

Lower Neches River & Neches-Trinity Coastal Basins

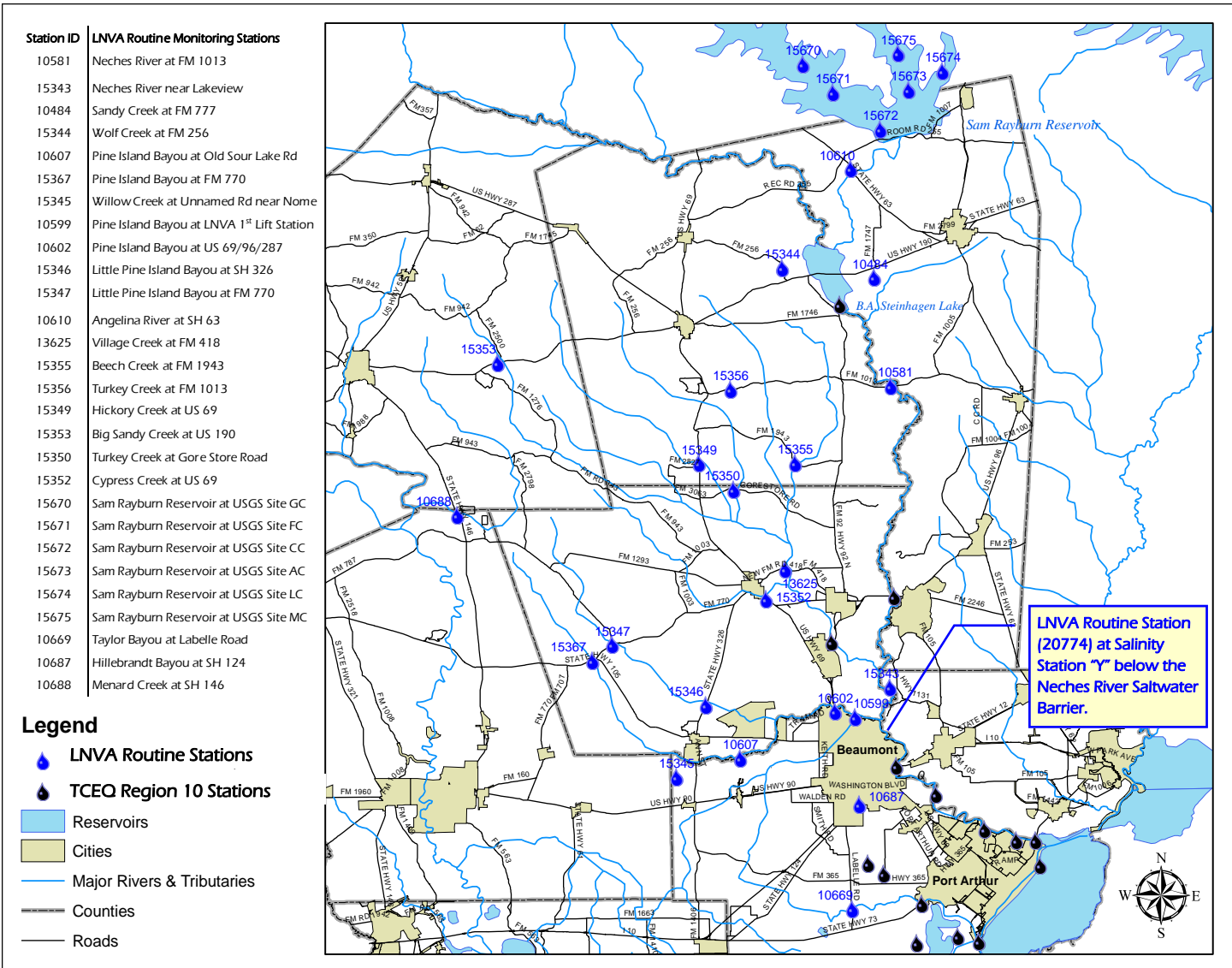
The Lower Neches Valley Authority (LNVA) has been involved in the Texas Clean Rivers Program (CRP) since the Clean Rivers Act was passed in 1991. The goal of the program is to maintain and improve the quality of water within each river basin in Texas through an ongoing partnership involving the Texas Commission on Environmental Quality (TCEQ), river authorities, other agencies, local governments, industry and citizens.

The LNVA administers the CRP in the Lower Neches River Basin (Basin 6) and the Neches-Trinity Coastal Basin (Basin 7). During FY 2012, LNVA will monitor surface water quality at 31 routine stations on a quarterly basis. Parameters include flow, pH, temp., conductivity, dissolved oxygen, turbidity, alkalinity, hardness, sulfate, chloride, E. coli or Enterococci bacteria, TSS, TDS, ammonia-nitrogen, total nitrate+nitrite, total phosphorus, total kjeldahl nitrogen (TKN), and chlorophyll a.

LNVA submits quality assured data to the TCEQ for the development of surface water quality monitoring (SWQM) assessment

reports. Formerly called the "Texas Water Quality Inventory and 303(d) List," the Texas Integrated Report evaluates the quality of surface waters in Texas, and describes the status of Texas' natural waters based on historical data. It identifies impaired water bodies that are not meeting standards set for their use on the 303(d) List.

The Texas Integrated Report satisfies the requirements of federal Clean Water Act Sections 305(b) and 303(d). The TCEQ produces a new report every two years in even-numbered years, as required by law. The 303(d) List must be approved by the EPA before it is final. The 2010 list was approved by the EPA on Nov. 18, 2011. The 2010 assessment included data collected during the most recent seven-year period (Dec. 1, 2001 to Nov. 30, 2008) and up to ten years, if needed, to attain a minimum number of samples for assessment. The 2012 assessment is currently underway and a draft has been submitted to data providers for their review.



2010 Integrated Report—Texas 303(d) List, Nov. 18, 2011

Segment ID/ Description	Use Impairment (Year Listed)	Identified Parameters (Category)	Explanation of Impairment/ Concern	Actions Taken	Recommended Actions
Segment 0602: Lower Neches River above Tidal	Fish Consumption Use (2010)	Mercury in edible fish tissue (5c)	Atmospheric Deposition	New Advisory is- sued by DSHS on March 8, 2010	TCEQ Special Study; Coordinate fish tissue sampling with DSHS
Segment 0603: B.A. Steinhagen Reservoir	Fish Consumption Use (1998)	Mercury in edible fish tissue (5c)	Atmospheric Deposition	Public Advisory issued by DSHS	TCEQ Special Study; Coordinate fish tissue sampling with DSHS
Segment 0603A: Sandy Creek	Contact Recreation Use (2000)	Bacteria (5b)	Non-point Source Pollution	East Texas Recrea- tional Use Attain- ability Analysis (RUAA) Project	Evaluate bacteria standards based on RUAA results
Segment 0603B: Wolf Creek	Contact Recreation Use (2006)	Bacteria (5b)			
Segment 0607: Pine Island Bayou	Aquatic Life Use (2000)	Depressed Dis- solved Oxygen (5b)	Natural, low flow conditions	Use Attainability Analysis (UAA); CWQMN Station	Complete UAA study; Revise stan- dards as needed
	Contact Recreation Use (2008)	Bacteria (5c)	Non-point Source Pollution	Continue Routine Monitoring	RUAA Project
Segment 0607B: Little Pine Island Bayou	Contact Recreation Use (2006)	Bacteria (5c)	Non-point Source Pollution	Continue Routine Monitoring	RUAA Project
	Aquatic Life Use (2000)	Depressed DO (5b)	Natural, low flow conditions	Aquatic Life Assess- ment (ALA);	Complete ALA study; apply new standards
Segment 0607A: Boggy Creek	Aquatic Life Use (2000)	Depressed DO (5b)	Unknown	N/A	Routine monitoring on Boggy Creek
Segment 0607C: Willow Creek	Aquatic Life Use (2000)	Depressed DO (5b)	Unknown	UAA on Willow Creek	Routine monitoring on Willow Creek

Category **5a** - A TMDL is underway, scheduled, or will be scheduled; Category **5b** - A review of the water quality standards for this water body will be conducted before a TMDL is scheduled; Category **5c** - Additional data and information will be collected before a TMDL is scheduled.

2010 Integrated Report—Texas 303(d) List, Nov. 18, 2011

Segment ID/ Description	Use Impairment (Year Listed)	Identified Parameters (Category)	Explanation of Impairment/ Concern	Actions Taken	Recommended Actions
Segment 0608: Village Creek	General Use (2000) Fish Consumption Use (2010)	Low pH (5b) Mercury in edible fish tissue (5c)	Natural Condi- tions Atmospheric Deposition	TCEQ Proposed 2010 Standards Revision	Approve Standards to revise pH Range
Segment 0608A: Beech Creek	Contact Recreation Use (2006)	Bacteria (5b)	Non-Point Source Pollution	RUAAs Planned; LNVA Routine Monitoring	Complete RUAA's in the segment
Segment 0608B: Big Sandy Creek	Contact Recreation Use (2000)	Bacteria (5b)			
Segment 0608F: Turkey Creek	Contact Recreation Use (2000)	Bacteria (5c)			
Segment 0608C: Cypress Creek	Contact Recreation Use (2006) Aquatic Life Use (2000)	Bacteria (5b) Depressed DO (5b)	Non-Point Source Pollution Natural, low flow conditions	24 hr. DO & Biologi- cal Assessment; CRP Routine Monitoring	Continue 24 hr. DO/ Biological Data Collection
Segment 0608E: Mill Creek	Aquatic Life Use (2006)	Depressed DO (5c)	Unknown	Unknown	24 hr. DO Monitor- ing
Segment 0608G: Lake Kimble	Fish Consumption Use (2000)	Mercury in edible fish tissue (5c)	Atmospheric Deposition	Public Advisory Is- sued by DSHS	Coordinate fish tissue sampling
Segment 0701: Taylor Bayou above Tidal	Aquatic Life Use (1996)	Depressed DO (5b)	Natural condi- tions	UAA on Taylor/ Hillebrandt Bayou	Complete UAA; Revise DO stan- dard as needed
Segment 0701D: Shallow Prong Lake	Aquatic Life Use (2004)	Depressed DO (5c)	Unknown	TCEQ Routine Moni- toring	Continue Routine Monitoring; Con- sider Special Study
Segment 0702: Intracoastal Water- way Tidal	Fish Consumption Use (2010)	Dioxin/PCBs in edible tissue (5a)	Unknown	Public Advisory Is- sued by DSHS, July 8, 2008	TCEQ Special Study; Coordinate fish tissue sampling with DSHS
Segment 0702A: Alligator Bayou	Aquatic Life Use (1998)	Toxicity in Water and Sediment (5c)	Air Deposition, Point Source Pol- lution	Statewide Ambient Toxicity Assessment;	Determine source(s) of toxic- ity; develop TMDL
Segment 0704: Hillebrandt Bayou	Aquatic Life Use (1998) Contact Recreation Use (2010)	Depressed DO (5b) Bacteria (5b)	Natural, low flow conditions Non-point source pollution; munici- pal storm water	UAA on Taylor/ Hillebrandt Bayous LNVA & TCEQ Rou- tine monitoring	Complete UAA; Revise DO stan- dards as needed Continue Routine Monitoring and Develop RUAA

Category 5a - A TMDL is underway, scheduled, or will be scheduled; Category 5b - A review of the water quality standards for this water body will be conducted before a TMDL is scheduled; Category 5c - Additional data and information will be collected before a TMDL is scheduled.

Watershed Characterization Report

The following segments are included in the watershed characterization report due to their long history of impairments and inclusion on the Texas 303(d) List.

Segment 0603A: Sandy Creek

Segment 0603B: Wolf Creek

Sandy Creek and Wolf Creek both flow into B.A. Steinhagen Reservoir. Wolf Creek is 12 miles in length and Sandy Creek is a total of 23 miles in length. The Wolf Creek unclassified segment begins at the confluence of B.A. Steinhagen Lake southeast of Colmesneil in Tyler County and stretches to the upstream perennial portion of the stream south of Colmesneil in Tyler County. The Sandy Creek unclassified segment is from the confluence of B.A. Steinhagen Lake southwest of Jasper County to the confluence of Big and Little Sandy Creeks in the City of Jasper in Jasper County.

Soils 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, like in Segment 0602. The soils in segment 0603 generally drain well and are more permeable. Mean annual precipitation is 44-54 inches/year, and the mean temperature is 38/59 °F (Jan. min/max) and 71/94 °F (July min/max). Land use is primarily for timber production, pasture and livestock production, public parks and recreation, and wildlife habitat. The land is covered by mixed forest, evergreen forest, deciduous forest, and pine plantations.

Historically, this segment has good water quality for parameters such as dissolved oxygen, chlorides, sulfates, chlorophyll, and nutrients. 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. LNVA monitors one station on Sandy Creek at FM 777 southwest of Jasper and one station on Wolf Creek at FM 256. Other than elevated bacteria, Segment 0603 supports all designated uses.

The contact recreation use is not supported for Sandy Creek at FM 777 (Station 10484), due to high levels of *E. coli*. In 2010, thirty samples were assessed and the geomean was 194 MPN—Most Probable Number per 100mL; the criterion for the bacteria geomean is 126 MPN/100 mL. Wolf Creek at FM 256 (Station 15344) does not support the contact recreation use based on 30 samples assessed, since the bacteria geomean was 212 MPN/100 mL.

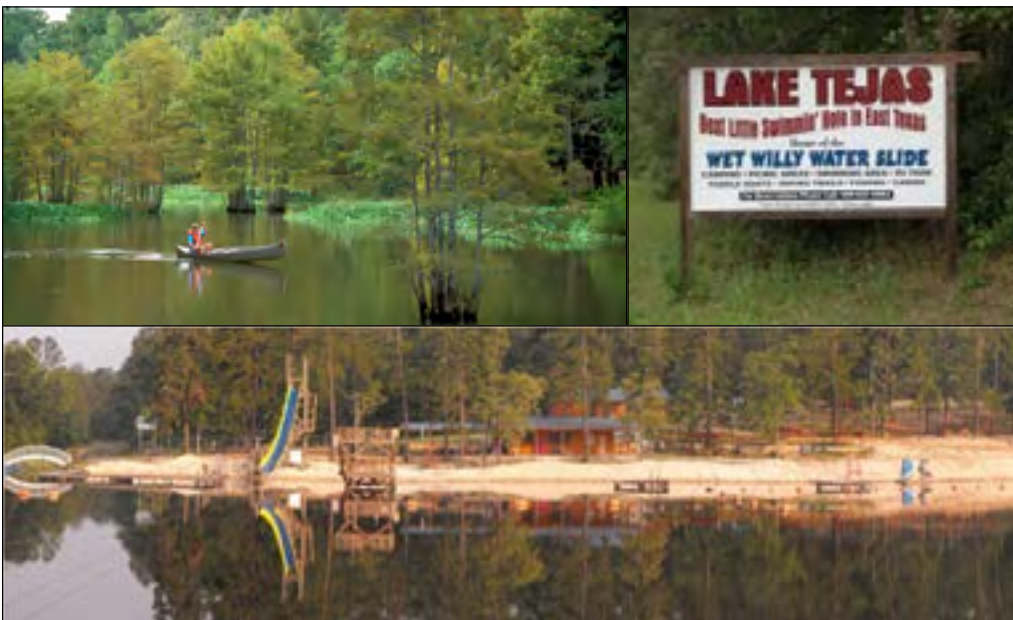
Generally, the bacteria counts seem to be seasonally influenced with higher *E. coli* counts in the summer months and lower counts in the winter months. Since Wolf Creek drains a large amount of pastureland, the likely source is manure runoff due to cattle grazing in riparian zones and unrestricted cattle access. It is common for *E. coli* counts to increase after significant rainfall events. Sandy Creek is also located in pastureland areas, however the segment originates in the City of Jasper and receives wastewater effluent and stormwater runoff as well. These factors may also contribute to the elevated bacteria in Sandy Creek.

However, increasing bacteria levels with more flow due to rainfall indicates non-point sources are likely the origin. Additional non-point sources may include sewage discharge due to failing on-site sewage facilities and wildlife.

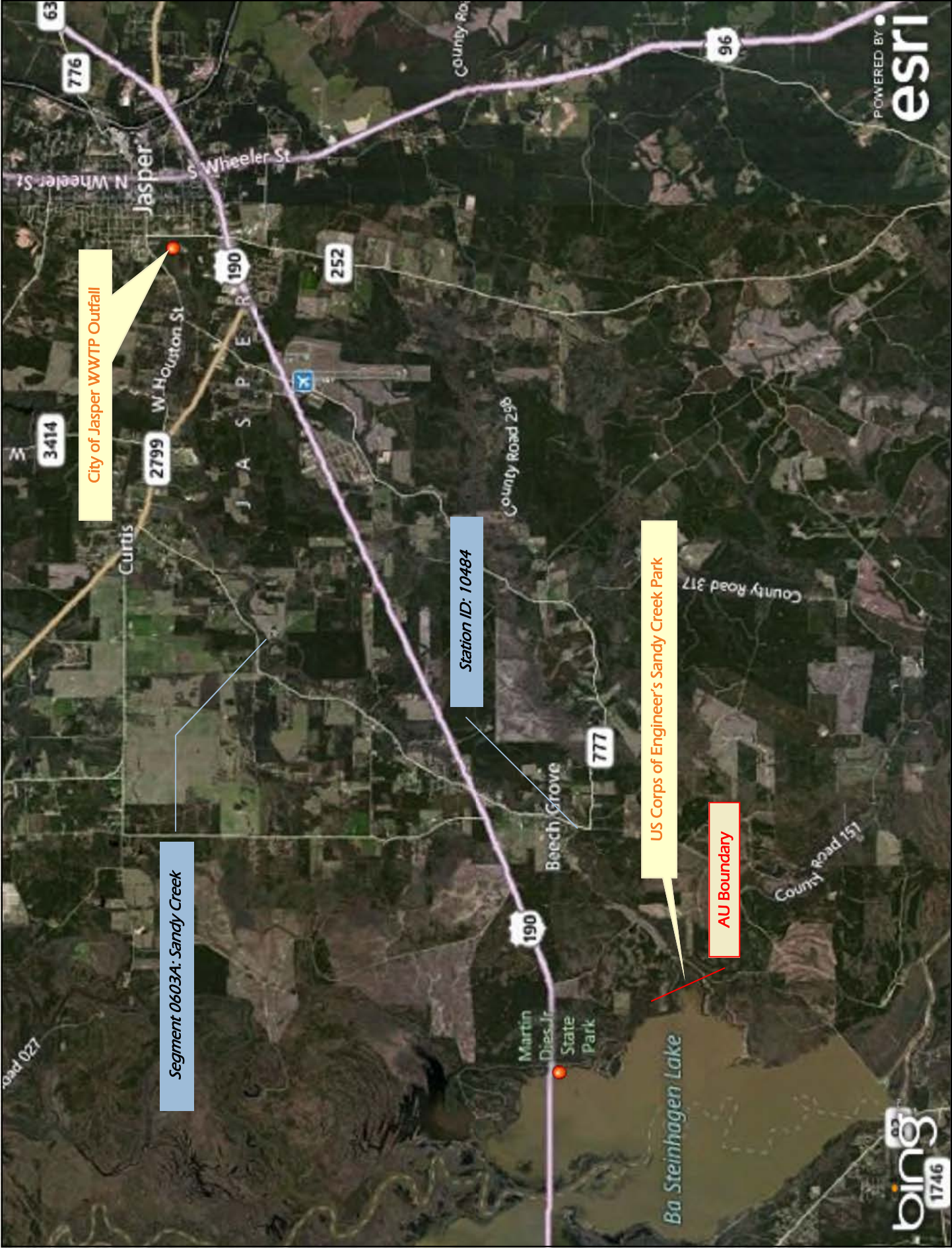
A Recreational Use Attainability Analysis (RUAA) was scheduled for both segments, however TCEQ has postponed many of these projects planned for the Neches River basin. Interested stakeholders may include land owners, local ranchers, City of Jasper, City of Colmesneil, Lake Tejas water park, U.S. Army Corps of Engineers, and the Texas Parks & Wildlife Department.

Segment 0607C: Willow Creek

The Willow Creek unclassified segment is from the confluence of Pine Island Bayou (0607) at the SH 326 bridge to the upstream perennial portion east of Devers in Liberty County.



Above Left: Sandy Creek flows through the scenic Sandy Creek Park operated by the U.S. Army Corps of Engineers on B.A. Steinhagen Lake. Above and Right: Lake Tejas is a popular recreational swimming area and water park located in the Wolf Creek watershed near Colmesneil, Texas.



City of Jasper WWTP Outfall

Segment 0603A: Sandy Creek

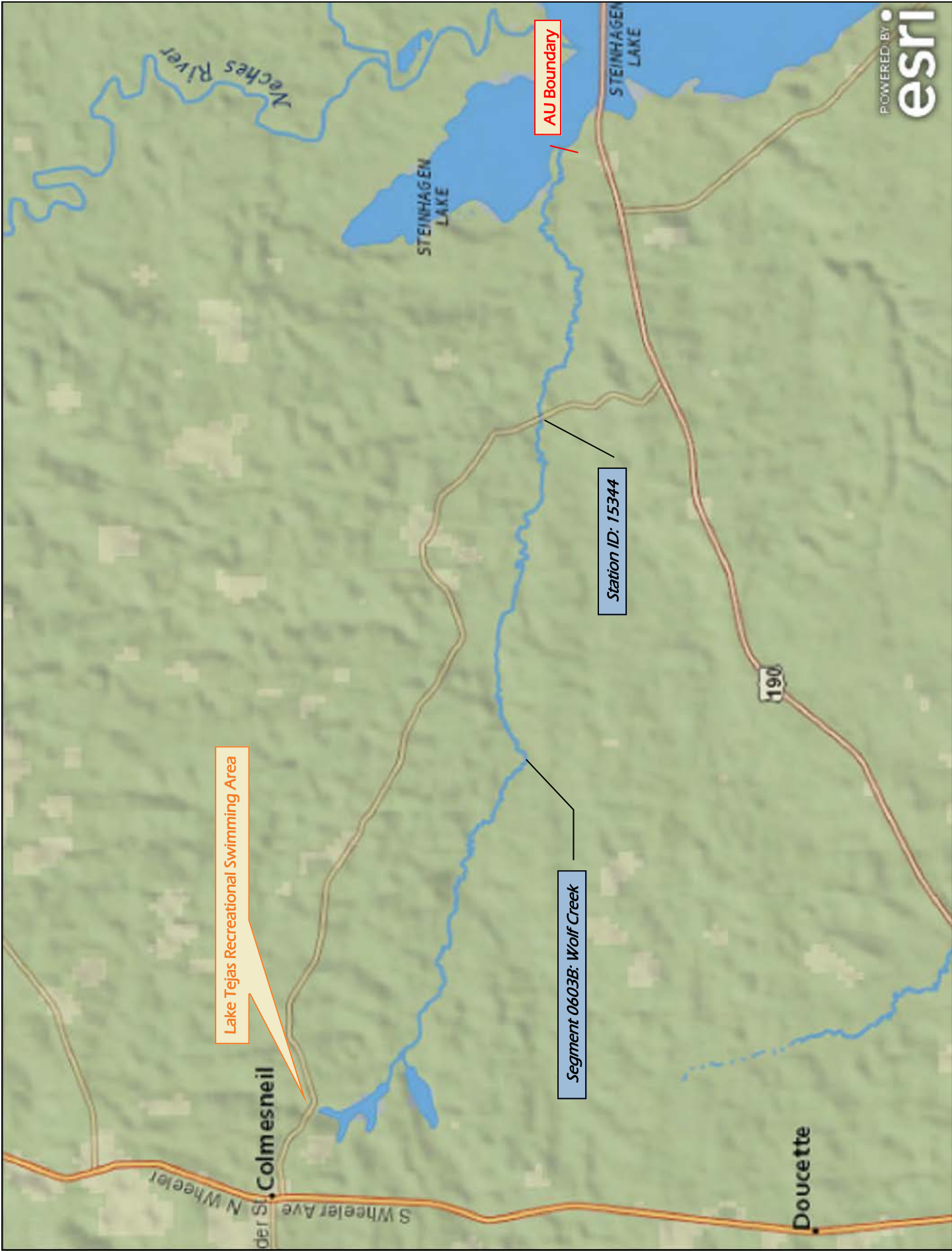
Station ID: 10484

US Corps of Engineer's Sandy Creek Park

AU Boundary

POWERED BY
esri

bing
1746



AU Boundary

Station ID: 15344

Segment 0603B: Wolf Creek

Lake Tejas Recreational Swimming Area

Streams in this segment are low gradient with sluggish flows, sand and clay substrate from its headwaters to its confluence with Pine Island Bayou at the Hardin and Jefferson County line. The upper reaches of Pine Island Bayou bisect mainly forestland through approximately 71% of the watershed. The lower reaches drain the communities of Sour Lake, Pinewood Estates, Bevil Oaks, Lumberton and the far northern areas of Beaumont. One routine station (ID 15345) is monitored quarterly by the LNVA (see photo at right).

In this segment, soils are acidic and poorly drained after heavy rainfall. The Level IV ecoregion in Segment 0607C is Flatwoods (35f), and the physiography consists of flat plains, irregular plains, small, undrained depressions, and a few surface mounds from salt domes. Mean annual precipitation here is 47-58 inches/year and mean temperature is 40/61 °F (Jan. min/max) and 73/92 °F (July min/max). Historically, longleaf pine flatwoods and savannas with bluestem grasses were present, but now it is mixed pine-hardwood forests.

Common vegetation in this segment is longleaf pine, loblolly pine, sweetgum, oak species, southern magnolia, and an understory of holly, yaupon, sweetbay, wax myrtle, and American beautyberry. Land use is timber production, pastureland, cattle production, and oil and gas production. Land cover is mixed forest, evergreen forest, deciduous forest, and forested wetlands.

Historically, low dissolved oxygen (DO) measurements have been collected in Willow Creek, therefore it has been included on the Texas 303(d) List since 2000. In the 2010 Integrated Report, Segment 0607C was listed as not supporting the aquatic life use for 24-hour average DO (2.9/5.0 mg/L), 24-hour minimum DO (2.2/3.0 mg/L), and grab sample minimum (2.25/3.0 mg/L). In 2010, a Use Attainability Analysis (UAA) was conducted by the TCEQ Water Quality Standards Team. They collected limited field data including 24-hour DO measurements and will tie in to the (biological) work being done on the Pine Island Bayou UAA.

Persistent, 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. Station 15345 is located in a large, rural area dominated by cattle grazing and oil/gas producing operations. Wildlife is abundant in this area as well. Deer, hogs and otters have been observed at or near this monitoring station. Interested stakeholders in the segment may include land owners, local ranchers, oil/gas production companies, and several municipalities. Three permitted outfalls are located in the far upper reaches of this segment including Hull Freshwater Supply District (FWSD) and the City of Daisetta.

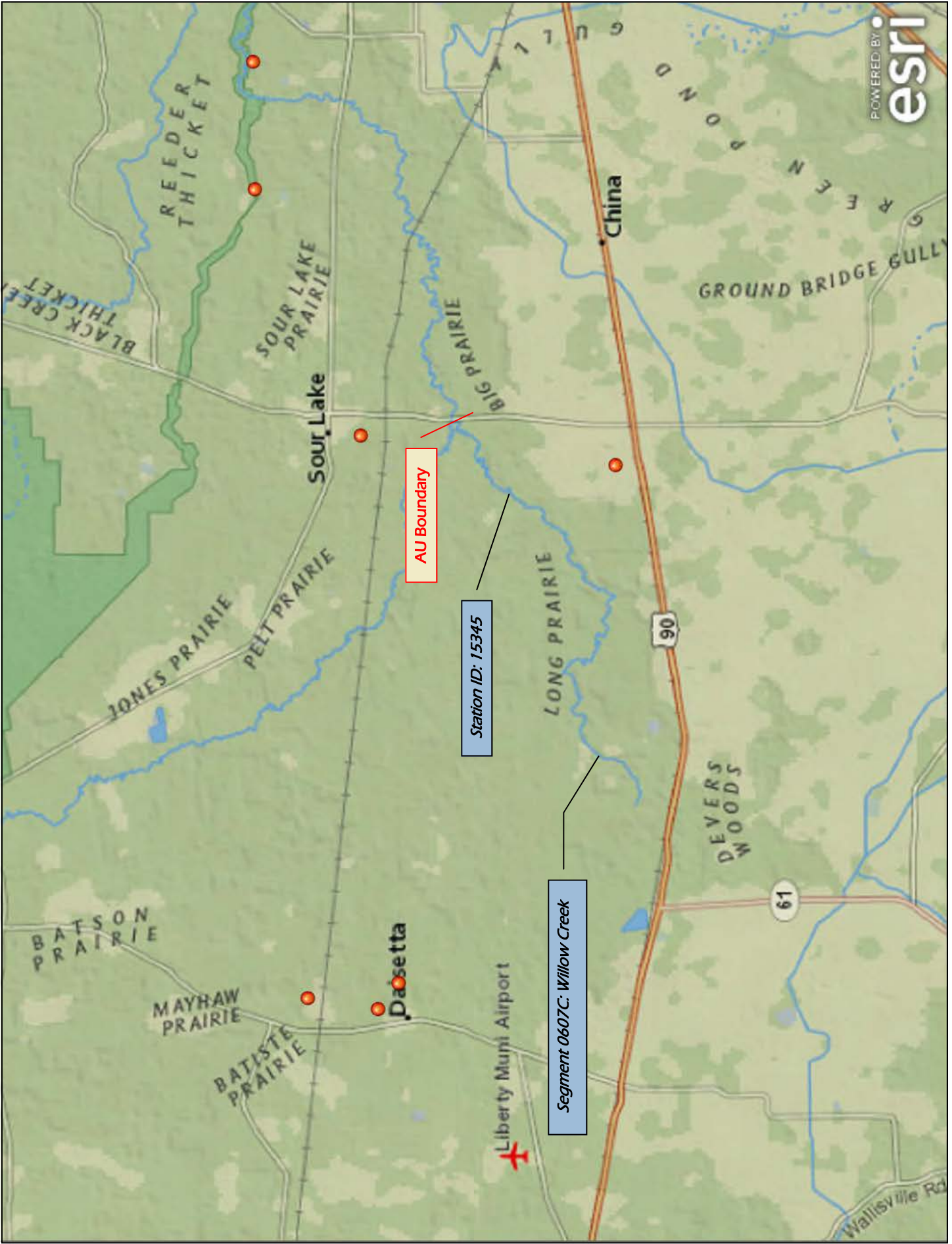


Above: Willow Creek monitoring station (Station ID 15345) near the Pine Island Bayou confluence in Jefferson County after a rainfall event.



Perennial pools in Cypress Creek at US Hwy. 69 near Kountze (Station ID 15352) are common due to low-flow conditions (below photo from June 2011) and beaver dams (top photo from Sept. 2010).





Segment 0608C: Cypress Creek

Cypress Creek is an unclassified segment from the confluence of Village Creek (0608) east of Kountze in Hardin County to the confluence with Bad Luck Creek northwest of Kountze in Hardin County. One routine station (ID 15352) is monitored quarterly by the LNVA (see photos on page 7).

Segment 0608C is in the 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. Forests include cypress swamps, baygalls, blackwater sloughs, yaupon, water tupelo, and mayhaw trees. Average rainfall is approximately 50 inches/year. Temperatures range from an average low of 38 °F in January to an average high of 93 °F in July. Land use in Segment 0608C is oil/gas production activities, timber production, pastureland, cattle production, and public land (Big Thicket National Preserve).

Since 2000, the aquatic life use has not been supported due to low dissolved oxygen levels in Cypress Creek. In the 2010 Integrated Report, Segment 0608C is listed for 24-hour average DO (3.9/5.0 mg/L), 24-hour minimum DO (2.7/3.0 mg/L), and grab sample minimum (2.35/3.0 mg/L). In 2010, a Use Attainability Analysis (UAA) was conducted by the TCEQ Water Quality Standards Team. They collected limited field data including 24-hour DO measurements and biological assessments. They will also tie in to the (biological) work being done on the Pine Island Bayou UAA. There is also a concern for impaired habitat in Cypress Creek.

Cypress Creek is a low gradient stream which is pooled during normal flow conditions. Therefore, this segment should be considered for re-classification to intermittent with perennial pools. Continued routine monitoring, 24-hour DO measurements, and additional flow data needed to reclassify this segment are recommended.

Since 2006, the contact recreation use is not supported due to elevated levels of *E. coli* bacteria in Cypress Creek. In 2010, eighteen samples were assessed and the geo-mean was 178.4 MPN/100mL. The bacteria geo-mean criteria is 126 MPN/100mL. Cypress Creek at US 69 (Station 15352) drains large areas of forested and agricultural land that is used for timber and cattle production, with some residential areas where on-site sewage facilities exist. The City of Kountze WWTP outfall discharges into a Cypress Creek tributary which is located below the routine monitoring station. Therefore, the high bacteria levels are likely due to non-point sources located upstream.

Interested stakeholders in the segment may include land owners, local ranchers, oil/gas producers, Big Thicket National Preserve, and the City of Kountze.

Segment 0704: Hillebrandt Bayou

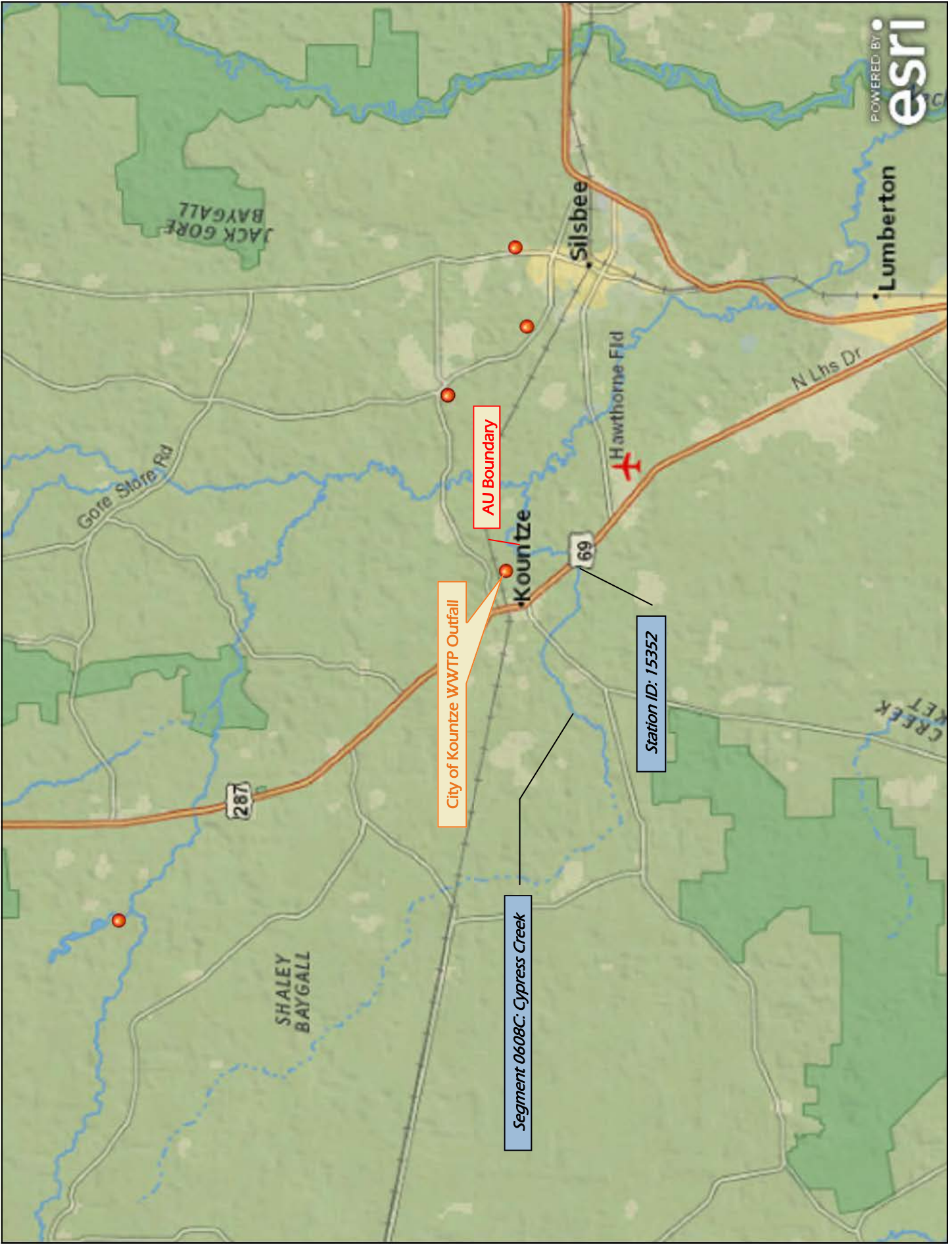
Hillebrandt Bayou is defined as a freshwater stream from the confluence of Taylor Bayou in Jefferson County to a point 100 meters (110 yards) upstream of SH 124 in Jefferson County, and is 14 miles in length. Two routine stations (ID's 10685 & 10687) are monitored quarterly by TCEQ and LNVA respectively. Segment 0704 includes four unclassified segments, and is designated for contact recreation use and intermediate aquatic life use (4.0 mg/L).

In the northern part of Segment 0704, trees are common and dominant types are water oak, pecan, southern live oak, American elm, and loblolly pine, much resembling the floodplain forests of Ecoregion 35. Lining the bayou is also water tolerant trees such as bald cypress and water tupelo. Prairie land is abundant in the southern section of Segment 0704, and as Hillebrandt Bayou converges with Taylor Bayou, low flat plains with freshwater and salt-water marsh grass is abundant. 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. Yearly rainfall averages between 37-58 inches/year, and mean temperature is 42/62 °F in January (min/max) and 74/92 °F in July (min/max).

Land use is pastureland, cropland (primarily rice), urban and industrial, oil and gas production, waterfowl hunting, parks and recreation, and golf courses. There are eight permitted municipal/industrial outfalls in this segment.

Hillebrandt Bayou serves as the primary receiving stream for the storm drainage system within the City of Beaumont, accepting runoff from approximately 70% of the city. Beaumont's Wastewater Treatment Plant discharges into Hillebrandt Bayou below SH 124 after tertiary treatment in the manmade wetlands (Cattail Marsh) and natural wetlands system. The wetlands comprise over 900 acres along Hillebrandt Bayou. Willow Marsh Bayou, Kidd Gully and Pevitot Gully are tributaries conveying additional flows from agricultural land. In addition to Hillebrandt Bayou receiving effluent from Cattail Marsh, the bayou also receives additional flow from Bayou Din, which is located along Bayou Din Golf Course. Flow is regulated in Hillebrandt Bayou by saltwater gates and barge locks downstream in Port Arthur.

Since 1998, the aquatic life use has not been supported due to depressed dissolved oxygen. In the 2010 Integrated Report, the lower assessment unit (AU) which is from the confluence with Taylor Bayou Above Tidal (0701) upstream to the confluence with Willow Marsh Bayou (0704A), Segment 0704_01 is listed for 24-hour average DO (2.98/4.0 mg/L) and 24-hour minimum DO (1.48/3.0 mg/L). There is also a concern for DO grab screening level. In the upper AU, which is from the confluence with Willow Marsh Bayou (0704A) upstream to a point 100 meters (110 yards) upstream of SH 124 in Jefferson County, Segment 0704_02 (Station 10687) is listed for DO grab minimum (2.17/3.00 mg/L) and there is a concern for DO grab screening level. Four samples exceeded the screening level criterion (4.0 mg/L) out of the 15



AU Boundary

City of Kountze WWTP Outfall

Station ID: 15352

Segment 0608C: Cypress Creek

287

69

JACK GORE
BAYGALL

SHALEY
BAYGALL

Gore Store Rd

Silsbee

Hawthorne Fld

N Lhs Dr

Lumberton

CREEK

grab samples assessed.

Also, in the 2010 Integrated Report for the first time, Segment 0704 is not supporting the contact recreation use in the upper AU (0704_02). This impairment is due to *E. coli* bacteria single sample and the bacteria geo-mean (460.2 MPN/100mL). *E. coli* levels exceeded the bacteria single sample standard of 394 MPN/100mL in 10 out of 15 samples for Station 10687– Hillebrandt Bayou at SH 124. This upper station consists primarily of stormwater and urban runoff from the City of Beaumont. Non-point source pollution is the likely source of these high bacteria levels. In contrast, *E. coli* counts below the wastewater treatment plant discharge are much lower. Only 5 out of 40 bacteria samples exceeded the single sample criterion from Feb. 2002–2008.

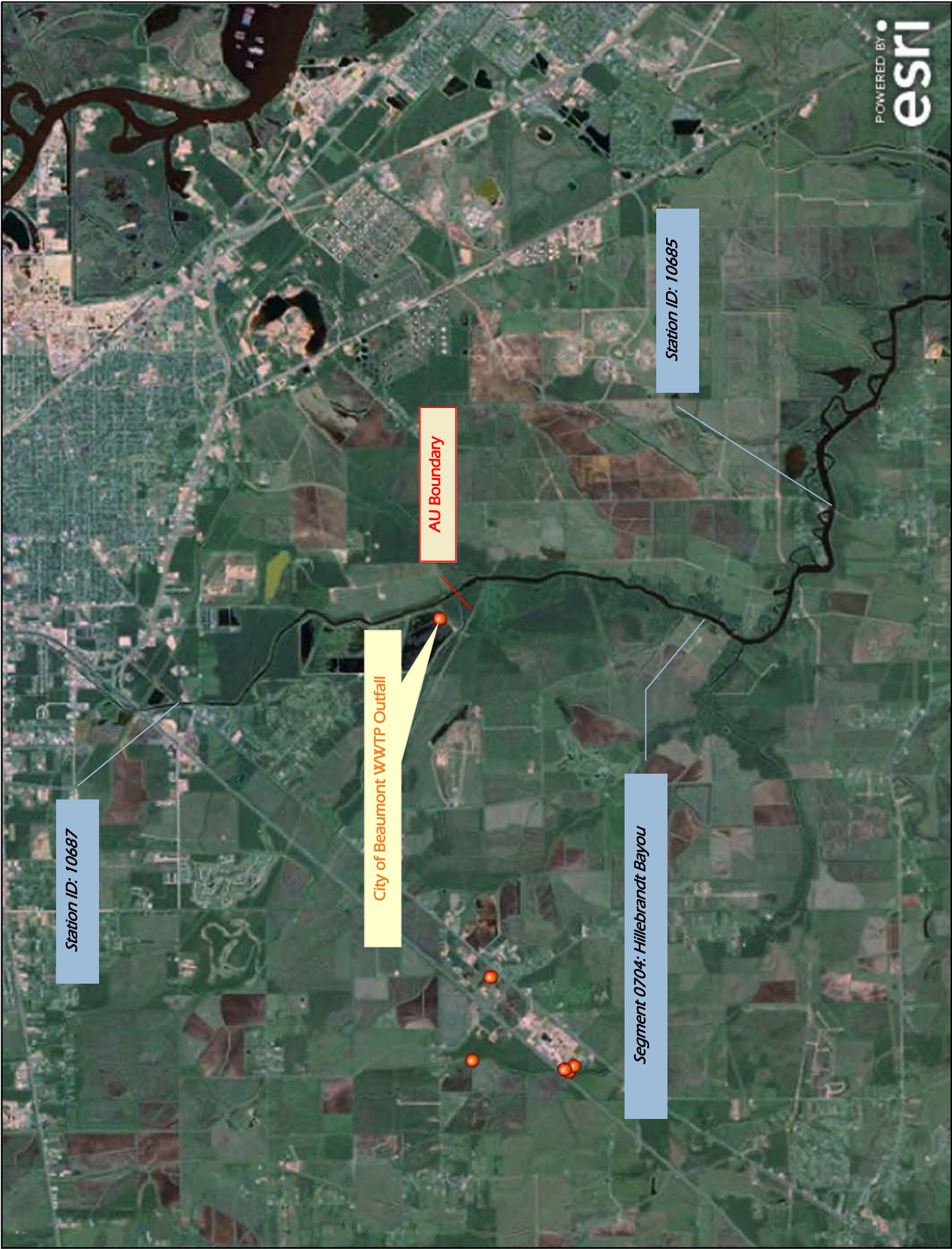
TCEQ initiated a UAA on Hillebrandt Bayou and Taylor Bayou (Segment 0701) to evaluate the appropriate aquatic life uses and dissolved oxygen criteria for these two stream segments currently on the 303(d) List. Site-specific data collection (biological, 24-hour dissolved oxygen, flow) by the Texas Institute for Applied Environmental Research (TIAER) began in July 2009. A final report on the aquatic life use-attainability analysis was submitted to TCEQ in 2010-2011.

The primary stakeholder in this segment is the City of Beaumont, however other interested stakeholders may include local industry, local agriculture (rice farmers), local ranchers, oil/gas producers, golf course operators/owners, and local citizens who use Hillebrandt Bayou for contact recreational purposes.



Above and Below: Hillebrandt Bayou at SH 124 (Station ID 10687) primarily receives stormwater and urban runoff from the City of Beaumont. During hot, summer months, aquatic vegetation like water hyacinth (below photo from Aug. 2011) will completely cover the water's surface.





Station ID: 10687

City of Beaumont WWTP Outfall

AU Boundary

Segment 0704: Hillebrandt Bayou

Station ID: 10685