2017
BASIN HIGHLIGHTS REPORT

Lower Neches River Basin &
Neches-Trinity Coastal Basin

Lower Neches Valley Authority

THE TEXAS CLEAN RIVERS PROGRAM

PREPARED IN COOPERATION WITH THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

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Lower Neches Basin Highlights

Long-Term Deployment Module Installation and Testing Project

In February 2017, the Lower Neches Valley Authority (LNVA) and Texas Commission on Environmental Quality (TCEQ) in cooperation with Hydrotech ZS Consulting initiated the Long-Term Deployment Module (LDM) Installation and Testing Project. Modifications were made to the Pine Island Bayou continuous water quality monitoring network (CWQMN) station referred to as CAMS 749. This project involved incorporating a second YSI multi-probe attached to a Long-Term Deployment Module (LDM) developed by Hydrotech.

The LDM is designed to reduce multi-probe sensor fouling in continuous water quality monitoring applications by filling a chamber containing the sensors with a water sample and testing the water quality before emptying the chamber. An internal pump discharges the water sample until the chamber fills for the next measurement. As a result, sensors are not exposed to the ambient water and sunlight which promotes biological growth and fouling. Sensor and deployment tube fouling can compromise data quality.

The goal of the testing is to compare multi-probe temperature, dissolved oxygen (DO), specific conductance (SC), pH, and turbidity multi-probe data collected with the LDM against multi-probe water quality measurements collected from a deployment that does not have an LDM. Station Leading Environmental Analysis Display System (LEADS) data and various Quality Control (QC) sample results will be used to evaluate the data. The reliability of the LDM will also be assessed.

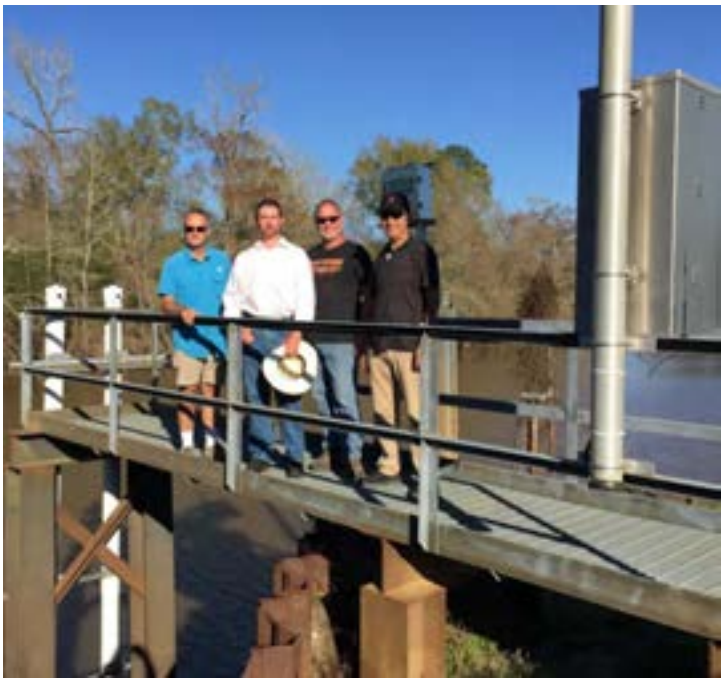
During the LDM testing period, CAMS 749 data reporting to LEADS, station operation, station service, and data validation will continue as usual using existing CWQMN procedures. Data collected from the multi-probe in the LDM will be reported to LEADS during the testing period but will not be available on TCEQ's public web page.

If the LDM proves reliable, provides representative stream water quality measurements, and reduces fouling, the program may use the unit to collect water quality data records at CAMS 749.

Benefits to reducing multi-probe/deployment tube fouling could include the following:

- Improved data quality
- Less frequent station service visits by increasing the length of multi-probe deployment periods
- Eliminate the need to collect USGS-based multi-probe / deployment tube fouling measurements

The Pine Island Bayou CWQMN station real-time data is available online at: https://www.tceq.texas.gov/cgi-bin/compliance/monops/water_site_photo.pl?cams=749



Pictured above are Ed Ragsdale (TCEQ), Joe Parish (LNVA), Chuck Dvorsky (TCEQ), and Zak Sihalla (Hydrotech) who participated in the installation of a newly designed deployment system for the real-time station (CAMS 749) on Pine Island Bayou. Pictured below is the unique deployment system using PVC tubes with a single buoy to float YSI multi-probes located inside each tube for the LDM installation and testing project.

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Water Quality Monitoring Programs

Stakeholder Participation

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 establishment of 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.

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

Pictured above is the Ivory Bill providing a group tour of the Neches River and LNVA Salt Water Barrier. Pictured below is the LNVA educational booth at the annual Neches River Festival in Beaumont, Texas.

Public Outreach and Education

Neches River Festival

LNVA's web page also provides an overview of the CRP statewide water quality program, and includes LNVA Basin Reports, Quality Assurance documents, CRP Workplan Summary, CRP Long-Term Plan, and links to important websites such as the Texas Stream Team Volunteer Monitoring Program, Texas Major Rivers Program, TCEQ Surface Water Quality Data Viewer, and Statewide Coordinated Monitoring Schedule (CMS).

Please visit our website at http://www.lnva.dst.tx.us/ to learn more about LNVA and the Clean Rivers Program.

Volunteer Monitoring Program

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/.

Water Quality Monitoring Programs

Basin-Wide Monitoring Program

LNVA's basin-wide monitoring program includes 25 routine stations in the Lower Neches River Basin. The CRP website at https://cms.lcra.org provides detailed information about each station on the Coordinated Monitoring Schedule (CMS) including maps showing locations for each station. In FY 2017, chlorophyll-a was added to the list of routine monitoring parameters by LNVA.

TCEQ Region 10 in Beaumont is monitoring 19 stations in the Lower Neches River and Neches-Trinity Coastal Basins. No CMS changes were made by LNVA or TCEQ during FY 2017. For additional information on the FY 2017 basin-wide monitoring schedule, please visit the statewide CMS website at https://cms.lcra.org/.

Routine Water Quality Monitoring

Routine water quality monitoring provides important water quality data used to identify long-term trends and assess the overall water quality conditions in the river basin. Routine water quality monitoring parameters include the following:

Alkalinity measures carbonate/bicarbonate ions to determine the buffering or neutralizing capacity of water. Low alkalinity (<20 mg/L) water has a limited ability to resist changes in pH, therefore it's more susceptible to acidification and low pH.

Total Hardness measures calcium and magnesium ions as calcium carbonate ($CaCO_3$). It's important when determining the toxicity of heavy metals on aquatic biota. Generally, the higher the hardness in water, the lower the toxicity.

Nitrogen occurs in natural waters in various forms, including nitrate (NO_3), nitrite (NO_2), and ammonia (NH_3).

Nitrate (NO_3) generally occurs in trace quantities in surface water. It is the essential nutrient for many photosynthetic autotrophs and has been identified as the growth limiting nutrient. When nitrate concentrations become excessive eutrophication and associated algal blooms can be become a problem.

Nitrite (NO_2) is extremely toxic to aquatic life, however it is usually present only in trace amounts in most natural freshwater systems because it is rapidly oxidized to nitrate. In sewage treatment plants using nitrification process to convert ammonia to nitrate, the process may be impeded, causing discharge of nitrite at elevated concentrations into receiving waters.

Ammonia (NH_3) is one of the most important pollutants in the aquatic environment because of its relatively highly toxic nature and its ubiquity in surface water systems. It is discharged in large quantities in industrial, municipal and agricultural wastewaters.

Organic nitrogen and ammonia can be determined together and are referred to as *Total Kjeldahl Nitrogen (TKN)*, a term that reflects the technique used in their determination. Organic nitrogen is the byproduct of living organisms. It includes such natural materials as proteins and peptides, nucleic acids and urea, and numerous synthetic organic materials. Typical organic nitrogen concentrations vary from a few hundred micrograms per liter in some lakes to more than 20 mg/L in raw sewage (19th edition, Standard Methods, 1995).

Phosphorus is often the limiting nutrient for plant growth, meaning it is in short supply relative to nitrogen. Phosphorus usually occurs in nature as phosphate. Phosphate that is bound to plant or animal tissue is known as organic phosphate. Phosphate that is not associated with organic material is known as inorganic phosphate. Both forms are present in aquatic systems and may be either dissolved in water or suspended. Testing for total phosphorous (both inorganic and organic phosphate) provides a more complete measure of all the phosphorus that is actually in the water.

Turbidity measures the cloudiness of water. Cloudiness is caused by suspended solids (mainly soil particles) and plankton (microscopic plants and animals) that are suspended in the water column. Moderately low levels of turbidity may indicate a healthy, well-functioning ecosystem, with moderate amounts of plankton present to fuel the food chain.

Sulfate can be dissolved in many natural waters. Concentrations of this ion usually vary greatly from one watershed to another due to the natural availability in rocks and soils. Sulfate results (annual averages) are compared to the general use criteria of the surface water quality standards which are segment specific. Excessive amounts of sulfate can cause taste and odor problems in water treatment, and scaling in boilers and heat exchangers used for industrial purposes.

Chloride is found in all watersheds to some degree. Concentrations can vary naturally, usually increasing as the mineral content increases. Chlorides can be introduced by sewage effluent and discharge from oil field activity. Small amounts of chloride are required for normal cell function in plant and animal life, however, high levels of chlorides can corrode metals and affect the taste of food products. Therefore, water that is used in industry or processed for any use has a recommended maximum chloride level. Chloride surface water quality standards are segment specific and based on the annual average.

Conductivity is a measure of how well water can pass an electrical current. It is an indirect measure of the presence of inorganic dissolved solids such as chloride, nitrate, sulfate, phosphate, sodium, magnesium, calcium, iron and aluminum. The presence of these substances increases the conductivity of a body of water.

Inorganic *Total Dissolved Solids (TDS)* are essential ingredients for aquatic life. They regulate the flow of water in and out of organisms' cells and are building blocks of the molecules necessary for life. A high concentration of total dissolved solids, however, can cause water balance problems for aquatic organisms and de-

Water Quality Monitoring Programs

(Continued from page 4)

crease dissolved oxygen levels. TDS water quality standards are segment specific and based on the annual average.

Dissolved Oxygen (DO) in water is expressed as a concentration. The DO concentration in a stream is the mass of the oxygen gas present, in milligrams per liter of water. Milligrams per liter (mg/L) can also be expressed as parts per million (ppm).

The concentration of dissolved oxygen in a stream is affected by many factors:

Temperature: Oxygen is more easily dissolved in cold water.

Flow: Oxygen concentrations vary with the volume and velocity of water flowing in a stream. Faster flowing white water areas tend to be more oxygen rich because more oxygen enters the water from the atmosphere in those areas than in slower, stagnant areas.

Aquatic Plants: The presence of aquatic plants in a stream affects the dissolved oxygen concentration. Green plants release oxygen into the water during photosynthesis. Photosynthesis occurs during the day when the sun is out and ceases at night. Thus in streams with significant populations of algae and other aquatic plants, the dissolved oxygen concentration may fluctuate daily, reaching its highest levels in the late afternoon. Because plants, like animals, also take in oxygen, dissolved oxygen levels may drop significantly overnight.

Altitude: Oxygen is more easily dissolved into water at low altitudes that at high altitudes.

Dissolved or suspended solids: Oxygen is also more easily dissolved into water with low levels of dissolved or suspended solids.

Human Activities Affecting DO: Removal of riparian vegetation may lower oxygen concentrations due to increased water temperature resulting from a lack of canopy shade and increased suspended solids resulting from erosion of bare soil.

Typical urban human activities may lower oxygen concentrations. Runoff from impervious surfaces bearing salts, sediments and other pollutants increases the amount of suspended and dissolved solids in stream water.

Organic wastes and other nutrient inputs from sewage and industrial discharges, septic tanks, and agricultural and urban runoff can result in decreased oxygen levels. Nutrient input often leads to excessive algal growth. When the algae die, the organic matter is decomposed by bacteria. Bacterial decomposition consumes a great deal of oxygen.

In streams that have been impacted by any of the above factors, summer is usually the most crucial time for dissolved oxygen levels because stream flows tend to lessen and water temperatures tend to increase. In general, DO levels less than 3 mg/L are stressful to most aquatic organisms. Most fish kills occur at1-2 mg/L. In some water bodies, fish can move away from low DO areas. Water with low DO from 2 – 0.5 mg/L are considered hypoxic; waters with less than 0.5 mg/L are anoxic.

Freshwater streams with high DO concentrations (> 5 mg/L) have high aquatic life use which means they are able to support a greater diversity of aquatic organisms. In Texas, with exception to site specific criteria, most streams and reservoirs must maintain ≥ 3.0 mg/L for the entire 24-hour period. Freshwater streams and reservoirs with high aquatic life use standards (24-hour average) are generally ≥ 5.0 mg/L and tidal streams are generally ≥ 4.0 mg/L.

pH is an important limiting chemical factor for aquatic life. If the water in a stream is too acidic or basic, the H+ or OH- ion activity may disrupt aquatic organisms biochemical reactions by either harming or killing the stream organisms.

pH is expressed in a scale with ranges from 1 to 14. A solution with a pH less than 7 has more H+ activity than OH-, and is considered acidic. A solution with a pH value greater than 7 has more OH- activity than H+, and is considered basic. The pH scale is logarithmic, meaning that as you go up and down the scale, the values change in factors of ten. A one-point pH change indicates the strength of the acid or base has increased or decreased tenfold.

Streams generally have a pH values ranging between 6 and 9, depending upon the presence of dissolved substances that come from bedrock, soils and other materials in the watershed.

Changes in pH can change the aspects of water chemistry. For example, as pH increases, smaller amounts of ammonia are needed to reach a level that is toxic to fish. As pH decreases, the concentration of metal may increase because higher acidity increases their ability to be dissolved from sediments into the water.

E. coli in freshwater and *Enterococci* in saltwater are indicator bacteria that are not usually disease-causing agents themselves. However, high concentrations suggest the presence of disease-causing organisms. *E. coli* and Enterococci bacteria sample results indicate the probability of finding pathogenic organisms in a stream or reservoir. The primary contact recreation use criteria is based on the geometric mean for *E. coli* (126/100mL) and Enterococci (35/100mL).

Chlorophyll is the photosynthetic, green pigment found in most plants, algae, and cyanobacteria. The concentration of chlorophyll a is used to estimate phytoplankton biomass in surface water. In aquatic environments, excessive growth of aquatic vegetation or phytoplankton (e.g. algal blooms) disrupts normal functioning of the ecosystem, causing a variety of problems such as a lack of oxygen in the water.

Summary of Water Quality Conditions

The Texas Integrated Report of Surface Water Quality 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.

State water quality assessment reports are completed every two years, in even numbered years, and must be approved by the EPA. 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.

The 2014 Texas 303(d) List was adopted and approved for submission by the TCEQ on June 3, 2015. It was submitted to the Environmental Protection Agency (EPA) and approved on Nov. 19, 2015. Water bodies included on the 2014 303(d) List are not meeting current water quality standards and therefore do not support their designated uses. Water bodies may also have concerns for use attainment and established screening levels which is part of the Texas Integrated Report. Additional information including the approved 2014 Texas 303(d) List is available at: https://www.tceq.texas.gov/waterquality/assessment/14twqi/14txir

A summary of the water quality impairments and concerns are listed below in the bullets for each segment located in the Lower Neches River and Neches-Trinity Coastal Basins. A list of special projects designed to address any impairments and/or concerns is provided for each basin.

Segment 0601: Neches River Tidal

The Neches River Tidal (0601) is defined in the Texas Surface Water Quality Standards (TSWQS) as a river segment from the confluence with Sabine Lake in Orange County to the Neches River Saltwater Barrier, which is at a point 0.8 kilometers (0.5 miles) downstream of the confluence of Pine Island Bayou, [a point 11.3 kilometers (7.0 miles) upstream of IH 10] in Orange County. Below the I-10 interstate crossing in Beaumont, the segment is highly industrialized, consisting primarily of a navigation channel from the mouth of the river to the Port of Beaumont, which is maintained by the U.S. Army Corps of Engineers (USACE). This navigation channel is dredged 40 feet deep and 400 feet wide in order to accommodate marine traffic and large vessels. A proposed USACE project would deepen this channel from 40 feet to 48 feet to accommodate larger ships that will be traveling through the Panama Canal, allowing them to reach local ports and critical industry along the waterway.

Segment 0601 is classified as a tidal stream segment with intermediate aquatic life use and primary contact recreation use designations. Located on the most southerly end of the Neches River, hydrologic influences on this segment include tidal exchange and freshwater inflows. This segment is where Level IV Ecoregions Northern Humid Gulf Coastal Prairies (34a) and Texas-Louisiana Coastal Marshes (34g) converge. The area has sandy, silt, and clayey substrates, and consists of low, flat plains with some of the area being tidal marshes with bayous. Land use is primarily oil and gas production, along with marshland, wildlife and waterfowl habitat, cropland, and urban/industrial. Cities located along Segment 0601 include Beaumont, Port Neches, and Groves.

The segment boundary is 27 miles long with an unclassified water body within this segment called Star Lake Canal which is three miles in length. Star Lake Canal (0601A) is a tidally influenced, dredged canal that receives industrial effluents, which discharge into the Neches River. The canal was constructed after 1948 as an industrial wastewater and stormwater outfall, and is currently used by local industries and manufacturing facilities. The primary flow in Star Lake Canal is due to tidal fluctuations and industrial discharges (wastewater/stormwater outfalls) into the canal.

TCEQ Region 10 currently monitors five stations and LNVA monitors one station on this tidal segment (see page 13). Historical water quality concerns and impairments include elevated bacteria, nutrients, depressed dissolved oxygen and organics in water (malathion).

Segment 0601: Neches River Tidal

- Not supporting contact recreation use due to bacteria in the Neches River Tidal (Enterococcus)
- Not supporting fish consumption use due to polychlorinated biphenyls (PCBs) in edible tissue
- Concern for aquatic life use due to malathion (lower segment only)

Segment 0601A: Star Lake Canal

- Not supporting contact recreation use due to bacteria (Enterococcus)
- Concern for aquatic life use due to malathion

Segment 0602: Neches River below B.A. Steinhagen Reservoir

The Neches River below B.A. Steinhagen Reservoir (0602) is defined in the TSWQS as a river segment from the Neches River Saltwater Barrier, which is at a point 0.8 kilometers (0.5 miles) downstream of the confluence of Pine Island Bayou, [a point 11.3 kilometers (7.0 miles) upstream of IH 10] in Orange County to Town Bluff Dam in Jasper/Tyler County. Situated in a broad flood plain, the segment is 84 miles long and major tributaries include Village Creek and Pine Island Bayou. Stream discharge is regulated by the Town Bluff Dam at B.A. Steinhagen Lake and the Neches River Saltwater Barrier.

Segment 0602 is situated in the Level III Ecoregion known as

Summary of Water Quality Conditions

South Central Plains, also termed the "piney woods". Soils are sandy loams, acidic sands, and some silty subrates, with poorly drained soils in the floodplains, flatwoods, and low terraces. Land use includes livestock agriculture, hunting leases, timber production, pasture production, recreation, wildlife habitat, oil and gas production, and some public land (Big Thicket National Preserve). Land cover includes mixed forest, evergreen forest, deciduous forest, pine plantations, and forested wetlands.

Segment 0602 is designated for high aquatic life use, primary contact recreation use, and public water supply. Two routine SWQM stations are monitored quarterly by LNVA and one station is monitored by TCEQ Region 10 (see page 14).

Neches River at Lakeview in the Big Thicket National Preserve

The Texas Dept. of State Health Services (DSHS) has issued several fish consumption advisories for portions of this segment on the Neches River. The advisories warn the public to limit their consumption of six species of fish due to elevated levels of mercury in fish tissue samples collected. The latest advisory (ADV-51) also includes dioxins and adds blue catfish, flathead catfish, gar, smallmouth buffalo, and spotted bass. The advisory area includes the Neches River and all contiguous waters from the SH 7 bridge west of Lufkin downstream to the U.S. Hwy. 96 bridge near Evadale which is located in Segment 0602. Additional Information on the fish consumption advisories can be found on the DSHS website at: https://www.dshs.texas.gov/seafood/advisories-bans.aspx

Segment 0602: Neches River below B.A. Steinhagen

- Not supporting fish consumption use due to mercury and dioxins in edible tissue
- Concern for depressed dissolved oxygen
- Concern for mercury in edible tissue

Segment 0603: B.A. Steinhagen Lake

B.A. Steinhagen is a reservoir managed by the U.S. Army Corps of Engineers (USACE) and covers approximately 13,000 surface acres. It is situated in the piney woods area located along U.S. Hwy. 190 between Woodville and Jasper where it impounds the Neches River near the confluence with the Angelina River.

Along with Sam Rayburn Reservoir, it provides flood control for the lower Neches River Basin and generates hydroelectric power at the USACE Town Bluff Dam or "Dam B" which supplies freshwater downstream to LNVA and other users along the Neches River.

Soils in the segment are acidic and sandy which supports upland longleaf pine woodlands, longleaf pine savannas, and hardwood slope forests. Segment 0603 is largely represented by Level IV Ecoregion 35e called Southern Tertiary Uplands, which is more hilly than the Flatwoods to the south. Land use is primarily for timber production, public lands, pasture and livestock production, recreation and wildlife habitat. The land is covered by mixed forest, evergreen forest, deciduous forest, and pine plantations.

Tributaries in the segment include Wolf Creek and Sandy Creek. Wolf Creek drains areas of pine forest and pastureland, while Sandy Creek is a forested sub-watershed with pasturelands and its upper reaches drain the City of Jasper. Sandy Creek and Wolf Creek historically have elevated bacteria levels.

Three stations are monitored in the segment by TCEQ Region 10 and LNVA including routine water quality monitoring on Sandy Creek and Wolf Creek (see page 15).

The Texas DSHS issued a fish consumption advisory in Nov. 1995 after elevated levels of mercury were found in largemouth bass, freshwater drum, white bass and hybrid striped bass. The new advisory (ADV-51) rescinds the 1995 advisory (ADV-12) for B.A. Steinhagen and Sam Rayburn Reservoirs. This new advisory includes both mercury and dioxins, and the list of species adds blue catfish, flathead catfish, gar, smallmouth buffalo and spotted bass to those included in ADV-12 for Sam Rayburn and B.A. Steinhagen Reservoirs.

The issue of mercury in fish tissue is regional, encompassing other water bodies in East Texas in addition to the B.A. Steinhagen and Sam Rayburn Reservoirs. The level of mercury contamination in fish tissue is the result of bioaccumulation, and there are no risks to the public in other recreational activities.

Segment 0603: B.A. Steinhagen Lake

- Not supporting fish consumption use due to mercury and dioxins in edible tissue

Segment 0603A: Sandy Creek

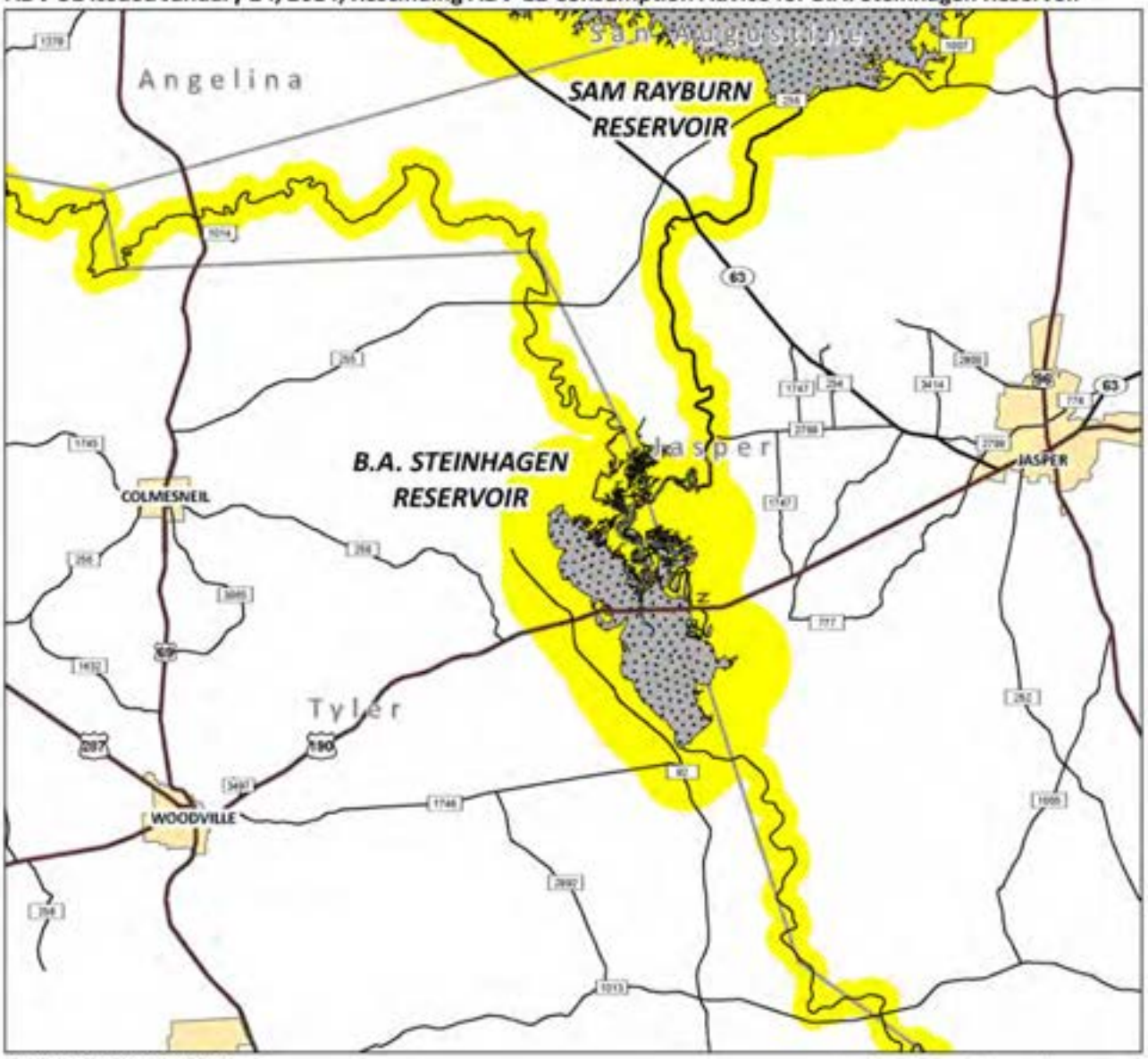
- Not supporting contact recreation use due to bacteria

Summary of Water Quality Conditions

B.A. Steinhagen Reservoir

Jasper and Tyler Counties

ADV-51 Issued January 24, 2014, Rescinding ADV-12 Consumption Advice for B.A. Steinhagen Reservoir



Contaminants of Concern:
Dioxins and Mercury (Hg)

Species Affected	Women of Childbearing Age and Children < 12	Women Past Childbearing Age and Adult Men[1]
Blue catfish > 30 inches	DO NOT EAT	2 meals/month
Flathead catfish	DO NOT EAT	1 meal/month
Gar (all species)	DO NOT EAT	1 meal/month
Largemouth bass > 16 inches	DO NOT EAT	2 meals/month
Smallmouth buffalo	DO NOT EAT	DO NOT EAT
Spotted bass > 16 inches	DO NOT EAT	2 meals/month

[1] A meal is eight ounces of fish.

*Advisory image courtesy of Texas Department of State Health Services.

Summary of Water Quality Conditions

Segment 0603B: Wolf Creek

- Not supporting contact recreation use due to bacteria

Segment 0607: Pine Island Bayou

Pine Island Bayou is defined in the TSWQS as from the confluence with the Neches River in Hardin/Jefferson County to FM 787 in Hardin County and is 81 miles in length. Major tributaries include Little Pine Island Bayou (0607B) and Willow Creek (0607C).

Pine Island Bayou has a large drainage area of 657 square miles. The segment is a natural streambed with sand and clay substrate from its headwaters to its confluence with the Neches River. Streams are low gradient and sluggish in this segment with sandy, silty substrates. Land use is timber production, pastureland, cattle production, and oil and gas production.

Soils are acidic and drain poorly after high rainfall events. The Level IV ecoregion is Flatwoods (35f), and physiography consists of flat plains, irregular plains, small, undrained depressions, and a few surface mounds from salt domes.

Six routine stations are monitored by LNVA on a quarterly basis and one station is monitored by TCEQ Region 10 on Boggy Creek near Lumberton (see page 16).

In June 2008, TCEQ 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 DO and Turbidity. The station collects and transmits real-time data for the following parameters: dissolved oxygen, pH, water temperature, conductivity, TDS, turbidity, and water depth.

Historically, low DO measurements have been collected in the watershed and the segment has remained on the 303(d) List of impaired water bodies. However, low DO levels in the watershed are likely due to natural causes which are influenced by high ambient summer temperatures, low-flow conditions, and decaying organic material that is present in the water.

Segment 0607: Pine Island Bayou

- Not supporting aquatic life use due to depressed dissolved oxygen
- Not supporting contact recreation use due to bacteria
- Concern for depressed dissolved oxygen (screening level)

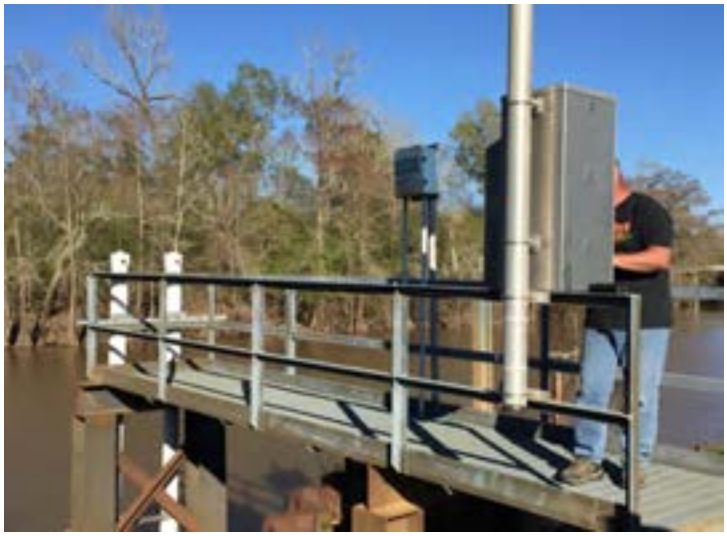
Special Projects:

Pine Island Bayou Use Attainability Analysis (UAA) Project, 9/20/2005–10/1/2011; TCEQ sampling included 24hr DO, Habitat, Benthics, Nekton, Conventionals, Flow, and Field Parameters.

Pine Island Bayou Continuous Water Quality Monitoring Project, 6/10/2008–present; CWQMN Station 749 is operated by LNVA. Real-time water quality parameters include Sample Depth, Surface Water Temperature, Specific Conductance, Turbidity, Total Dissolved Solids, Dissolved Oxygen, and pH.

Segment 0607A: Boggy Creek

- Not supporting aquatic life use due to depressed dissolved oxygen
- Concern for impaired habitat in Boggy Creek



CWQMN Station on Pine Island Bayou (CAMS 749) after the installation of the new deployment system for the LDM testing project.

- Concern for depressed dissolved oxygen (screening level)

Segment 0607B: Little Pine Island Bayou

- Not supporting aquatic life use due to depressed dissolved oxygen
- Concern for depressed dissolved oxygen (screening level)

Special Projects:

Aquatic Life Assessment (ALA) of Little Pine Island Bayou (0607B), 9/20/2005–10/1/2011; TCEQ sampling included 24hr DO, Habitat, Benthics, Nekton, Conventionals, Flow, and Field Parameters

Segment 0607C: Willow Creek

- Not supporting aquatic life use due to depressed dissolved oxygen
- Concern for depressed dissolved oxygen (screening level)

Special Projects:

Willow Creek, Cypress Creek, and Boggy Creek Use Attainability Analysis (UAA), 6/1/2007–10/15/2010; TCEQ performed limited sampling (24hr DO) and used the Pine Island Bayou UAA.

Summary of Water Quality Conditions

Pine Island Bayou CWQMN Station (CAMS 749) displays real-time water quality data online at the following address:
https://www.tceq.texas.gov/cgi-bin/compliance/monops/water_daily_summary.pl?cams=749

Parameter Measured	Morning												Afternoon					Parameter Measured	POC
	Mid	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Noon	1:00	2:00	3:00	4:00		
Surface Water Temperature	29.9	29.8	29.7	29.7	29.7	29.6	29.5	29.5	***29.4***	29.5	29.7	29.5	29.7	**30.0**	29.8	NA	NA	Surface Water Temperature	1
Sample Depth	0.580	0.580	0.583	0.603	0.610	0.620	**0.625**	0.608	0.610	0.600	0.600	0.598	0.588	0.575	***0.570***	NA	NA	Sample Depth	1
Surface Specific Conductance	***157***	158	158	158	158	160	161	161	160	160	161	161	**162**	162	162	NA	NA	Surface Specific Conductance	1
Turbidity	***26.75***	27.00	26.75	27.00	27.00	27.75	**28.25**	28.00	28.25	28.00	27.75	28.25	28.00	28.25	28.00	NA	NA	Turbidity	1
Total Dissolved Solids	***102***	103	103	103	103	104	105	105	104	104	104	105	105	**106**	106	NA	NA	Total Dissolved Solids	1
Surface Dissolved Oxygen	**3.8**	3.8	3.7	3.1	3.2	3.0	2.7	***2.6***	2.7	2.6	3.2	2.8	3.0	2.8	2.9	NA	NA	Surface Dissolved Oxygen	1
Surface Water pH	**6.9**	6.9	6.9	6.9	6.9	***6.8***	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	NA	NA	Surface Water pH	1
Parameter Measured	Mid	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Noon	1:00	2:00	3:00	4:00	Parameter Measured	POC
	Morning												Afternoon						
	Maximum values for each parameter are **bold** within the table. Minimum values are ***bold italic***.																		

PLEASE NOTE: This data has not been verified by the TCEQ and may change. This is the most current data, but it is not official until it has been certified by our technical staff. Data is collected from TCEQ ambient monitoring sites and may include data collected by other outside agencies. This data is updated hourly. All times shown are in local standard time unless otherwise indicated.

Segment 0608: Village Creek

The Village Creek classified stream segment is from the confluence with the Neches River in Hardin County to the confluence of Lake Kimball Dam in Hardin County. This segment is broad and covers over 200 miles in stream length. The Village Creek watershed has many tributaries draining approximately 1,113 square miles as it flows southeasterly to its confluence with the Neches River. Segment 0608 includes the following tributaries or unclassified segments: Beech Creek (0608A), Big Sandy Creek (0608B), Cypress Creek (0608C), Mill Creek (0608E), Turkey Creek (0608F), and Lake Kimball (0608G).

The Village Creek watershed lies entirely within the region of southeast Texas known as the Big Thicket. Segment 0608 is similar to Segment 0602 and 0603, in that it falls under the same South Central Plains, or "Piney Woods" ecoregion. Once thickly blanketed in pine and hardwood forests, now most of the area is covered by loblolly and shortleaf pine plantations. Village Creek State Park is located in Hardin County and covers more than 1,000 acres of thick forests. Land use is timber production, oil and gas extraction, pastureland, cattle production, recreational areas and public lands.

In this segment, LNVA monitors eight routine SWQM stations quarterly and TCEQ Region 10 monitors one station on Village Creek (see page 17).

Historical data assessments found a correlation between water quality concerns and stream flows in the segment. Low dissolved oxygen concentrations correlated with low stream flows during the summer months while low pH levels during increased stream flows indicated the presence of tannins and acidic soils.

In 2009, the Texas DSHS issued a fish consumption advisory (ADV-39) for Village Creek. The advisory warns the public to limit their consumption due to elevated levels of mercury in fish tissue samples taken from three species. The DSHS advises that adults should limit consumption of crappie, gar, and largemouth bass to no more than two 8oz meals per month and children under twelve years old should limit consumption of crappie, gar, and largemouth bass to no more than two 4oz meals per month. Women who are nursing, pregnant, or who may become pregnant should not consume crappie, gar, and largemouth bass from Village Creek.

In 1999, a DSHS fish consumption advisory (ADV-16) was issued for Lake Kimball (0608G) due to high levels of mercury in fish tissue for all species of fish. Adults should limit their consumption of fish to no more than two 8oz meals per month. Children under twelve years old should limit consumption to no more than two 4oz meals per month.

Segment 0608: Village Creek

- Not supporting fish consumption use due to mercury in edible tissue
- Concern for mercury in edible tissue
- Concern for low pH levels

Segment 0608A: Beech Creek

Summary of Water Quality Conditions

- Not supporting aquatic life use due to elevated copper
- Concern for impaired habitat

Segment 0608B: Big Sandy Creek

- Not supporting contact recreation use due to bacteria

Segment 0608C: Cypress Creek

- Not supporting aquatic life use due to depressed dissolved oxygen
- Concern for impaired habitat

Special Projects:

Willow Creek, Cypress Creek, and Boggy Creek Use Attainability Analysis (UAA), 6/1/2007–10/15/2010; TCEQ performed limited sampling (24hr DO) and used the Pine Island Bayou UAA.

Segment 0608E: Mill Creek

- Not supporting aquatic life use due to depressed dissolved oxygen

Segment 0608F: Turkey Creek

- Not supporting contact recreation use due to bacteria

Segment 0608G: Lake Kimball

- Not supporting fish consumption use due to mercury in edible tissue

Segment 0609: Angelina River below Sam Rayburn Reservoir

The Angelina River below Sam Rayburn Reservoir is defined in the TSWQS as from a point immediately upstream of its confluence with Indian Creek to the Sam Rayburn Reservoir Dam in Jasper County. The Angelina River ranges from 75-150 feet in width through this segment as it meanders through the rolling hills of the East Texas Piney Woods (Level III Ecoregion 35).

The segment extends 13 river miles from the tailrace below Sam Rayburn Dam towards the headwaters of B.A. Steinhagen Reservoir. Another 5.2 miles of old riverbed exists along the lower side of Sam Rayburn Dam upstream from the confluence with the tailrace. The drainage area of Segment 0609 is 107 square miles, with land use characterized as sparsely populated and heavily forested with minimal area of non-irrigated cropland located in the southeast quadrant of the watershed.

The 153,000 acre Angelina National Forest borders the upper part of Segment 0609, and the land use includes recreational activities on public lands in the area. Flows are generally very high compared to other segments in the basin, especially during the almost daily water releases from the Sam Rayburn Dam. Fishing, boating, swimming and water skiing are very common in this segment. Segment 0609 is designated for primary contact recreation use, high aquatic life use, and public water supply.

LNVA monitors one SWQM station in this segment (see page 18).

- Not supporting fish consumption use due to mercury and dioxins in edible tissue

Segment 0701: Taylor Bayou above Tidal

Taylor Bayou above Tidal, Segment 0701, is from the salt water lock 7.7 kilometers (4.8 miles) downstream of SH 73 in Jefferson County to the confluence with Hillebrandt Bayou, and includes Shallow Prong Lake on Big Hill Bayou. Taylor Bayou is 34 feet long, ranges from 8 to 13 feet in depth, and is characterized as low gradient with sluggish flow. Shallow Prong Lake (0701D) is a small reservoir that is 150 surface acres.

Segment 0701 is located in the Level III ecoregion known as the Western Gulf Coastal Plain (ecoregion 34) and has a mix of two Level IV ecoregions present: the Northern Humid Gulf Coastal Prairies (34a) and the Texas-Louisiana Coastal Marshes (34g). Soils drain poorly and much of the segment stays wet for most of the year. Soils are fine textured and made up of sands, silts, and clays, and even some salt domes.

Segment 0701 is generally flat plains with most of the area covered by standing water, and tidal marshes with bayous, lakes, and canals. Land use is largely agricultural with farming of rice, grain, sorghum, cotton, and soybeans common. There is also cattle production, pastureland, urban and industrial uses, oil and gas production, waterfowl hunting, marshland, and wildlife habitat throughout Segment 0701.

The segment is designated for primary contact recreation use and intermediate aquatic life use. Irrigation return flows from rice fields, storm water runoff and municipal and industrial discharges are the principle sources of flow in the segment and its major tributary, Hillebrandt Bayou. A saltwater lock near the mouth of the bayou minimizes tidal impact and saltwater intrusion, but the segment is still highly tidally influenced.

TCEQ Region 10 monitors two SWQM stations on Taylor Bayou and one station on Shallow Prong Lake (see page 19).

Segment 0701: Taylor Bayou above Tidal

- Not supporting aquatic life use due to depressed dissolved oxygen
- Concern for depressed dissolved oxygen (screening level)
- Concern for chlorophyll-a

Special Projects:

Taylor Bayou Above Tidal & Hillebrandt Bayou Aquatic Life Use-Attainability Analyses (UAAs), 4/1/2009–3/31/2010; Texas Institute for Applied Environmental Research (TIAER) sampling included 24hr DO, Benthics, Nekton, and Flow

Segment 0701D: Shallow Prong Lake

Summary of Water Quality Conditions

- Concern for arsenic in edible tissue

Segment 0702: Intracoastal Waterway Tidal

The Intracoastal Waterway Tidal, Segment 0702, is from the confluence with Galveston Bay at Port Bolivar in Galveston County to the confluence with the Sabine-Neches/Port Arthur Canal in Jefferson County (including Taylor Bayou Tidal from the confluence with the Intracoastal Waterway up to the saltwater lock 7.7 kilometers (4.8 miles) downstream of SH 73 in Jefferson County). This tidal segment is 63 miles long and includes the unclassified segment, Alligator Bayou (0702A).

Segment 0702 is primarily located in the Level IV Ecoregion known as Texas-Louisiana Coastal Marshes (34g). This ecoregion is 539 square miles, and is comprised of flat plains with most of the land covered in standing water, beach ridges, cheniers, canals, and tidal marshes with bayous meandering through. Elevation is anywhere from sea level to 30 feet, and soil is made up of clay and silt with some shell fragments and sand on cheniers/beach ridges. The highest point in the segment is at High Island (30 feet) which is situated atop an old salt dome. This ecoregion has many freshwater and saltwater coastal marshes, and a wetter, more humid climate than Ecoregion 35 to the northeast.

Land use includes marshland, wildlife and waterfowl habitat, oil and gas production, and extensive industrial activity. The marshes in this segment provide wintering grounds for ducks and geese and breeding and rearing grounds for fish and shrimp such as brown shrimp, white shrimp, blue crab, red drum, southern flounder, and spotted sea trout. Due to the ecologically rich areas in Segment 0702, fishing is both recreationally popular as well as commercially important.

Two SWQM stations in this segment are routinely monitored by TCEQ Region 10 in Beaumont (see page 20).

Segment 0702 is designated for primary contact recreation use and high aquatic life use. Historically, Segment 0702 has been listed on the state's 303(d) List for bacteria impairments, ambient toxicity in water, toxicity in sediment, and impaired fish community.

Alligator Bayou is a freshwater tributary of Taylor Bayou Tidal, with a watershed of approximately 40 square miles located upstream from the saltwater locks on Taylor Bayou. Discharges to the waterbody are primarily from municipal and industrial facilities, with a small amount from agriculture. An interim assessment of the presence and causes of ambient water and sediment toxicity in Alligator Bayou, Segment 0702A, was conducted by the TMDL program in 2001—2002.

In June 2013, the Texas DSHS issued a revised fish consumption advisory (ADV-50) for Galveston Bay. The DSHS has removed the consumption advisory for spotted seatrout from a portion of Galveston and Trinity Bays and all of East and West Bays. Laboratory testing of spotted seatrout from these areas indicated that concentrations of dioxins and PCBs have decreased to acceptable levels and no longer pose a significant health risk.

An advisory for all species of catfish remains in effect for all of the Galveston Bay System due to Dioxins and PCBs. This advisory includes a portion of the Intracoastal Waterway Tidal from the eastern most boundary of East Bay to Port Bolivar in Segment 0702.

Segment 0702: Intracoastal Waterway Tidal

- Not supporting contact recreation use due to bacteria
- Not supporting fish consumption use due to dioxins and PCBs in edible tissue
- Concern for chlorophyll-a in Taylor Bayou Tidal

Special Projects:

Galveston Bay System Dioxin & PCBs Survey, 9/1/2009-4/2/2014; TCEQ survey to characterize the extent of dioxin and PBC contamination in the Galveston Bay system which includes Segment 0702.

Segment 0702A: Alligator Bayou

- Not supporting aquatic life use due to acute toxicity in water and sediment toxicity
- Concern for lead in sediment
- Concern for chlorophyll-a

Segment 0703: Sabine-Neches Canal Tidal

The Sabine-Neches Canal Tidal, Segment 0703, is from the confluence with Sabine Pass at the southern tip of Pleasure Island in Jefferson County to the Sabine Lake seawall at the northern tip of Pleasure Island in Jefferson County. This tidal segment is 16 miles in length. The Sabine-Neches Canal exchanges water with Sabine Lake, and a large amount of marine traffic navigates between the Port of Houston and Port Arthur, including both large vessels and smaller recreational boats.

Land use includes oil and gas production, as well as marshland, wildlife, and waterfowl habitat. The ecoregion encompassing Segment 0703 is Western Gulf Coastal Plain (34), and more specifically Ecoregion IV known as Texas Louisiana Coastal Marshes (34g). There is extensive freshwater and saltwater coastal marshes consisting of grasses, sedges, and rushes. Few trees are found in this segment, and soils consist of clay and silt, with sand and shell fragments on cheniers or beach ridges. Most of the area is covered by standing water as bayous, lakes, or canals in low lying areas.

Two SWQM stations are routinely monitored by TCEQ Region 10 in Beaumont (see page 21).

- Not supporting contact recreation use due to bacteria

Summary of Water Quality Conditions

Segment 0704: Hillebrandt Bayou

Hillebrandt Bayou, Segment 0704, is defined as a freshwater stream from the confluence of Taylor Bayou in Jefferson County to a point 100 meters (110 yards) upstream of SH 124 in Jefferson County. Hillebrandt Bayou is 14 miles in length, and extends from the southern part of the South Central Plains Ecoregion (35) to the Northern Humid Gulf Coastal Prairies Ecoregion (34a). Segment 0704 tributaries or unclassified segments include Willow Marsh Bayou (0704A), Kidd Gully (0704B), Pevitot Gully (0704C), and Bayou Din (0704D).

Soils consist of fine-textured sands, silt, and clayey substrates, and low gradient rivers, streams, and bayous are common. Drainage near Hillebrandt Bayou is generally poor due to the substrate types, and soils remain wet most of the year. Land use is pastureland, cropland, urban and industrial, oil and gas production, waterfowl hunting, and golf course use.

Hillebrandt Bayou serves as the primary receiving stream for the storm water drainage system in the City of Beaumont. A wastewater discharge includes effluent which is treated in the final stages by manmade and natural wetlands south of Beaumont along Hillebrandt Bayou. These wetlands comprise over 900 acres. Willow Marsh Bayou, Kidd Gully and Pevitot Gully convey additional flows from agricultural land, and Bayou Din is located along a public golf course. In addition, flows in Hillebrandt Bayou are regulated by saltwater gates and barge locks on Taylor Bayou in Port Arthur.

Segment 0704 is designated for primary contact recreation use and intermediate aquatic life use. Three SWQM stations are routinely monitored by TCEQ Region 10 in Beaumont (see page 22).

- Not supporting contact recreation use due to bacteria
- Not supporting aquatic life use due to depressed dissolved oxygen
- Concern for chlorophyll-a and ammonia-nitrogen
- Concern for depressed dissolved oxygen (screening level/DO minimum)

Special Projects:

Taylor Bayou Above Tidal & Hillebrandt Bayou Aquatic Life Use-Attainability Analyses (UAAs), 4/1/2009–3/31/2010; Texas Institute for Applied Environmental Research (TIAER) sampling included 24hr DO, Benthics, Nekton, and Flow

Clean Rivers Program Nutrient Monitoring Project, 10/25/2011–8/31/2013; CWA Section 106 Grant allowed CRP to supplement the collection of additional nutrient parameters in select basins. LNVA collected total kjeldahl nitrogen (TKN) and chlorophyll-a at 25 routine stations in Basins 6 and 7.

Water Quality Monitoring Stations

SEGMENT: 601 Neches River Tidal

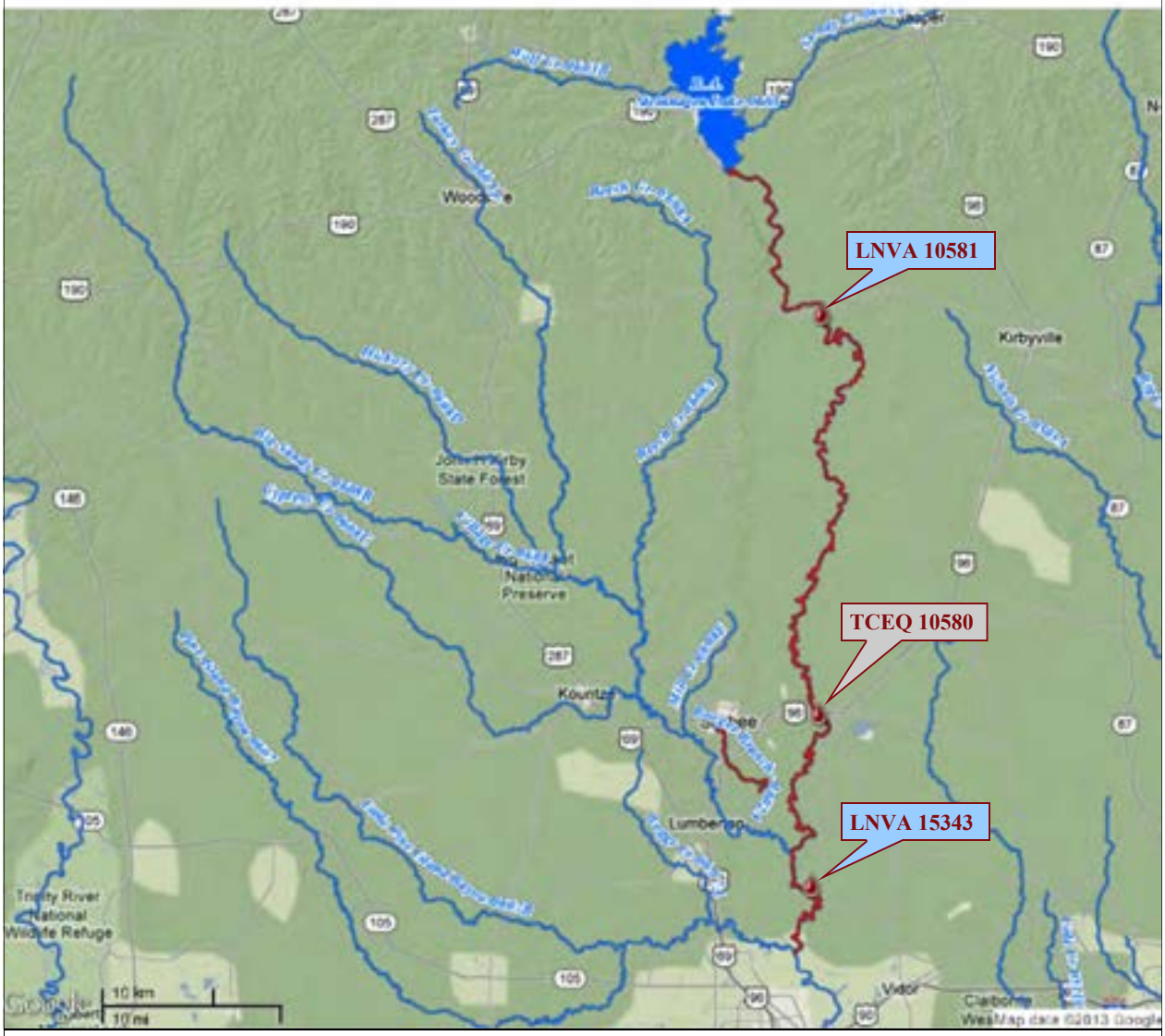
See appendix A for parameter list

Site Description	Station ID	Water-body ID	Basin	Agency	Field	Conv.	Bacteria	Flow	Metals in sediment
NECHES RIVER 0.8 KM DOWNSTREAM OF MOBIL CANAL 9.65 KM DOWNSTREAM OF IH 10 780 M UPSTREAM OF MANSFIELD FERRY ROAD	10570	0601	6	TCEQ	4	4	4		4
NECHES RIVER AT LNVA SALINITY STATION Y 1.8 KILOMETERS DOWNSTREAM OF NECHES RIVER SALTWATER	20774	0601	6	LNVA	4	4	4	4	
NECHES RIVER AT PORT NECHES CITY PARK BOAT RAMP 117 M NORTHEAST OF MERRIMAN STREET IN BEAUMONT	10566	0601	6	TCEQ	4	4	4		
NECHES RIVER AT SH 87 BRIDGE NORTH OF PORT	10563	0601	6	TCEQ	4	4	4		4
NECHES RIVER BRIDGE AT IH 10 NEAR BEAUMONT 1.02 KM EAST OF US 90/IH 10 INTERSECTION	10575	0601	6	TCEQ	4	4	4		4
STAR LAKE CANAL 0.4 KM UPSTREAM OF THE NECHES RIVER KM UPSTREAM OF SH 87/GULFWAY DRIVE NORTH OF PORT ARTHUR	10485	0601A	6	TCEQ	4	4	4		4

Water Quality Monitoring Stations

SEGMENT: 602 Neches River Below B. A. Steinhagen Lake

See appendix A for parameter list

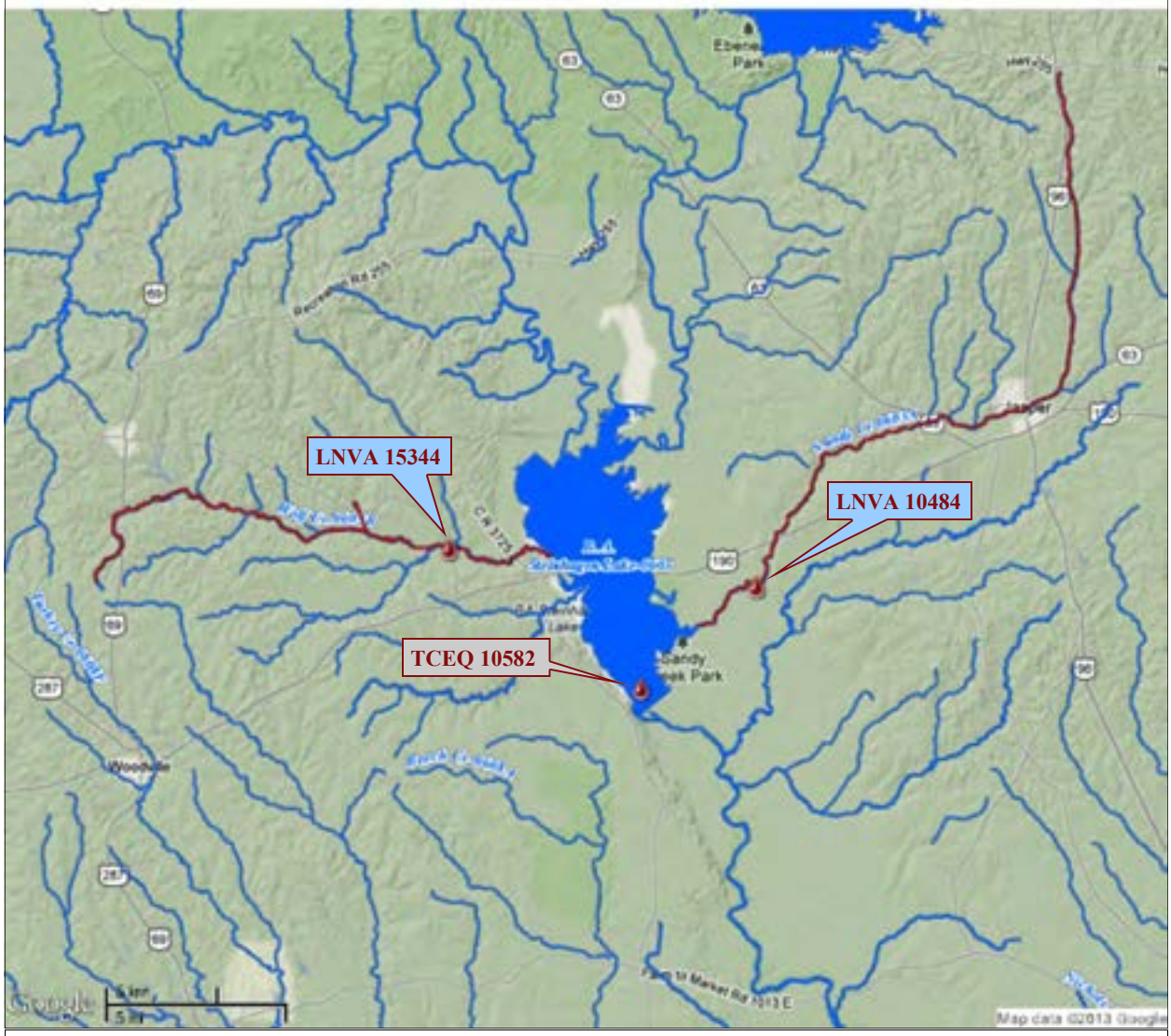


Site Description	Station ID	Water-body ID	Basin	Agency	Field	Conv.	Bacteria	Flow
NECHES RIVER AT US 96 2.09 KM WEST OF US 96/FM 105 INTERSECTION 8.6 KM EAST OF SILSBEE	10580	0602	6	TCEQ	4	4	4	4
NECHES RIVER AT FM 1013 IN THE BIG THICKET NATIONAL PRESERVE EAST OF SPURGER IN JASPER COUNTY	10581	0602	6	LNVA	4	4	4	4
NECHES RIVER NEAR LAKEVIEW 1 KM WEST OF FM 1131 12.24 KM UPSTREAM OF PINE ISLAND BAYOU CONFLUENCE	15343	0602	6	LNVA	4	4	4	4

Water Quality Monitoring Stations

SEGMENT: 603 B. A. Steinhagen Lake

See appendix A for parameter list

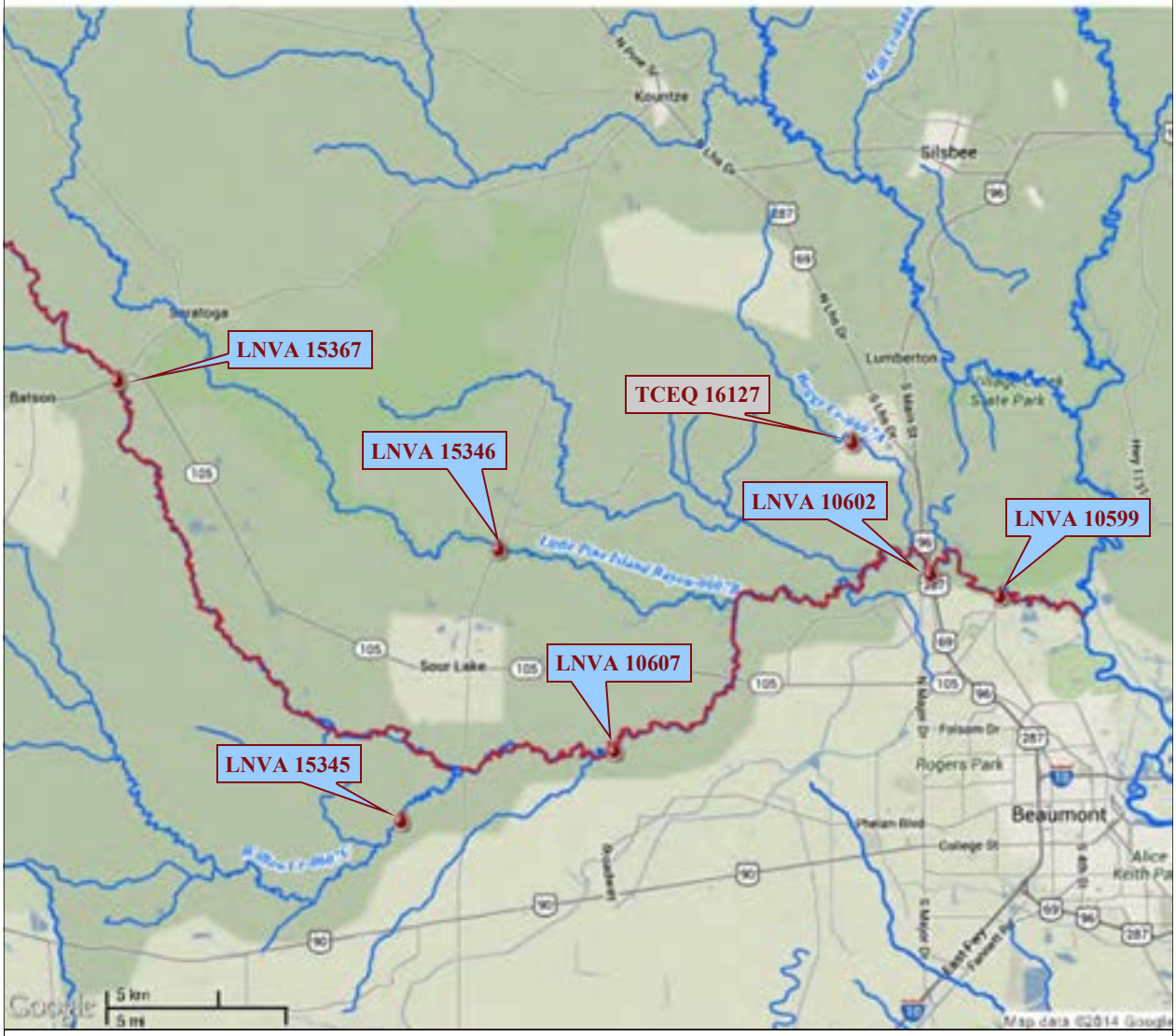


Site Description	Station ID	Water-body ID	Basin	Agency	Field	Conv.	Bacteria	Flow
B A. STEINHAGEN RESERVOIR NEAR DAM 948 M NORTHWEST OF DAM FACE 2.07 KM NORTH OF FM	10582	0603	6	TCEQ	4	4	4	
SANDY CREEK AT FM 777 2.15 KM SOUTHWEST OF FM 777/US 190 INTERSECTION 14.7 KM SOUTHWEST OF	10484	0603	6	LNVA	4	4	4	4
WOLF CREEK AT FM 256 5.6 KM UPSTREAM OF BA. STEINHAGEN RESERVOIR 2.3 KM NNW OF US 190/FM	15344	0603	6	LNVA	4	4	4	4

Water Quality Monitoring Stations

SEGMENT: 0607 Pine Island Bayou

See appendix A for parameter list

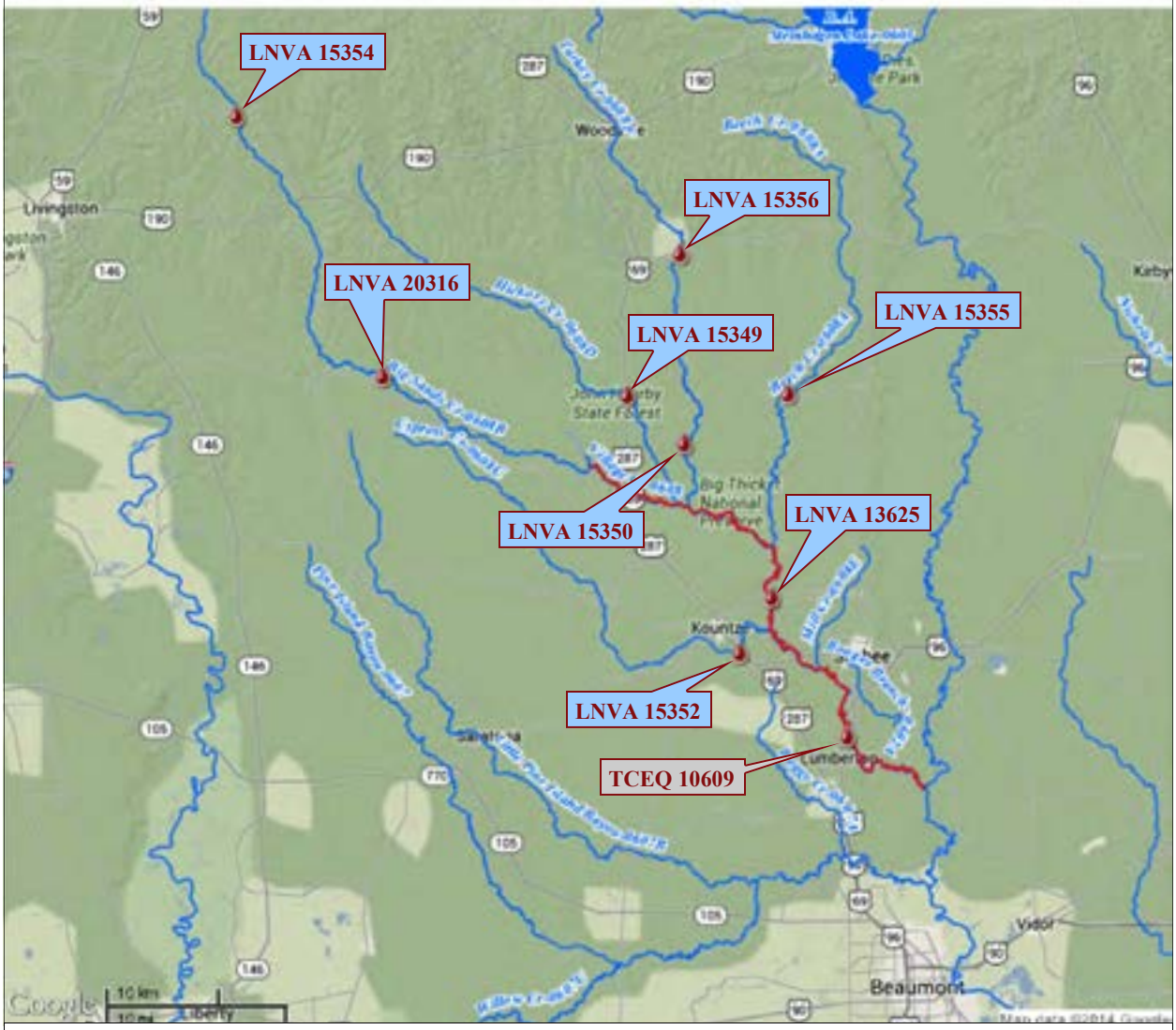


Site Description	Station ID	Water-body ID	Basin	Agency	Field	Conv.	Bacteria	Flow
PINE ISLAND BAYOU AT LNVA LOWER PUMP STATION, 6.62 KM UPSTREAM OF NECHES RIVER CONFLUENCE 2.86 KM EAST OF US 69	10599	0607	6	LNVA	4	4	4	4
PINE ISLAND BAYOU AT SH 105, 0.65 KM SOUTHWEST OF FM 770/SH 105 INTERSECTION NEAR CITY OF BATSON	15367	0607	6	LNVA	4	4	4	4
PINE ISLAND BAYOU AT SOUR LAKE ROAD, 7.5 KM SOUTHEAST OF INTERSECTION OF SH 326/SH 105 IN CITY OF SOUR LAKE	10607	0607	6	LNVA	4	4	4	4
PINE ISLAND BAYOU AT US 69 /US 96/US 287 AT VOTH	10602	0607	6	LNVA	4	4	4	4
BOGGY CREEK AT FM 421, 1.75 KM SOUTHWEST OF FM 421/US 69 INTERSECTION NEAR LUMBERTON	16127	0607A	6	TCEQ	4	4	4	4
LITTLE PINE ISLAND BAYOU AT SH 326, 5.68 KM NORTH OF CITY OF SOUR LAKE	15346	0607B	6	LNVA	4	4	4	4
WILLOW CREEK AT UNNAMED ROAD, 4.87 KM NORTH NORTH-WEST OF NOME 6.78 KM UPSTREAM OF PINE ISLAND BAYOU CONFLUENCE/SH 326	15345	0607C	6	LNVA	4	4	4	4

Water Quality Monitoring Stations

SEGMENT: 0608 Village Creek

See appendix A for parameter list

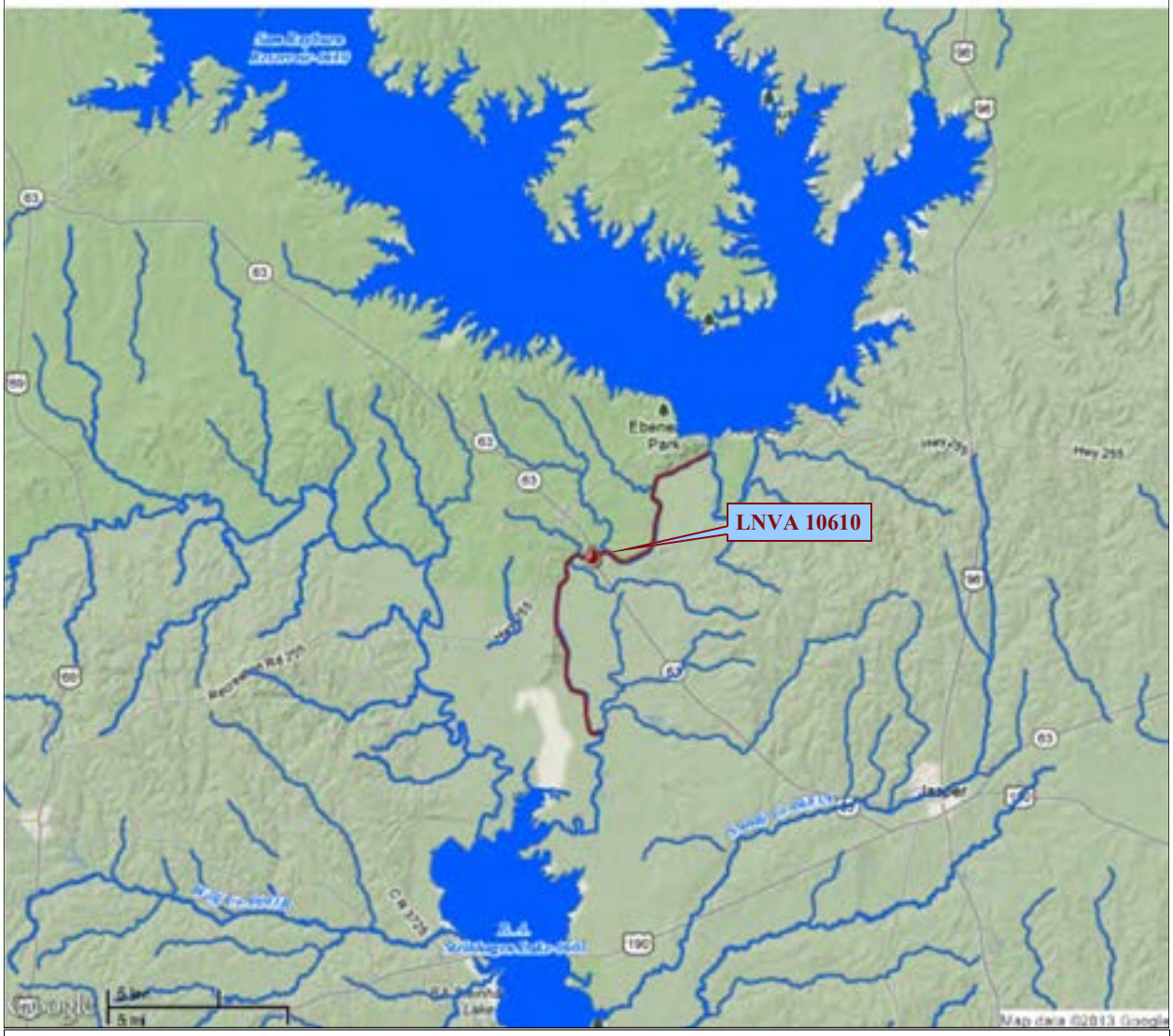


Site Description	Station ID	Water-body ID	Basin	Agency	Field	Conv.	Bacteria	Flow
VILLAGE CREEK AT US 96, 6.35 KM SOUTH OF SILSBEE	10609	0608	6	TCEQ	4	4	4	4
VILLAGE CREEK AT FM 418, 5.04 KM NORTHEAST OF KOUNTZE	13625	0608	6	LNVA	4	4	4	4
BEECH CREEK AT FM 1943, 7 KM WEST OF FM 1943/ FM 92 INTERSECTION 7.3 KM WEST-SOUTHWEST OF CITY OF FRED	15355	0608A	6	LNVA	4	4	4	4
Big Sandy Creek at FM 1276, 3.8 MI South of Dallardsville	20316	0608B	6	LNVA	4	4	4	4
BIG SANDY CREEK AT FM 942, 2.07 KM SOUTHWEST OF FM 942/FM 2500 INTERSECTION 10.47 KM SOUTHEAST OF LEGGETT	15354	0608B	6	LNVA	4	4	4	4
CYPRESS CREEK AT US 69/US 287, 3.4 KM SOUTHEAST OF KOUNTZE	15352	0608C	6	LNVA	4	4	4	4
HICKORY CREEK AT US 69, 0.73 KM NORTH OF FM 2827/US 69 INTERSECTION 5.8 KM SOUTH OF WARREN	15349	0608D	6	LNVA	4	4	4	4
TURKEY CREEK AT FM 1013, 3.57 KM EAST NORTHEAST OF US 287/FM 1013 INTERSECTION	15356	0608F	6	LNVA	4	4	4	4
TURKEY CREEK AT GORE STORE ROAD, 6.3 KM SOUTHEAST OF FM 2827/US 69 INTERSECTION	15350	0608F	6	LNVA	4	4	4	4

Water Quality Monitoring Stations

SEGMENT: 609 Angelina River Below Sam Rayburn Reservoir

See appendix A for parameter list



Site Description	Station ID	Water-body ID	Basin	Agency	Field	Conv.	Bacteria	Flow
ANGELINA RIVER AT SH 63, 2.10 KM SOUTHEAST OF SH 63/REC RD 255 INTERSECTION 19.56 KM NORTH OF JASPER	10610	0609	6	LNVA	4	4	4	4

Water Quality Monitoring Stations

SEGMENT: 701 Taylor Bayou/North Fork Taylor Bayou Above Tidal

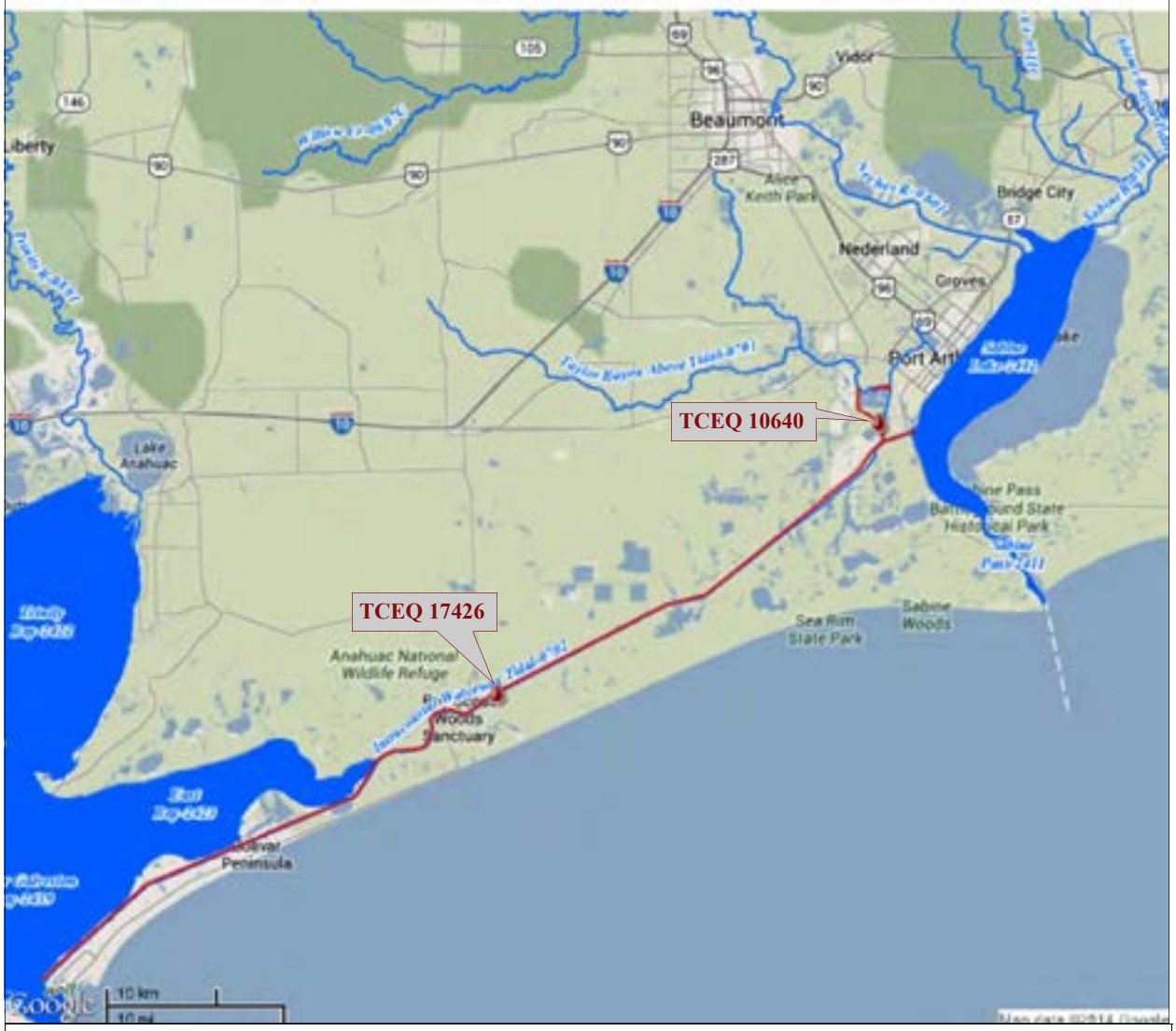
See appendix A for parameter list

Site Description	Station ID	Waterbody ID	Basin	Agency	Field	Conv.	Bacteria	Metals in water
TAYLOR BAYOU AT SH 73 WEST OF PORT ARTHUR	10668	0701	7	TCEQ	4	4	4	
TAYLOR BAYOU NORTH FORK AT IH 10	10674	0701	7	TCEQ	4	4	4	
SHALLOW PRONG LAKE ON BIG HILL BAYOU WEST-ERNMOST ARM NEAR FENCE PILINGS	10642	0701D	7	TCEQ	4	4	4	4

Water Quality Monitoring Stations

SEGMENT: 702 Intracoastal Waterway Tidal

See appendix A for parameter list



Site Description	Station ID	Waterbody ID	Basin	Agency	Field	Conv.	Bacteria
INTRACOASTAL WATERWAY (ICWW) MID CHANNEL AT THE JEFFERSON/CHAMBERS COUNTY LINE APPROX. 5 KM EAST OF SH124 NEAR HIGH ISLAND	17426	0702	7	TCEQ	4	4	4
TAYLOR BAYOU MID CHANNEL 420 M UPSTREAM OF CONFLUENCE WITH INTRACOASTAL WATERWAY TIDAL	10640	0702	7	TCEQ	4	4	4

Water Quality Monitoring Stations

SEGMENT: 703 Sabine-Neches Canal Tidal

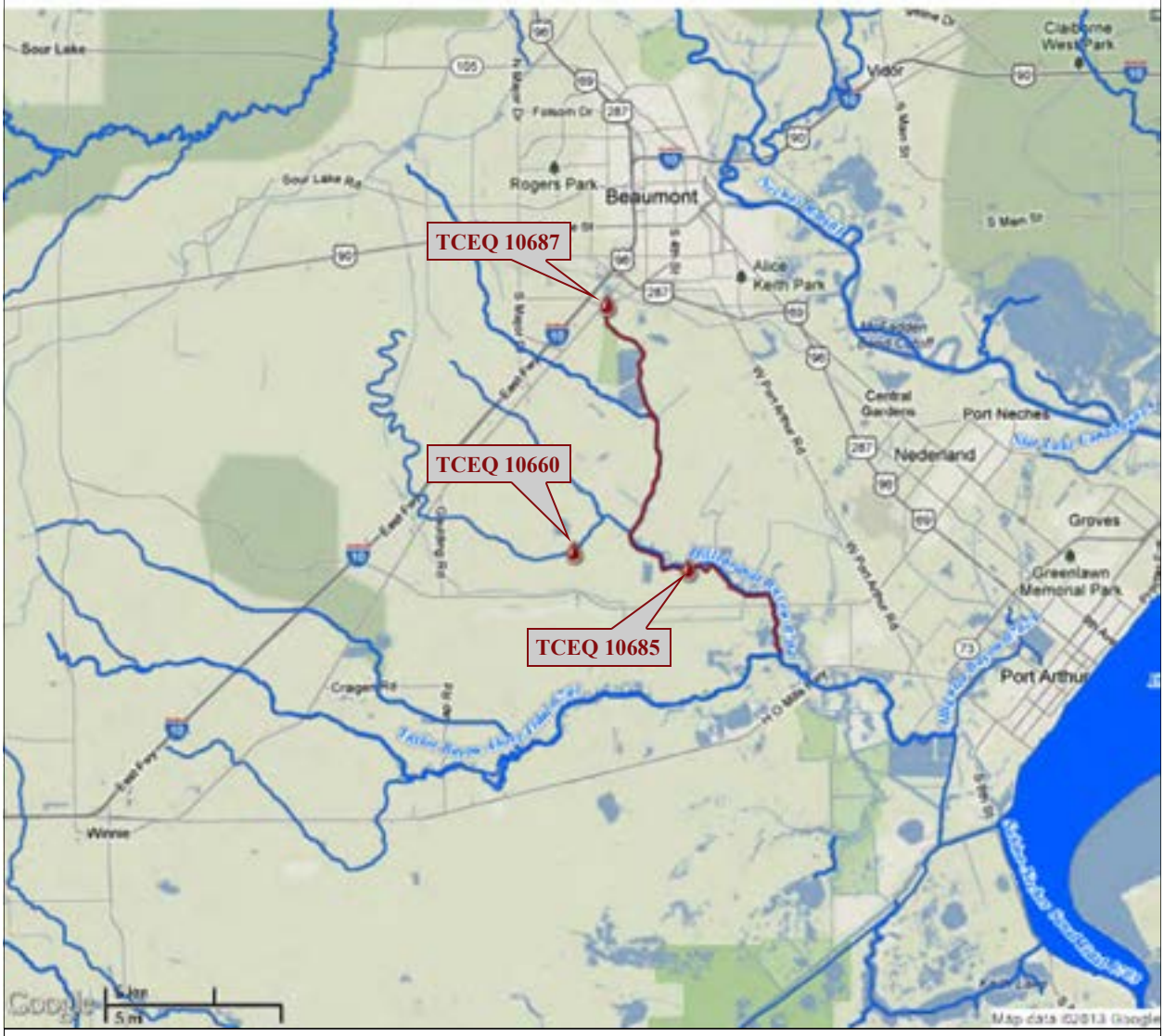
See appendix A for parameter list

Site Description	Station ID	Waterbody ID	Basin	Agency	Field	Conv.	Bacteria
SABINE-NECHES CANAL TIDAL MID CHANNEL ADJACENT TO TOPCO DOCKS 340 M SOUTH OF TAFT AVE AT DD 7 LEVEE RD	10683	0703	7	TCEQ	4	4	4
TAYLOR BAYOU TURNING BASIN AT TEXACO DOCK AT CONFLUENCE WITH SABINE-NECHES CANAL TIDAL	10652	0703	7	TCEQ	4	4	4

Water Quality Monitoring Stations

SEGMENT: 704 Hillebrandt Bayou

See appendix A for parameter list



Site Description	Station ID	Waterbody ID	Basin	Agency	Field	Conv.	Bacteria
HILLEBRANDT BAYOU AT SH 124 IN BEAUMONT	10687	0704	7	TCEQ	4	4	4
HILLEBRANDT BAYOU AT HILLEBRANDT ROAD NEAR LOVELL LAKE 30 M DOWNSTREAM OF MIDDLE OF HILLEBRANDT ROAD BRIDGE	10685	0704	7	TCEQ	4	4	4
BAYOU DIN AT LABELLE ROAD SOUTH OF BEAUMONT	10660	0704D	7	TCEQ	4	4	4

Appendix A : Parameter List

The number of times each parameter group is sampled per year is indicated below each map. Parameters below are not all-inclusive and may vary by site or agency.

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)
- Stream discharge (freshwater streams and rivers)
- Method of stream discharge measurement (freshwater streams and rivers)

Conventional Parameters

- Total Alkalinity
- Sulfate (SO4)
- Chloride
- Total Hardness
- Total Suspended Solids (T.S.S.)
- Turbidity (NTU)
- Ammonia (NH3)
- Nitrate + Nitrite (NO3+NO2)
- Total Phosphorus (PO4)

Bacteria

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