated with rice farming. The water used to flood this farm's rice fields is higher in salt content than the surrounding watershed water. The fields are also used for crawfish. It was found that the farm was in compliance with their permit requirements. These fields are flushed twice a year so if this occurs again, LNVA will be able to address stakeholder concerns.

## Pine Island Bayou Watershed Characterization

### Recommendations to Address Impairments

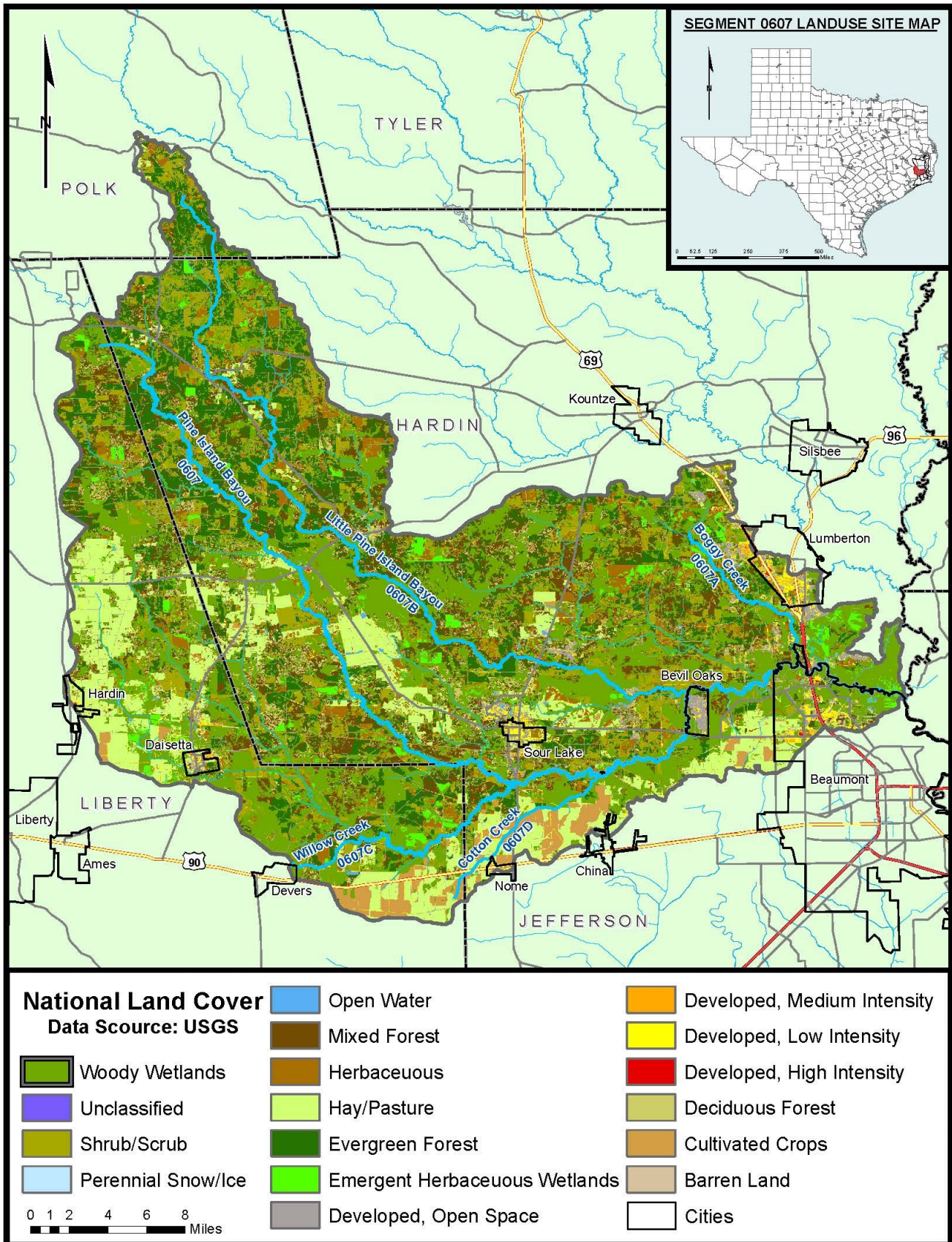
The map on page 13 shows the Pine Island Bayou watershed, Segment 0607 and LNVA's monitoring stations. The current impairments in the Pine Island Bayou watershed are non-supporting aquatic life use due to depressed dissolved oxygen in Segment 0607 Pine Island Bayou, Segment 0607A Boggy Creek, 0607B Little Pine Island Bayou, and Segment 0607C Willow Creek. Segment 0607 Pine Island Bayou is also not supporting contact recreation use due to bacteria. Boggy Creek has a concern for impaired habitat. See pages 18-20 of this report for pictures of all the Pine Island Bayou stations that LNVA currently monitors.

Based on the results of the UAA's conducted in PIB, it was recommended that there be a dissolved oxygen standard change from 5 mg/L to 3 mg/L in the 2014 Texas Surface Water Quality Standards. The Environmental Protection Agency is in process of reviewing this standard change. In order to obtain information on current dissolved oxygen conditions in Pine Island Bayou, LNVA is working with TCEQ to obtain additional 24 hour dissolved oxygen monitoring data. If the EPA approves the standard change, the additional dissolved oxygen monitoring may demonstrate that the new standard is being attained. LNVA will continue collecting bacteria data in its routine monitoring to determine if any further steps are necessary once recent data has been assessed. LNVA CRP will also continue to educate the public and stakeholders about water quality in the Pine Island Bayou watershed as well as the rest of the Lower Neches Basin through a variety of meetings and events.





# Land Use in Pine Island Bayou Map



## Pine Island Bayou Sample Site Photos



**WILLOW CREEK AT UNNAMED ROAD, 4.87 KM NORTH NORTHWEST OF NOME 6.78 KM UPSTREAM OF PINE ISLAND BAYOU CONFLUENCE/SH 326**



**LITTLE PINE ISLAND BAYOU AT SH 326, 5.68 KM NORTH OF CITY OF SOUR LAKE**

## Pine Island Bayou Sample Site Photos



**PINE ISLAND BAYOU AT LNVA LOWER PUMP STATION, 6.62 KM UP-STREAM OF NECHES RIVER CONFLUENCE 2.86 KM EAST OF US 69**



**PINE ISLAND BAYOU AT US 69 /US 96/US 287 AT VOTH**

## Pine Island Bayou Sample Site Photos



**PINE ISLAND BAYOU AT SOUR LAKE ROAD, 7.5 KM SOUTHEAST OF INTERSECTION OF SH 326/SH 105 IN CITY OF SOUR LAKE**



**PINE ISLAND BAYOU AT SH 105, 0.65 KM SOUTHWEST OF FM 770/SH 105 INTERSECTION NEAR CITY OF BATSON**