Brazos River Basin Highlights Report

2021

Brazos River Authority

BRAZOS RIVER BASIN HIGHLIGHTS REPORT 2021

INTRODUCTION

BASIN HIGHLIGHTS REPORT

This report is a programmatic update that contains information and updates on on-going activities and projects that address water quality concerns in the lakes and streams of the Brazos River basin. The report also includes a summary of water quality monitoring results, an overview of scheduled routine monitoring for FY 2021, and summarization of the 2020 Integrated Report (IR).

The digital version of this report is imbedded with hyperlinks so that you can easily access more detailed information on projects in the Brazos River Basin. So wherever you see a word that looks like this, just click and you will be directed to a website that will give you further information on the topic of interest. You can also click the Table of Contents to navigate to your desired section. After having been directed to another page in the document or to an internet page, you may press Alt+← to return to where you were previously in the document.

THE TEXAS CLEAN RIVERS PROGRAM

The principal aim of the Texas Clean Rivers Program (CRP) is to ensure safe, clean water supplies for the future of Texans' drinking water needs, industry, agriculture, healthy ecosystems, recreation and for all other uses of this valuable state resource. The CRP is managed by the Texas Commission on Environmental Quality (TCEQ) and funded entirely by fees assessed to wastewater discharge and water rights permit holders.

The goal of the CRP is to maintain and improve the quality of water resources within each river basin in Texas through an ongoing partnership involving the TCEQ, other agencies, river authorities, regional entities, local governments, industry and citizens. The program's watershed management approach aims to identify and evaluate water quality issues, establish priorities for corrective action, work to implement those actions, and adapt to changing priorities. The Brazos River Authority (BRA) carries out the water quality management efforts in the basin under contract with TCEQ.

THE BRAZOS RIVER AUTHORITY (BRA)

The BRA was created by the Texas Legislature in 1929 as the first government entity in the United States created specifically for the purpose of developing and managing the water resources of an entire river basin. Today, the BRA's staff of more than 250 develop and distribute water supplies, provide water and wastewater treatment, monitor water quality, and pursue water conservation through public education programs. The BRA does not levy or collect taxes; rather maintains and operates reservoirs and treatment systems using revenues from the customers it serves. The Brazos River Authority exists to develop, manage, and protect the water resources of the Brazos River basin. The BRA, as a member of the Texas Clean Rivers Program, works to answer questions about the quality of our local streams, rivers, and lakes in the in the yearly Basin Highlights/Summary Reports.

The Authority wishes to thank both the Texas Commission on Environmental Quality's Clean Rivers Program staff and the Surface Water Quality Monitoring Team for their hard work and significant contributions to the water quality in the Brazos River basin. Thanks also go out to the

hundreds of individuals and organizations that are not named who have attended public meetings and other outreach events sponsored by the Authority and the Clean Rivers Program. Their input is the foundation of the watershed management process.

OVERVIEW OF WATER QUALITY MONITORING

TEXAS SURFACE WATER QUALITY STANDARDS (TSWQS)

The TSWQS establish explicit goals for the quality of streams, rivers, lakes, and bays throughout the state. The Standards are developed to maintain the quality of surface waters in Texas so that they support public health and enjoyment, and protect aquatic life, consistent with the sustainable economic development of the state. Water quality standard numerical criteria are used by TCEQ as the maximum or minimum instream concentration that may result from permitted discharges and/or nonpoint sources and still meet designated uses. Numeric quality standards have not been developed for nutrients and chlorophyll *a* (although chlorophyll *a* criteria has been developed for certain reservoirs). Instead, the water quality standards for nutrients and chlorophyll *a* are expressed as narrative criteria. In the absence of segment-specific numeric water quality criteria, the state has developed screening levels for these parameters in order to identify areas where elevated concentrations may cause water quality concerns.

DESIGNATED USES AND CRITERIA

The designated uses assigned to water bodies in the state determine what criteria to apply when assessing water quality. Those uses/criteria include general use, recreational use, domestic water supply use, and aquatic life use.

General use criteria include pH, temperature, radioactivity, toxic substances, and dissolved minerals such as chloride, sulfate, total dissolved solids (TDS). General use criteria also include aesthetic parameters like appearance, taste, odor, foaming, surface debris, etc. Nutrients such as ammonia, nitrates, phosphorus, and chlorophyll-*a* are also used to screen concerns for supporting general use.

Recreational use criteria are applied to water that is not designated for drinking, but that has a good chance of being ingested (swimming, boating, wading, etc). It is assessed using criteria for bacteria indicators such as *E. coli* or Enterococcus.

Domestic water supply use criteria are applied to waters that could be used for drinking water use. They include parameters such as chlorides, sulfates, and TDS in drinking water.

Aquatic life use criteria are applied to waters that support fish, oysters, mussels, macrobenthics, and other aquatic communities. They include parameters such as dissolved oxygen, fish and macrobenthic community index, and acute and chronic substances.

CLASSIFIED/UNCLASSIFIED SEGMENTS AND ASSESSMENT UNITS

To resolve the issues of regional and geological diversity of the state, standards are developed for classified segments. Classified segments are defined segments of waterways that are unique from other segments. Each classified segment has been designated a four-digit code. The Brazos River Basin is designated by the number 12. Each classified segment is distinguished by the next two numbers, for example, Segment ID 1201 is the portion of the Brazos River that flows into the gulf and is referred to as the Brazos River Tidal segment. Appropriate water uses such as contact recreation, public water supply, and aquatic life are then applied to the segments. Site-specific water quality criteria have been developed for water temperature, dissolved oxygen, pH, bacteria, chloride, sulfate, and total dissolved solids for classified segments. Site-specific chlorophyll *a* has been developed for several reservoirs.

Many streams that are not classified segments are still assessed by TCEQ and are considered unclassified waterbodies. This could be a small tributary of a classified segment, and they are coded with the four-digit Segment ID they flow into, followed by a letter, such as 1201A. These unclassified waterbodies do not have specific water quality standards developed for them. For assessment purposes, unclassified streams are assessed using the numeric criteria developed for the classified segment into which the stream flows unless site-specific criteria for certain parameters have been developed. This is the case for dissolved oxygen and bacteria in several unclassified waterbodies throughout the basin. Use support is reported at both the segment and assessment unit (AU). An AU is defined as the smallest geographic area of use support reported in the assessment. Support of criteria and uses are examined for each AU. To address water quality regulatory activity such as permitting, standards development, and remediation, use support information applies to the AU level. The 303(d) list is reported at the level of the AU for each waterbody. Each AU within a waterbody segment is given a number following an underscore after the segment designation, such as 1201_01. A segment may consist of one or more AUs.

THE TEXAS INTEGRATED REPORT OF SURFACE WATER QUALITY

The TCEQ assesses the condition of the state's waterbodies on a periodic basis under the Clean Water Act (CWA) Section 305(b). The results of the assessment are contained within the Texas Water Quality Inventory and 303(d) List and are comprised of a complete listing of all water quality concerns in the state. This report is referred to as the Integrated Report (IR). As required by the CWA, the IR is updated every two years and includes the review of the past seven years of data (with a lag-time of two years) collected by many organizations statewide, including the BRA. The IR remains a draft document until approval by EPA. Specific assessment methodologies are described in the 2020 Guidance for Assessing and Reporting Surface Water Quality in Texas. The 2020 IR, on which the following information is based, provides an assessment of water quality results using data acquired from December 1, 2011 through November 30, 2018. Please click here for more information and to review the 2020 Texas Integrated Report for Clean Water Act Sections 305(b) and 303(d). On May 12, 2020, the 2020 Texas Integrated Report for Clean Water Act Sections 305(b) and 303(d) was approved by the USEPA.

The 2020 IR provides an overview of surface water quality throughout the state, including issues relating to public health, fitness for use by aquatic species and other wildlife, and specific pollutants and their possible sources. These water quality issues are identified by comparing concentrations in the water to numerical criteria that represent the state's water quality standards or screening levels to determine if the

waterbody supports its designated uses, such as suitability for aquatic life, for contact recreation, or for public water supply. Waterbodies that do not meet established water quality standards are placed on the 303(d) List and are referred to as "impaired," "not supporting," or "NS", all of which indicate that a waterbody does not meet established water quality standards. Once placed on the list the waterbody is targeted for special study and/or corrective action.

The TCEQ also identifies segments where the data indicates that the waterbody is close to violating water quality standards as having a "concern for near non-attainment of standards" or "CN." These CN segments are then targeted for increased monitoring to better understand the conditions in the stream.

Screening levels for chlorophyll *a* and nutrients are applied to waterbodies statewide and are based on the 85th percentile of nutrient values in the statewide water quality database. Waterbodies that exhibit frequent (>25% of the time) elevated concentrations of nutrients or chlorophyll *a* are referred to as having a "concern for screening level violations" or "CS" and are often targeted for continued and increased monitoring to better understand the effects of the elevated concentrations.

MONITORING IN THE BRAZOS RIVER BASIN

The Brazos River Basin can be divided into 14 major watersheds that fall within the 42,000 square miles and portions of 70 counties that make up the basin. The 14 major watersheds include:

- the Caprock watershed;
- the Salt and Double Mountain Forks of the Brazos watershed;
- the Clear Fork of the Brazos watershed;
- the Upper Brazos River watershed;
- the Aquilla Creek watershed;
- the Bosque River watershed;
- the Leon River watershed;
- the Lampasas River watershed;
- the Little River watershed;
- the Central Brazos River watershed;
- the Navasota River watershed;
- the Yegua Creek watershed;
- the Lower Brazos River watershed; and
- the Oyster Creek watershed

The Caprock watershed is a non-contributing watershed to the Brazos River Basin due to lack of rainfall and high evaporative rates in northwest Texas. Precipitation in this area is either absorbed by area soils or is contained in the hundreds of playa lakes in this part of the state. Playa lakes are shallow, round depressions that fill after storms then rapidly dry due to evaporation. These temporary lakes provide water for wildlife and flood control for municipalities. However, due to their ephemeral natures, these lakes are not monitored or assessed as part of the CRP. One of the key roles of the CRP is fostering coordination and cooperation in monitoring efforts. Coordinated monitoring meetings are held once a year to bring all the monitoring agencies together to discuss streamlining and coordinating efforts, and to eliminate duplication of monitoring efforts in the watersheds of the Brazos River Basin.

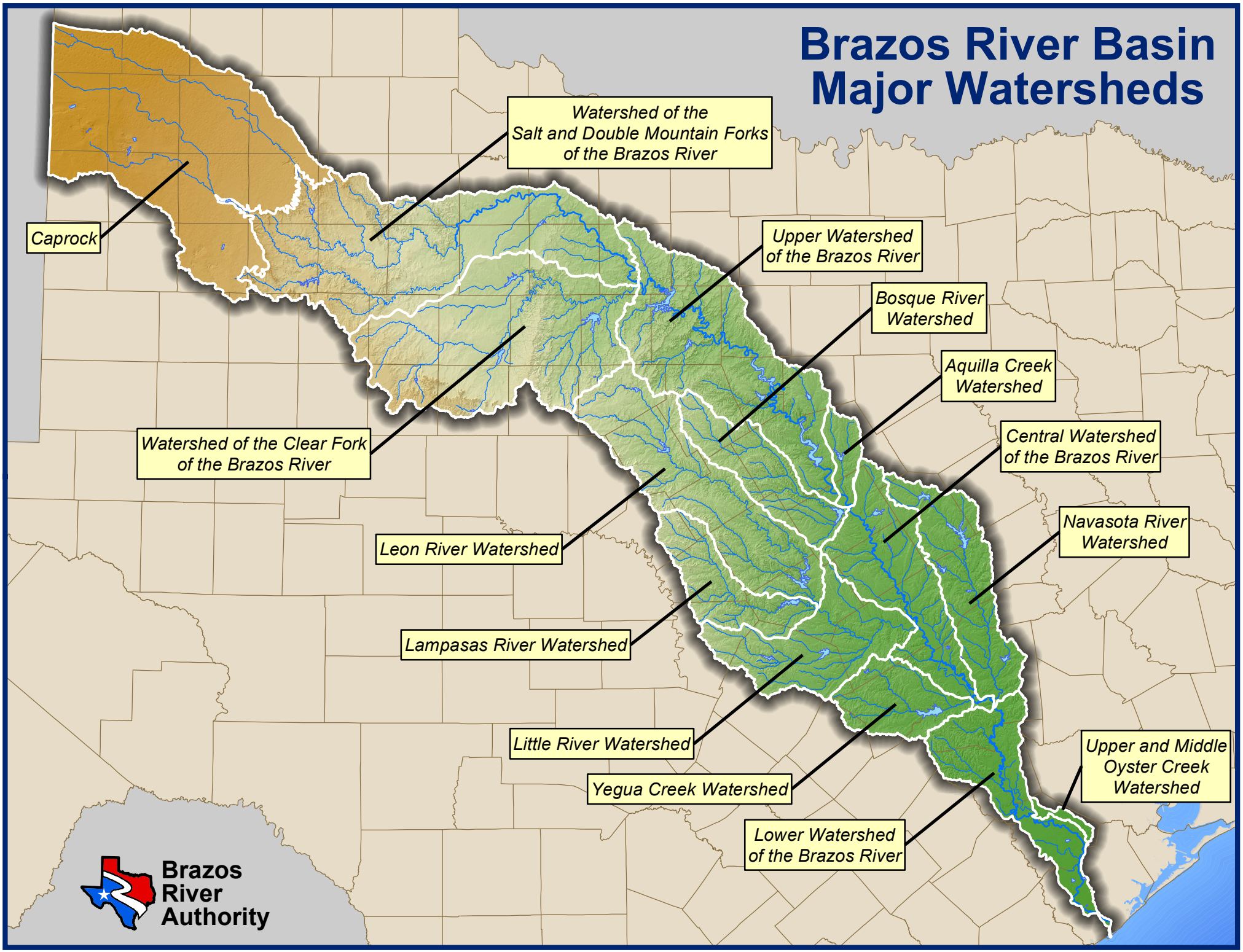

Brazos River Basin
Major Watersheds
Caprock
Watershed of the
Salt and Double Mountain Forks
of the Brazos River
Upper Watershed
of the Brazos River
Bosque River
Watershed
Aquilla Creek
Watershed
Central Watershed
of the Brazos River
Navasota River
Watershed
Watershed of the Clear Fork
of the Brazos River
Leon River Watershed
Lampasas River Watershed
Little River Watershed
Yegua Creek Watershed
Lower Watershed
of the Brazos River
Upper and Middle
Oyster Creek
Watershed
Brazos
River
Authority

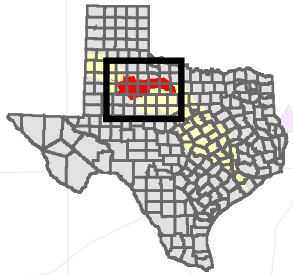
Table 1. FY 2021 Summary of Known Sampling for the Brazos River Basin (September 2020 through August 2021)									
Sampling Entity	**Field**	**Conventional**	**Bacteria**	**24-hr DO**	**Biological and Habitat**	**Metals in Water**	**Organics in Water**	**Metals in Sediment**	**Organics in Sediment**
BRA	30 monthly 70 quarterly 7 semi-annually			4 - 5 times per year	6 semi-annually (Insteam Flow Studies)				
TCEQ	95 quarterly 13 semi-annually			2 quarterly 2 semi-annually 1 - 6 times per year	1 semi-annually	3 quarterly 5 semi-annually	2 semi-annually	1 annually 6 semi-annually	3 semi-annually
	1 semi-annually								
TIAER	10 monthly 7 semi-monthly 8 quarterly			1 yearly					
TWRI	9 monthly		9 monthly						

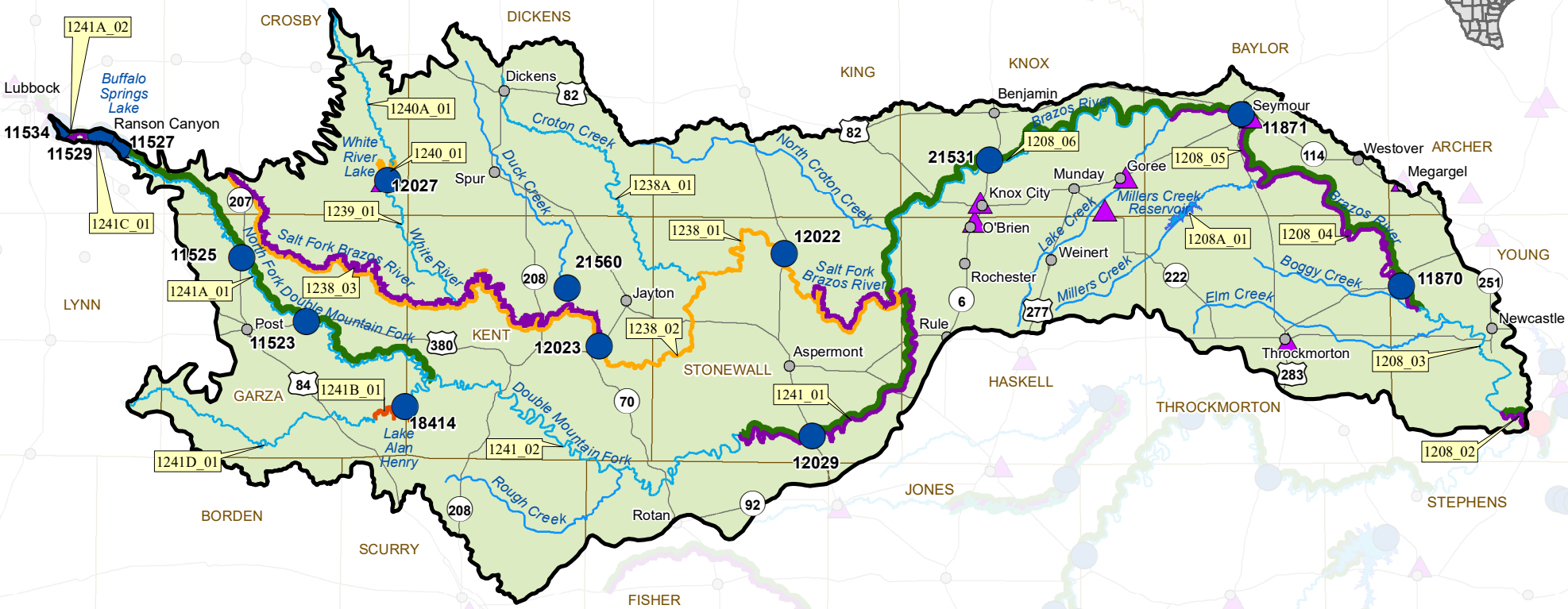
(Information compiled from the Clean Rivers Program Coordinated Monitoring website (http://cms.lcra.org/)

The remainder of this report contains summary water quality assessment results for each of the segments that were evaluated in the Brazos Basin Clean Rivers Program assessment area for the 2020 IR. It is important to remember that the information presented represents a snapshot in time and that water quality conditions are dynamic and can change over time. Furthermore, segments unmentioned or identified as having no impairments or concerns are not necessarily without problem. Rather, there may have been limited or no data available and all uses may not have been assessed.

Each major watershed is mapped separately and depicts watershed boundaries, segments with names and AUs, county boundaries, cities, major roads, monitoring locations, discharge locations, water quality impairments and selected water quality concerns. There are also tables summarizing segments in each watershed that are listed in the 2020 IR as possessing impairments or concerns and what parameter was evaluated that contributed to the listing. For each table: NS - indicates a segment is non-supporting for a designated use, or impaired, CS - indicates a segment has a concern for water quality based on screening levels, CN - indicates a segment has concern for near-nonattainment of applicable water quality standards. Entries in **BOLD** were newly listed in the 2020 IR and strike-throughs indicate listing removal from the 2020 IR.

Watershed of the Salt and Double Mountain Forks of the Brazos River
FY21 Water Quality Monitoring and 2020 IR Status





- Bacteria Impairment
- Total Dissolved Solids/Chloride Impairment
- Mercury in Edible Tissue
- Chlorophyll a and/or Nutrient Concern
- TCEQ Routine Monitoring Station
- Wastewater Outfall
- Watershed Boundary

Brazos River Authority

0 10 20 Miles

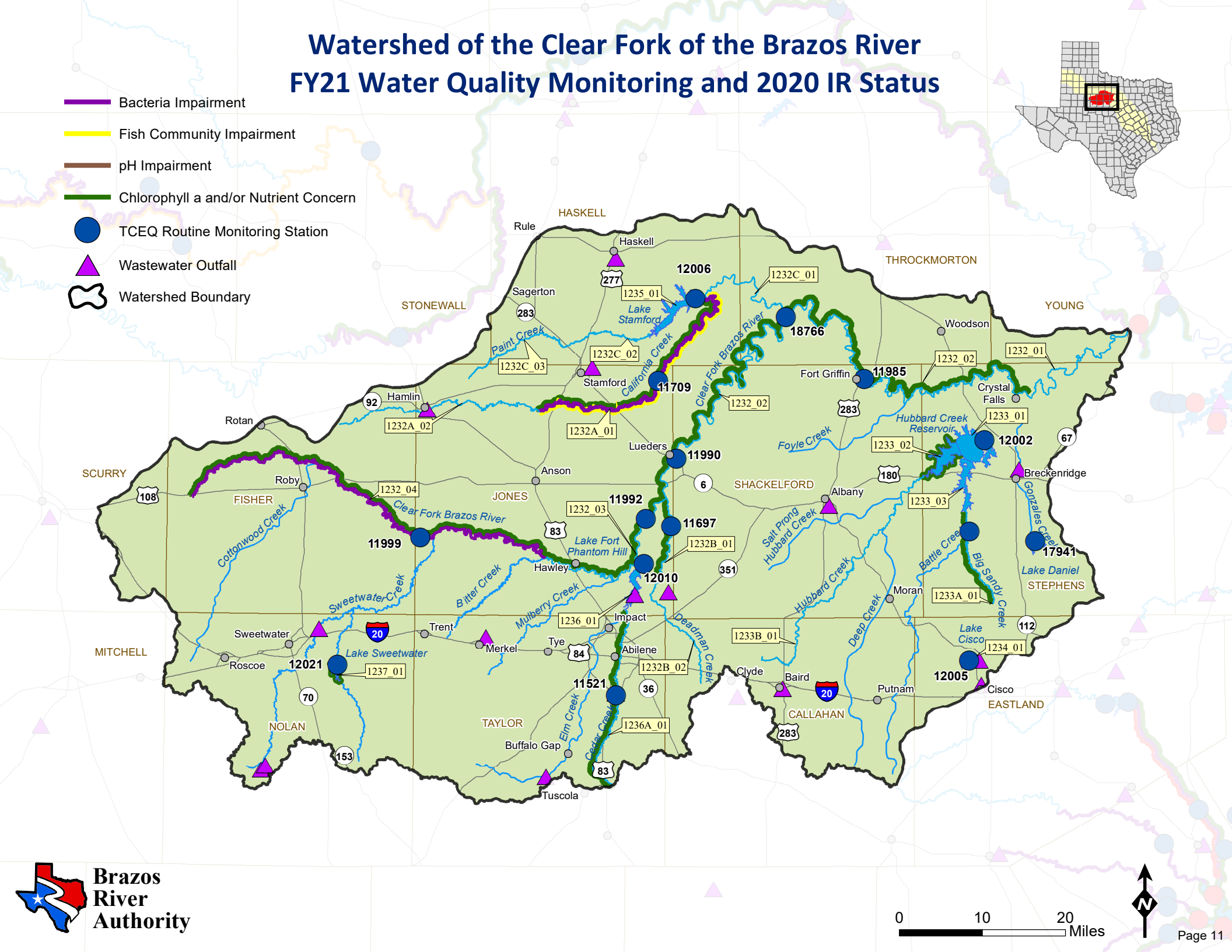
N

Watershed of the Salt Fork and Double Mountain Fork of the Brazos River

Table 2: Waterbodies of the Salt Fork and Double Mountain Fork Watersheds IR status

Water Body	Segment	Parameter(s) Impairment and/or Concern
Brazos River Above Possum Kingdom Lake	1208_02 1208_04	Bacteria – NS
	1208_05	Bacteria – NS Nutrients and/or Chl *a* – CS
Miller's Creek Reservoir	1208A_01	Bacteria – CN DO – CS
Salt Fork Brazos River	1238_01 1238_02	Cl^- – NS
	1238_03	**Bacteria – NS** Cl^- – NS
Croton Creek	1238A_01	Bacteria – CN
White River Lake	1240_01	Cl^-, TDS – NS
Double Mountain Fork Brazos River	1241_01	Bacteria – NS Nutrients and/or Chl a – CS
North Fork Double Mountain Fork Brazos River	1241A_01	Nutrients and/or Chl *a* – CS
	1241A_02	**Bacteria – NS** Nutrients and/or Chl a – CS
Lake Alan Henry	1241B_01	Mercury in Edible Tissue

Watershed of the Clear Fork of the Brazos River
FY21 Water Quality Monitoring and 2020 IR Status

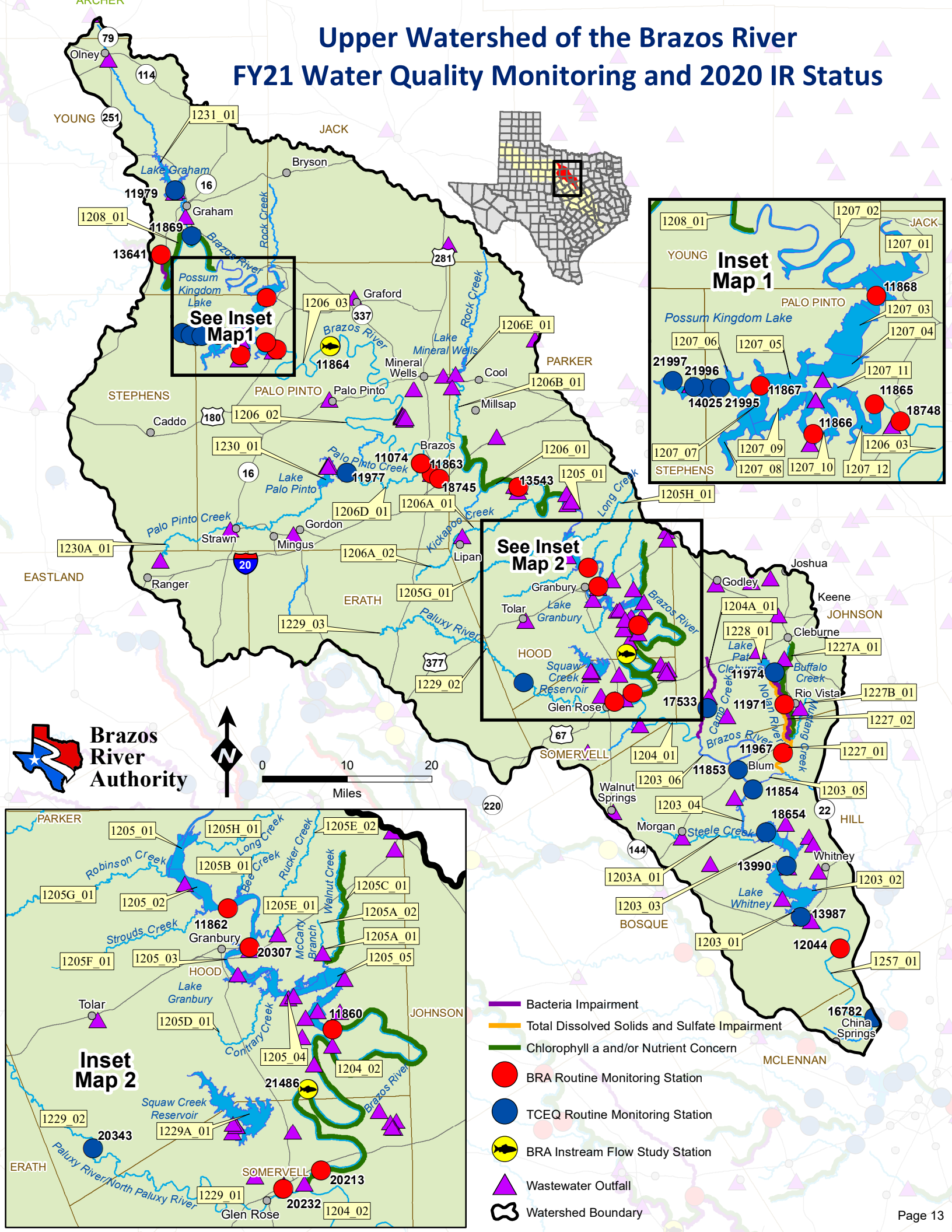


Brazos River Authority

Table 3: Waterbodies of the Clear Fork Watershed IR status

Water Body	Segment	Parameter(s) Impairment and/or Concern
Clear Fork Brazos River	~~1232_02~~	~~High pH - NS~~ Nutrients and/or Chl *a* – CS
	1232_03	Nutrients and/or Chl *a* – CS
	1232_04	Bacteria – NS Nutrients and/or Chl *a* – CS
California Creek	1232A_01	Bacteria – NS Impaired fish community – NS Nutrients and/or Chl *a* – CS Macrobenthics – CN
Deadman Creek	1232B_01	Nutrients and/or Chl *a* – CS
	1232B_02	Bacteria – CN
Hubbard Creek Reservoir	1233_02	DO – CS
Big Sandy Creek	1233A_01	Bacteria – CN Nutrients and/or Chl *a* – CS
Cedar Creek	1236A_01	Nutrients and/or Chl *a* – CS
Lake Sweetwater	1237_01	TDS – CN

Upper Watershed of the Brazos River
FY21 Water Quality Monitoring and 2020 IR Status

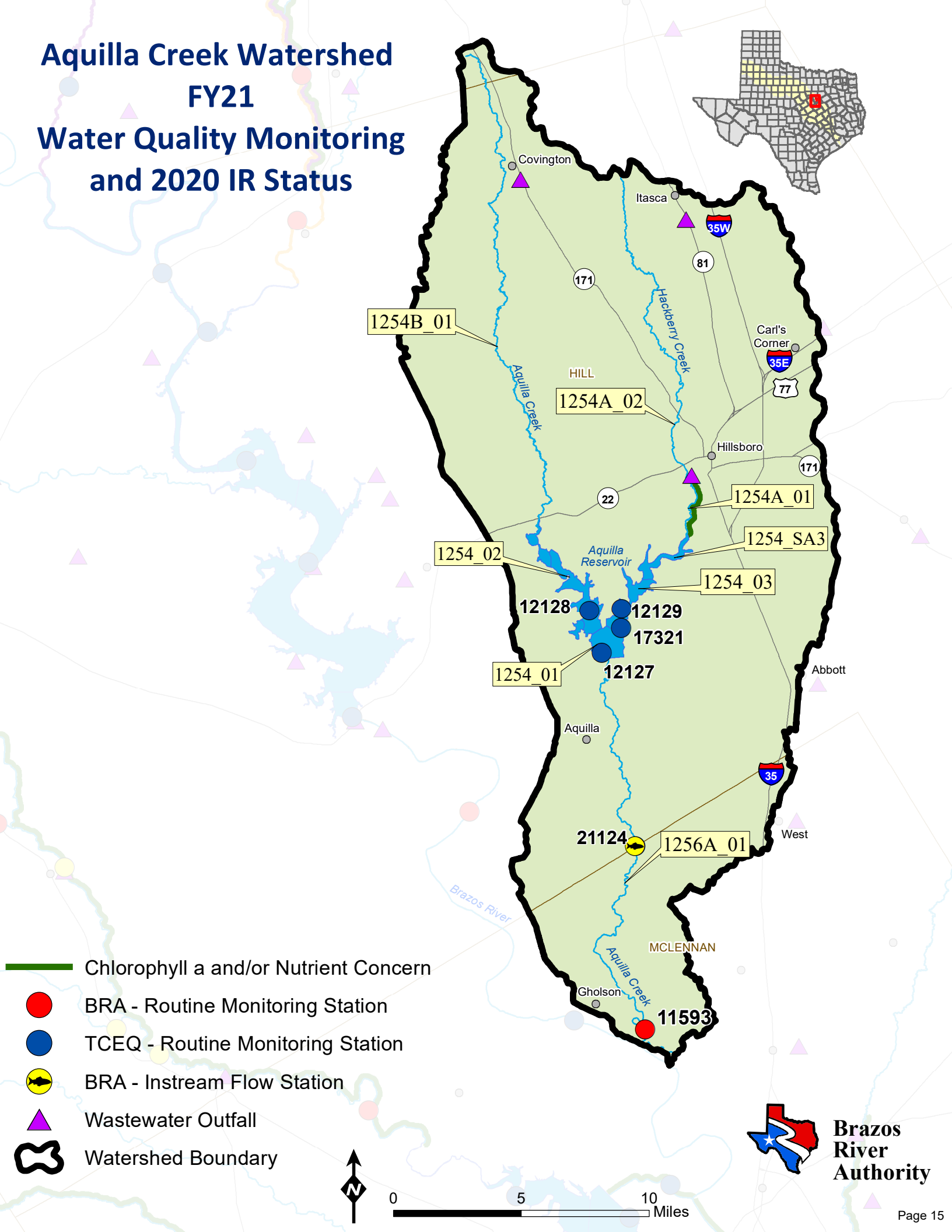


Upper Watershed of the Brazos River

Table 4: Waterbodies of the Upper Watershed IR status

Water Body	Segment	Parameter(s) Impairment and/or Concern
Whitney Lake	1203_01	DO – CN
Brazos River Below Granbury	1204_02	Nutrients and/or Chl *a* – CS Habitat – CS
Camp Creek	1204A_01	Bacteria – NS
Lake Granbury	1205_05	DO – CS
Walnut Creek	1205C	Nutrients and/or Chl *a* – CS
Brazos River Below Possum Kingdom Lake	1206_01 1206_03	Nutrients and/or Chl *a* – CS
	1206_01 1206_02	Habitat – CS Macrobenthics – CN
Brazos River Above Possum Kingdom Lake	~~1208_01~~	~~Bacteria – NS~~ Nutrients and/or Chl *a* – CS
Nolan River	1227_01	SO_4, TDS – NS Nutrients and/or Chl *a* – CS
	1227_02	Bacteria, SO_4, TDS – NS Nutrients and/or Chl *a* – CS Bacteria – CN
Buffalo Creek	1227A_01	Bacteria – CN Nutrients and/or Chl *a* – CS

Aquilla Creek Watershed
FY21
Water Quality Monitoring and 2020 IR Status

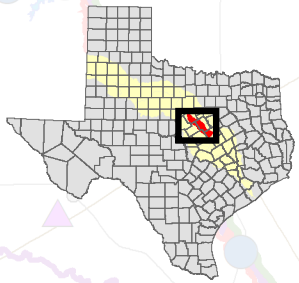


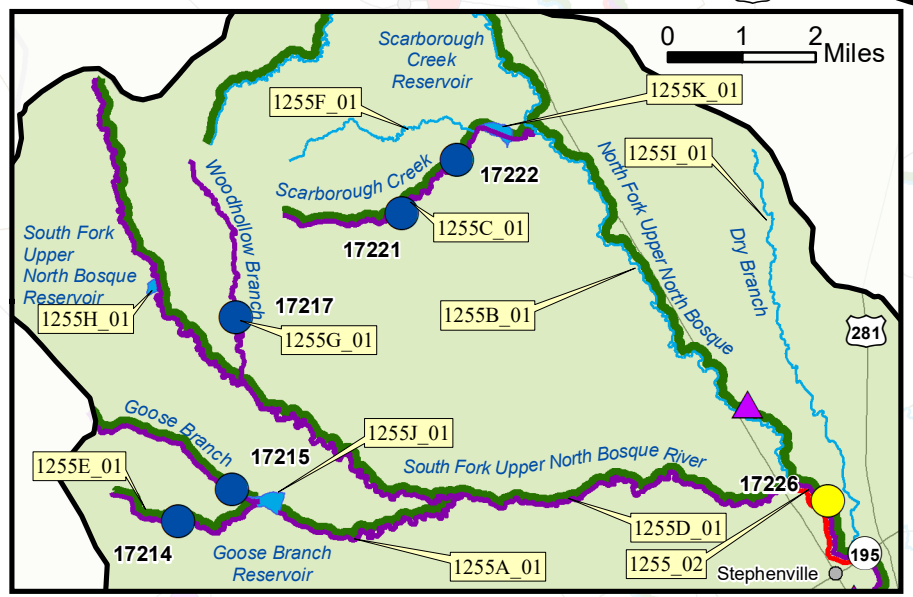
Aquilla Creek Watershed

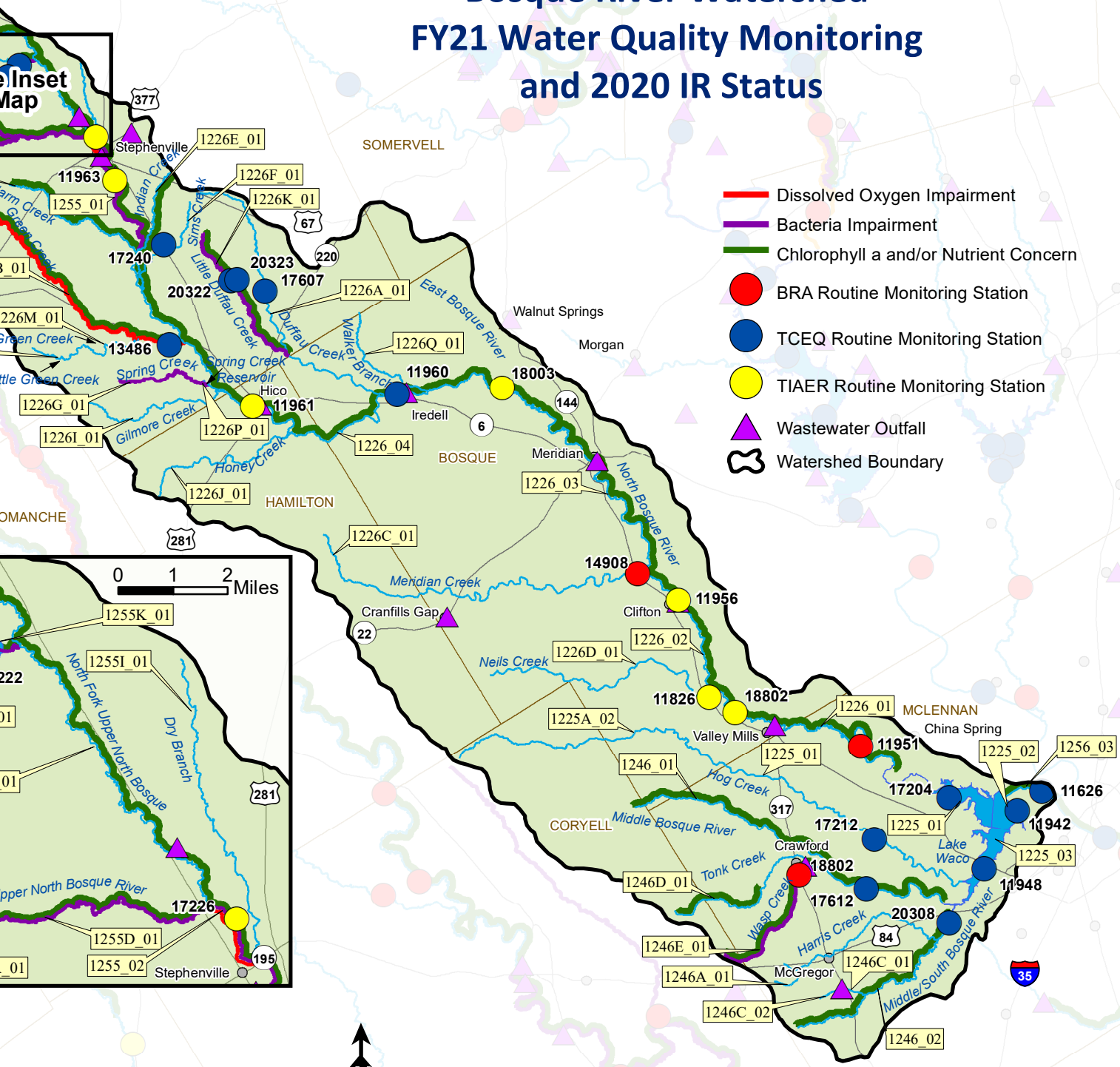
Table 5: Waterbodies of the Aquilla Creek Watershed IR status

Water Body	Segment	Parameter(s) Impairment and/or Concern
Aquilla Reservoir	1254_03	Nutrients and/or Chl *a* – CS Sediment – CS
Hackberry Creek	1254A_01	Nutrients and/or Chl *a* – CS DO – CS

Bosque River Watershed
FY21 Water Quality Monitoring and 2020 IR Status







Brazos River Authority

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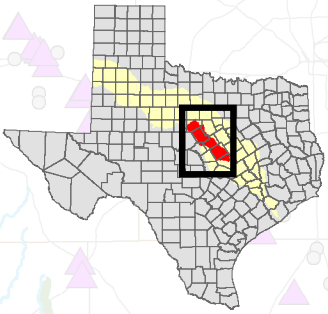
Bosque River Watershed

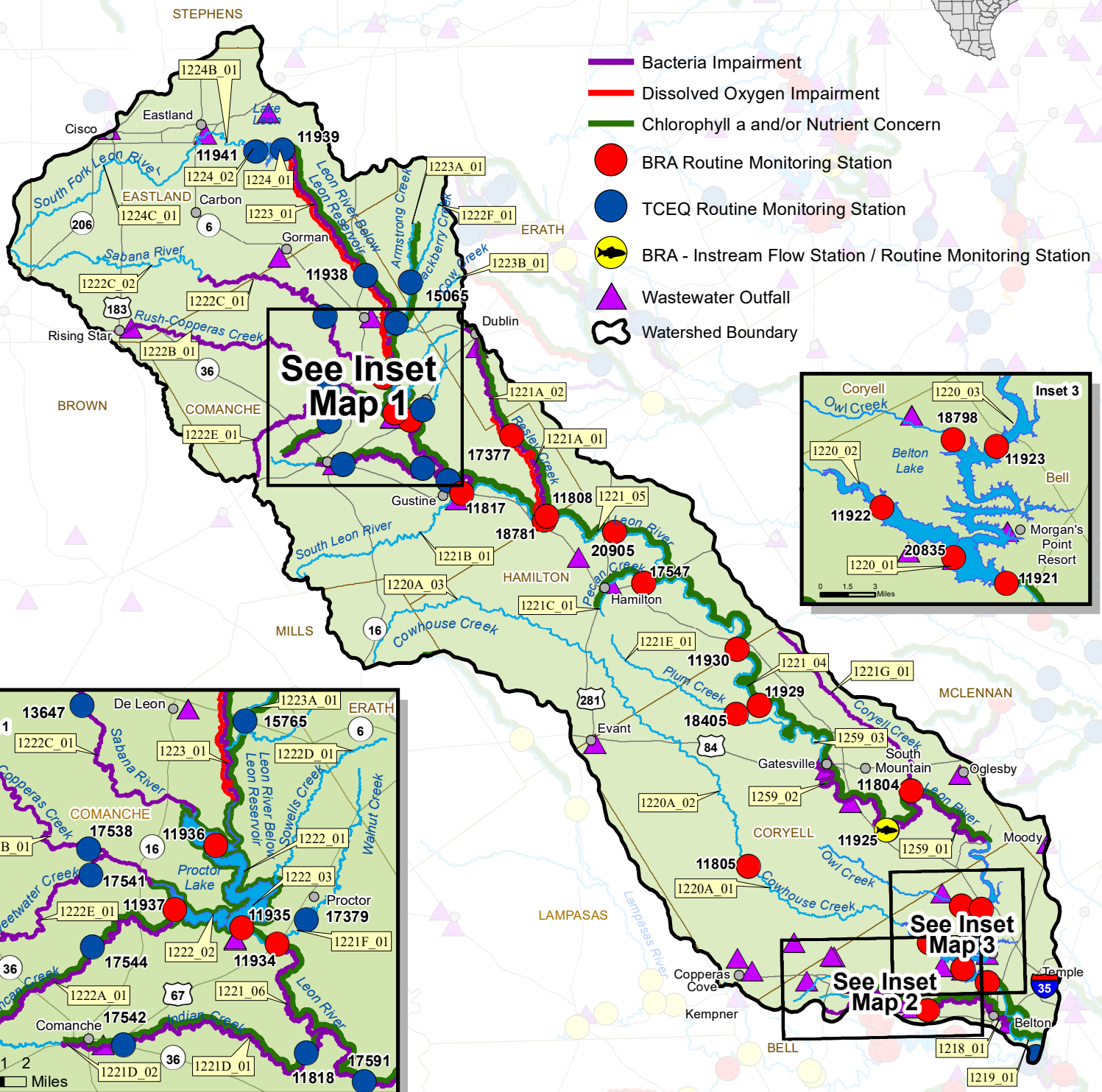
Table 6: Waterbodies of the Bosque River Watershed IR status

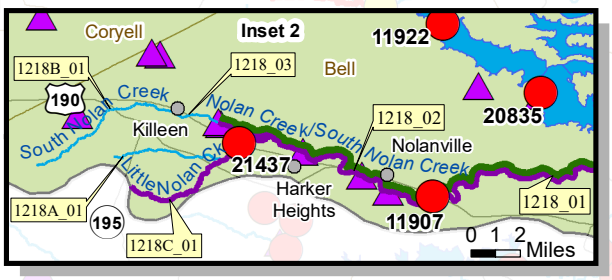
Water Body	Segment	Parameter(s) Impairment and/or Concern
North Bosque River	1226_02	Nutrients and/or Chl *a* – CS DO – CN
	1226_03	Nutrients and/or Chl *a* – CS
	1226_04	Nutrients and/or Chl *a* – CS Macrobenthic Community – CN
Green Creek	1226B_01	DO – NS
Indian Creek	1226E_01	Nutrients and/or Chl *a* – CS
Sims Creek	1226F_01	Nutrients and/or Chl *a* – CS
Spring Creek	1226G_01	Bacteria – NS
Alarm Creek	1226H_01	Nutrients and/or Chl *a* – CS
Little Duffau Creek	1226K_01	Bacteria – NS Nutrients and/or Chl *a* – CS
Sims Creek Reservoir	1226O_01	DO – CS
Middle Bosque/South Bosque River	1246_01 1246_02	Nutrients and/or Chl *a* – CS
Tonk Creek	1246D_01	Nutrients and/or Chl *a* – CS
Wasp Creek	1246E_01	Bacteria – NS Nutrients and/or Chl *a* – CS
Upper North Bosque River	1255_01	Bacteria – NS Nutrients and/or Chl *a* – CS
Upper North Bosque River Goose Branch	1255_02	Bacteria – NS DO – NS Nutrients and/or Chl *a* – CS
	1255A_01	Bacteria – NS Nutrients and/or Chl *a* – CS
North Fork Upper North Bosque River	1255B_01	Nutrients and/or Chl *a* – CS

Water Body	Segment	Parameter(s) Impairment and/or Concern
Scarborough Creek	1255C_01	Bacteria – NS Nutrients and/or Chl *a* – CS
South Fork North Bosque River	1255D_01	Bacteria – NS Nutrients and/or Chl *a* – CS
Unnamed Tributary of Goose Branch	1255E_01	Bacteria – NS Nutrients and/or Chl *a* – CS
Woodhollow Branch	1255G_01	Bacteria – NS
South Fork Upper North Bosque River Reservoir	1255H_01	DO – CS
Brazos River/Lake Brazos	1256_03	Nutrients and/or Chl *a* – CS

Leon River Watershed
FY21 Water Quality Monitoring and 2020 IR Status







Brazos River Authority

0 10 20 Miles

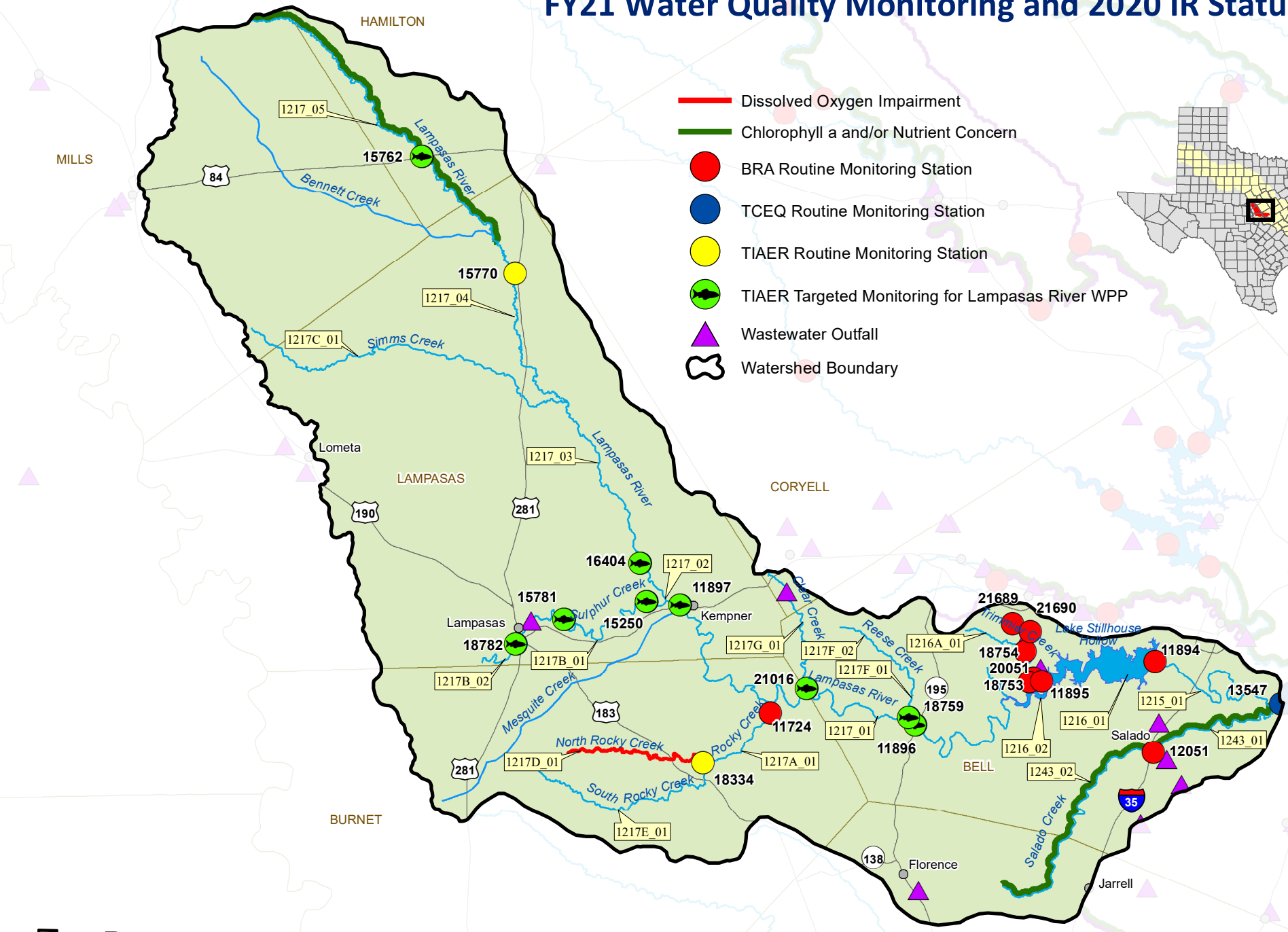
Leon River Watershed

Table 7: Waterbodies of the Leon River Watershed IR status

Water Body	Segment	Parameter(s) Impairment and/or Concern
Nolan Creek/South Nolan Creek	1218_01 1218_02	Bacteria – NS Nutrients and/or Chl a – CS
Unnamed Tributary to Little Nolan Creek	1218A_01	Bacteria – CN
Little Nolan Creek	1218C_01	Bacteria – NS
Long Branch	**1218D_01**	**Bacteria – NS**
Leon River Below Belton Lake	1219_01	Nutrients and/or Chl a – CS
Leon River Below Proctor Lake	1221_04 1221_05 1221_07	DO – CS Nutrients and/or Chl *a* – CS
	1221_06	Bacteria – NS Nutrients and/or Chl *a* – CS
Resley Creek	1221A_01	Bacteria – NS DO – NS Nutrients and/or Chl *a* – CS
	1221A_02	Bacteria – NS Nutrients and/or Chl *a* – CS
South Leon River	1221B_01	Habitat – CS
Pecan Creek	1221C_01	Nutrients and/or Chl *a* – CS
Indian Creek	1221D_01	Bacteria – NS Nutrients and/or Chl *a* – CS DO – CS
	1221D_02	Bacteria – NS Nutrients and/or Chl *a* – CS
Walnut Creek	1221F_01	Nutrients and/or Chl a – CS
Coryell Creek	**1221G_01**	**Bacteria – NS**

Water Body	Segment	Parameter(s) Impairment and/or Concern
Duncan Creek	1222A_01	Bacteria – NS Nutrients and/or Chl a – CS DO – CN
Rush-Copperas Creek	1222B_01	Bacteria – NS Nutrients and/or Chl a – CS
Sabana River	1222C_01	Bacteria – NS
Sowells Creek	1222D_01	Bacteria – CN
Sweetwater Creek	1222E_01	Bacteria – NS
Hackberry Creek	1222F_01	Bacteria – CN DO – CN
Leon River Below Leon Reservoir	1223_01	Bacteria – NS DO – NS Nutrients and/or Chl a – CS
Cow Creek	1223B_01	Bacteria – CN
Leon River Above Belton Lake	1259_01 1259_02 1259_03	Nutrients and/or Chl a – CS

Lampasas River Watershed
FY21 Water Quality Monitoring and 2020 IR Status



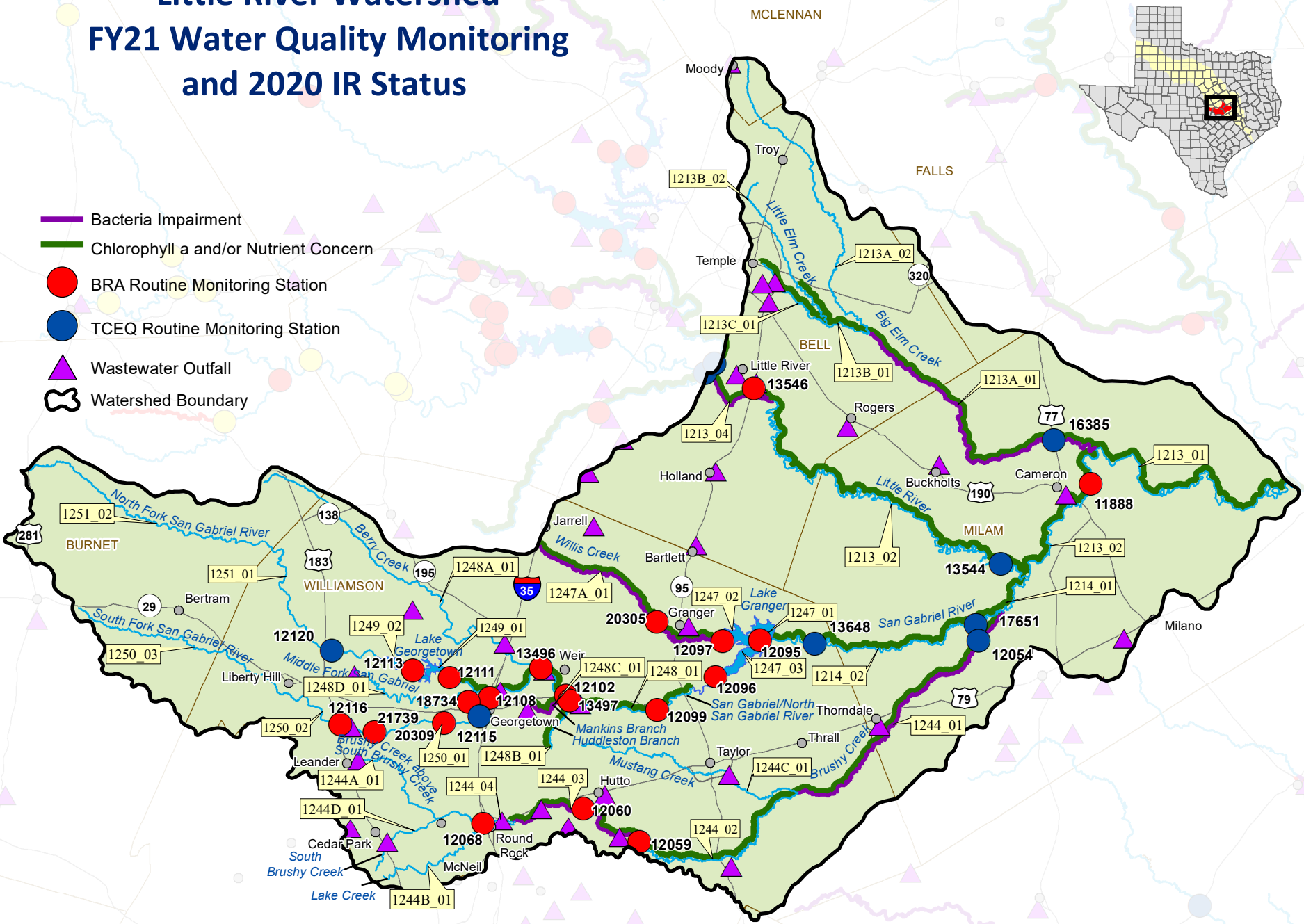
Brazos River Authority

Lampasas River Watershed

Table 8: Waterbodies of the Lampasas River Watershed IR status

Water Body	Segment	Parameter(s) Impairment and/or Concern
Lampasas River Above Stillhouse Hollow Lake	1217_04	Nutrients and/or Chl *a* – CS
Sulphur Creek	~~1217B_02~~	~~Bacteria – NS~~
North Rocky Creek	1217D_01	DO – NS
Salado Creek	1243_01 1243_02	Nutrients and/or Chl *a* – CS

Little River Watershed
FY21 Water Quality Monitoring and 2020 IR Status



Brazos River Authority

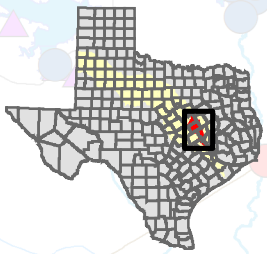
0 10 20 Miles

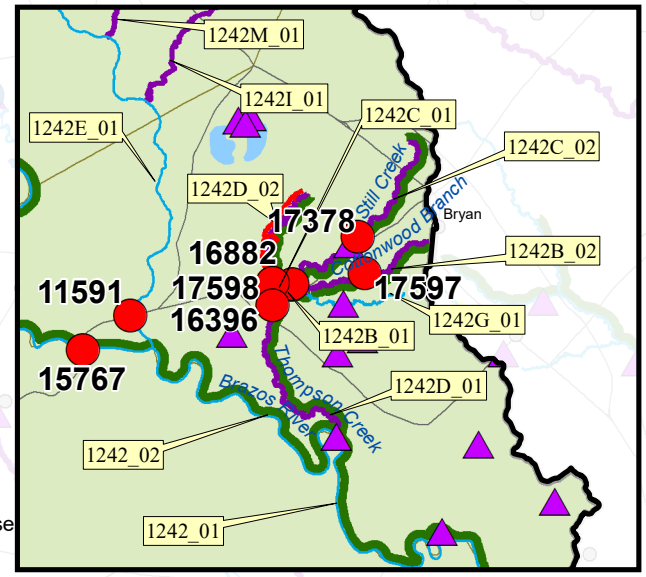
Little River Watershed

Table 9: Waterbodies of the Little River Watershed IR status

Water Body	Segment	Parameter(s) Impairment and/or Concern
Little River	1213_01 1213_02 1213_03	Nutrients and/or Chl *a* – CS
	1213_04	Bacteria – NS Nutrients and/or Chl *a* – CS
Big Elm Creek	1213A_01	Bacteria – NS
Little Elm Creek	1213B_01	Nutrients and/or Chl *a* – CS DO – CN
Unnamed Tributary of Little Elm Creek	1213C_01	Nutrients and/or Chl *a* – CS
San Gabriel River	1214_01	Nutrients and/or Chl *a* – CS
	1214_02	Bacteria - CN
Brushy Creek	1244_01	Nutrients and/or Chl *a* – CS
	1244_03	Bacteria – NS Nutrients and/or Chl *a* – CS
Willis Creek	1247A_01	Bacteria – NS Nutrients and/or Chl *a* - CS
San Gabriel/North Fork San Gabriel River	1248_01	Nutrients and/or Chl *a* - CS
Huddleston Branch	1248B_01	Bacteria – CN Nutrients and/or Chl *a* – CS
Mankins Branch	1248C_01	Bacteria – NS Habitat – CS Nutrients and/or Chl *a* – CS
South Fork San Gabriel River	1250_03	DO – CS

Central Watershed of the Brazos River FY21 Water Quality Monitoring and 2020 IR Status





Abbott
1242N_02
West
Leroy
Tehuacana Creek
1242N_01
Elm Mott
Axtell
84
1256_01
Lacy-Lakeview
LIMESTONE
Bellmead
Tradinghouse Creek Reservoir
1256_02
14226
18457
18457
Mart
MCLENNAN
Waco
Hallsburg
1242P_02
Beverly Hills
11609
Woodway
12037
Riesel
Hewitt
Big Creek
1242_06
Robinson
6
Big Sandy Creek
1242_05
35
1242A_01
Golinda
Lorena
Satin
Marlin City Lake
16781
Little Brazos River
7
Kosse
Moody
Eddy
Cow Bayou
Marlin
Chilton
11723
Bruceville-Eddy
1242P_01
14
Deer Creek
1242J_01
1242E_03
Lott
Bremond
1242O_01
Belfalls
1242J_01
FALLS
12032
1242F_01
320
1242_04
1242E_02
Walnut Creek
Rosebud
ROBERTSON
77
Pond Creek
1242K_01
16406
Calvert
1242F_02
Mud Creek
1242L_01
Brazos River
1242_03
Pin Oak Creek
Hearne
1242M_01
1242E_01
Spring Creek
MILAM
1242I_01
Campbells Creek
1242_02
190
See Inset Map
Milano
BRAZOS
Cedar Creek
21
BURLESON
6
Old River
Snook
1242_01

Dissolved Oxygen Impairment
Bacteria Impairment
Chlorophyll a and/or Nutrient Concern
BRA Routine Monitoring Station
TCEQ Routine Monitoring Station
Wastewater Outfall
Watershed Boundary

Brazos River Authority

0 10 20 Miles

N

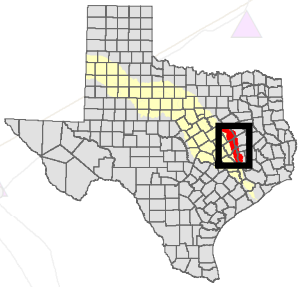
Central Watershed of the Brazos River Basin

Table 10: Waterbodies of the Central Watershed IR status

Water Body	Segment	Parameter(s) Impairment and/or Concern
Brazos River Above Navasota River	1242_01 1242_02 1242_04 1242_05 1242_06	Nutrients and/or Chl *a* – CS
Cottonwood Branch	1242B_01	Bacteria – NS Nutrients and/or Chl *a* – CS
	1242B_02	Bacteria – NS
Still Creek	1242C_02	Bacteria – NS Nutrients and/or Chl *a* – CS
Thompson Creek	1242D_01	Bacteria – NS Nutrients and/or Chl *a* – CS Fish Community – CN
	1242D_02	Bacteria – NS DO – NS Nutrients and/or Chl *a* – CS Macrobenthic – CS
Pond Creek	1242F_01	Bacteria – NS
Tradinghouse Reservoir	1242H_01	Harmful Algal Bloom/Golden Algae – CN
Campbells Creek	1242I_01	Bacteria – NS DO – CS
Deer Creek	1242J_01	Bacteria – NS Macrobenthic Community – CN
Mud Creek	1242K_01	Bacteria – NS
Pin Oak Creek	1242L_01	Bacteria – NS

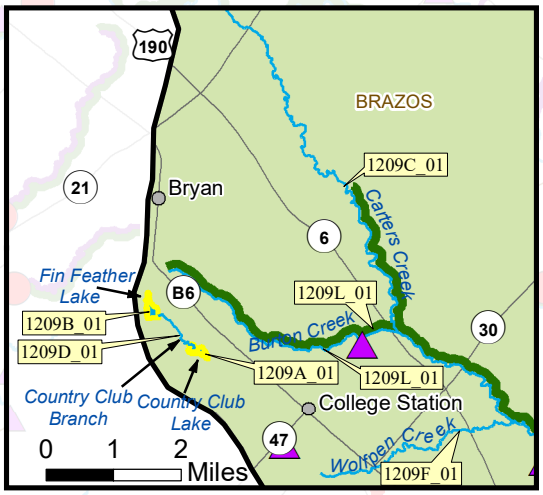
Water Body	Segment	Parameter(s) Impairment and/or Concern
Spring Creek	1242M_01	Bacteria – NS DO – CS
Tehuacana Creek	1242N_01	Bacteria – CN Nutrients and/or Chl *a* – CS Fish Kill Report – CN Macrobenthic – CN
Walnut Creek	1242O_01	Bacteria – NS
Big Creek	1242P_01	Bacteria – NS
Bullhide Creek	1242Q_01	Nutrients and/or Chl *a* – CS
Brazos River/Lake Brazos	1256_02	Nutrients and/or Chl *a* – CS

Navasota River Watershed
FY21 Water Quality Monitoring and 2020 IR Status



- Bacteria Impairment
- Dissolved Oxygen Impairment
- pH Impairment
- Toxicity in Sediment Impairment
- Chlorophyll a and/or Nutrient Concern
- BRA Routine Monitoring Station
- TCEQ Routine Monitoring Station
- BRA - Instream Flow Station
- Wastewater Outfall
- Watershed Boundary

HILL
Coolidge
Mount Calm
Navasota River
1210A_01
1210_01
Lake Mexia
1210_02
Mexia
16391
17586
1253A_01
Springfield Lake
16247
Christmas Creek
1253_03
MCLENNAN
84
FREESTONE
Teague
Holman Creek
1253_02
Groesbeck
1253_01
12126
Navasota River
1252_04
LIMESTONE
1252_05
13970
12125
Thornton
1252_02
1252_03
12124
Lake Limestone
Jewett
14
1209K_02
1252_01
12123
Steele Creek
FALLS
Kosse
79
LEON
1209_05
7
Marquez
Twin Oaks Reservoir
1209K_01
11877
Duck Creek
1209H_02
1209H_01
1209_05
Camp Creek Lake
1209O_01
Franklin
ROBERTSON
Normangee
Normangee Lake
Navasota River
18341
1209_04
Cedar Creek
MADISON
1209J_01
Shepard Creek
North Zulch
1209G_01
Seg 1209J
BRAZOS
1209E_01
Wixon Valley
Navasota River
Wickson Creek
16398
1209I_03
Gibbons Creek Reservoir
90
See Inset Map
1209_03
1209N_01
30
1209N_03
1209N_04
Carters Creek
11785
11875
1209N_02
18800
1209I_02
Gibbons Creek
1209C_01
1209I_01
Wellborn
1209_02
GRIMES
Anderson
BURLESON
6
Millican
1209_01
11873
Navasota
105
0 10 20 Miles



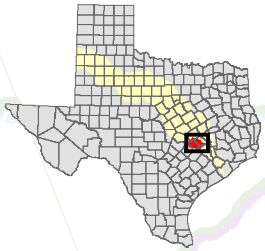
Brazos River Authority

Navasota River Watershed

Table 11: Waterbodies of the Navasota River Watershed IR status

Water Body	Segment	Parameter(s) Impairment and/or Concern
Navasota River Below Lake Limestone	1209_01	Nutrients and/or Chl *a* – CS DO – CS
	1209_02	DO – CS
Country Club Lake	1209A_01	Sediment – NS
Fin Feather Lake	1209B_01	Sediment – NS
Carters Creek	1209C_01	Nutrients and/or Chl *a* – CS
Wickson Creek	1209E_01	Bacteria – NS
Duck Creek	1209H_01	DO – NS
	1209H_02	Bacteria – NS DO – NS
Gibbons Creek	1209I_01	Bacteria – NS DO – NS
	1209I_02	Bacteria – NS
Shepherd Creek	1209J_01	Bacteria – NS
Steele Creek	1209K_02	Bacteria – NS
Burton Creek	1209L_01	Nutrients and/or Chl *a* – CS
Normangee Lake	1209O_01	Sediment – CS
Lake Mexia	1210_01 1210_02	DO – CS
Navasota River Above Lake Mexia	1210A_01	Bacteria – NS
Lake Limestone	1252_02	pH – CN
	1252_03	pH – NS
Navasota River Below Mexia	1253_01	Nutrients and/or Chl *a* – CS DO – CS
	1253_02	DO – CS
Springfield Lake	1253A_01	DO – CN

Yegua Creek Watershed
FY21 Water Quality Monitoring and 2020 IR Status

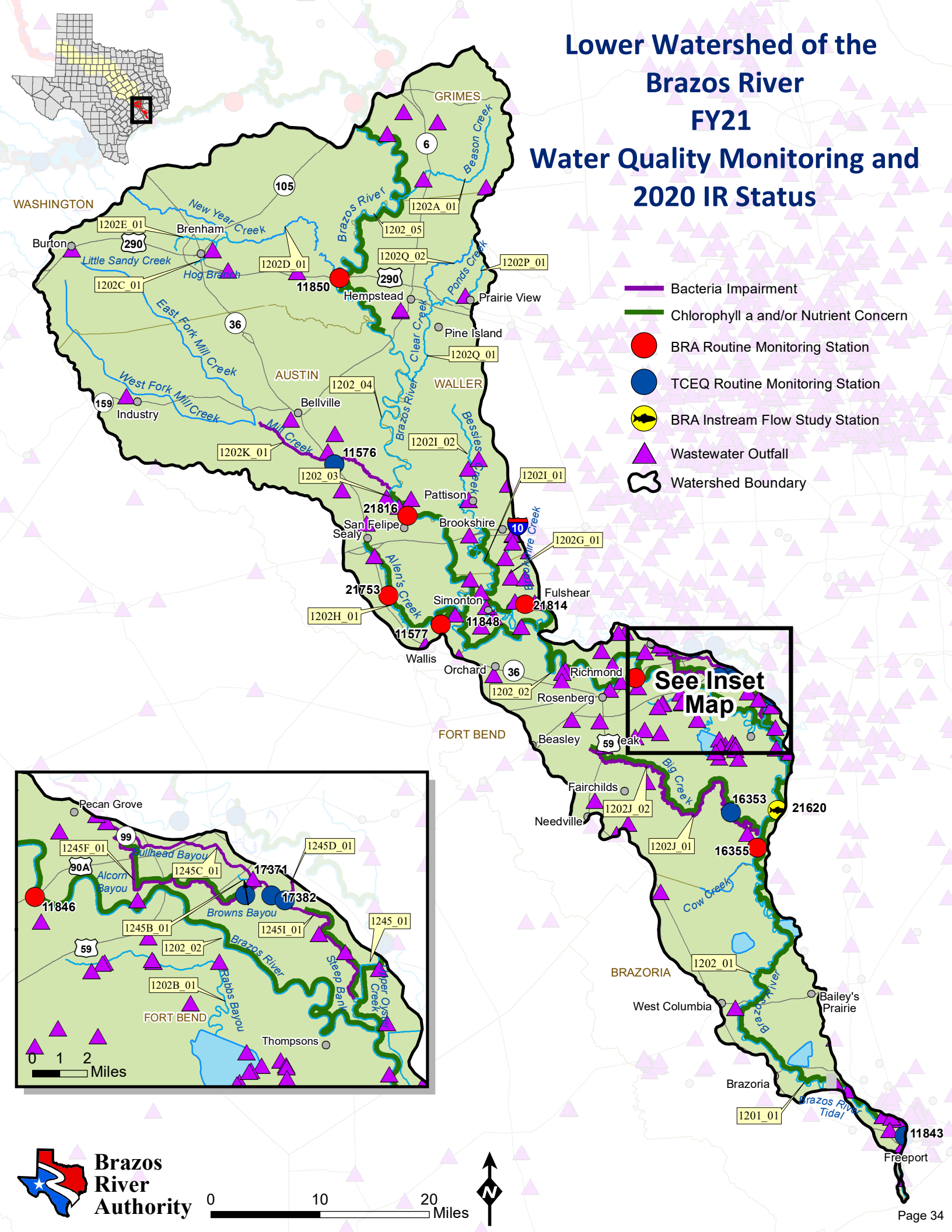


Brazos River Authority

Yegua Creek Watershed

Table 12: Waterbodies of the Yegua Creek Watershed IR status

Water Body	Segment	Parameter(s) Impairment and/or Concern
Yegua Creek	1211_01	Nutrients and/or Chl *a* – CS
Davidson Creek	1211A_02	Bacteria – NS DO – NS
Somerville Lake	1212_01 1212_03 1212_04	High pH – NS
Middle Yegua Creek	1212A_02	Bacteria – NS DO – CS Habitat – CS
Nail Creek	1212C_01	Nutrients and/or Chl *a* – CS DO – CS
Brushy Creek	1212K_01	Nutrients and/or Chl *a* – CS
Yegua Creek	1212L_01	Nutrients and/or Chl *a* – CS

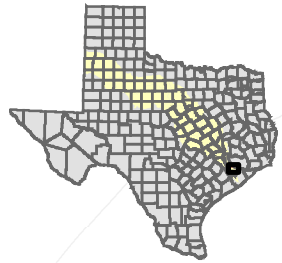

Lower Watershed of the Brazos River
FY21
Water Quality Monitoring and 2020 IR Status
Bacteria Impairment
Chlorophyll a and/or Nutrient Concern
BRA Routine Monitoring Station
TCEQ Routine Monitoring Station
BRA Instream Flow Study Station
Wastewater Outfall
Watershed Boundary
See Inset Map
GRIMES
WASHINGTON
AUSTIN
WALLER
FORT BEND
BRAZORIA
Brazos River
New Year Creek
Little Sandy Creek
Hog Branch
East Fork Mill Creek
West Fork Mill Creek
Mill Creek
Beason Creek
Ponds Creek
Clear Creek
Bessies Creek
Allen's Creek
Big Creek
Cow Creek
Sleep Bank
Upper Oyster Creek
Rabbs Bayou
Bullhead Bayou
Alcorn Bayou
Browns Bayou
Burton
Brenham
Hempstead
Prairie View
Pine Island
Industry
Bellville
Pattison
San Felipe
Sealy
Brookshire
Simonton
Fulshear
Wallis
Orchard
Richmond
Rosenberg
Beasley
Fairchilds
Needville
West Columbia
Bailey's Prairie
Brazoria
Freeport
Pecan Grove
Thompsons
1202A_01
1202_05
1202Q_02
1202P_01
1202Q_01
1202_04
1202I_02
1202I_01
1202_03
1202K_01
1202G_01
1202H_01
1202_02
1202J_02
1202J_01
1202_01
1201_01
1202E_01
1202C_01
1202D_01
1245F_01
1245C_01
1245D_01
1245B_01
1245I_01
1245_01
1202B_01
11850
11576
21816
21753
11577
11848
21814
16353
16355
21620
17371
17382
11846
11843
0 1 2 Miles
0 10 20 Miles
Brazos River Authority

Lower Watershed of the Brazos River Basin

Table 13: Waterbodies of the Lower Watershed IR status

Water Body	Segment	Parameter(s) Impairment and/or Concern
Brazos River Tidal	1201_01	~~Bacteria – NS~~ Nutrients and/or Chl *a* – CS
Brazos River Below Navasota River	1202_01 1202_02 1202_05	Nutrients and/or Chl *a* – CS
Allen's Creek	1202H_01	Nutrients and/or Chl *a* – CS
Big Creek	1202J_01	Bacteria – NS Fish Community – CN Habitat – CS
	1202J_02	Bacteria – NS DO – CS Nutrients and/or Chl *a* – CS
Mill Creek	1202K_01	Bacteria – NS Habitat – CS
Bullhead Bayou	1245C_01	Bacteria – NS
Unnamed Tributary of Bullhead Bayou	1245D_01	Bacteria – NS
Alcorn Bayou	1245F_01	Bacteria – NS Nutrients and/or Chl *a* – CS
Steep Bank Creek	1245I_01	Bacteria – NS DO – CS Nutrients and/or Chl *a* – CS

Upper and Middle Oyster Creek Watershed
FY21 Water Quality Monitoring and 2020 IR Status



1245E_01
Fulshear
Flewellen Creek
1245_03
1245A_02
99
Upper Oyster Creek
1245A_01
Red Gully
Bullhead Bayou
1245C_01
12087
Sugar Land
12083
90A
Alkire Lake
1245H_01
Stafford
59
Brooks Lake
1202F_01
1245G_01
1245_02
Upper Oyster Creek
Stafford Run
1245J_01
1245_01
12074
1258_01
Middle Oyster Creek
6
HARRIS
FORT BEND
BRAZORIA

Bacteria Impairment

Chlorophyll a and/or Nutrient Concern

TCEQ - Routine Monitoring Station

Wastewater Outfall

Watershed Boundary

Brazos River Authority

N

0 5 10 Miles

Upper and Middle Oyster Creek Watershed

Table 14: Waterbodies of the Upper and Middle Oyster Creek Watershed IR status

Water Body	Segment	Parameter(s) Impairment and/or Concern
Upper Oyster Creek	1245_01 1245_02 1245_03	Nutrients and/or Chl *a* – CS
Red Gully	1245A_01	Bacteria – CN Nutrients and/or Chl *a* – CS
Bullhead Bayou	1245C_01	Bacteria – NS
Flewellen Creek	1245E_01	Bacteria – CN
Stafford Run	1245J_01	Bacteria – CN

OTHER WATER QUALITY RELATED PROJECTS IN THE BASIN

LAKE LIMESTONE RIPARIAN RESTORATION

In fall 2019, six Brazos River Authority aquatic scientists set out on a mission to address a damaged area below the Sterling C. Robertson Dam at Lake Limestone, located on the upper Navasota River in Limestone, Robertson and Leon counties. The plan: reverse damaging practices of prior land-use methods. Armed with two truckloads of small tree saplings, shovels, and an award-winning attitude, the crew descended on the area below the dam. They were to repair the riparian zone.

A riparian zone is the area of land between the water of a stream or river and the higher ground. Sometimes call a rivers banks, this area holds specific benefits for both the quality of the river's water and the habitat for the fish and other water-based creatures living there. The crew split up into two groups of three and went to opposite sides of the stream, where they would begin planting the small tree saplings. Starting upstream near the dam and moving downstream along the banks and up into the floodplain, the crews began slicing into the earth and planting each individual tree for its hopeful journey into adulthood.

After 10 hours, about 500 newly planted saplings lined the banks.
Although many different trees thrive in the riparian zone next to a stream, the types of trees selected were made with the help of the staff at the U.S. Department of Agriculture's Natural Resource Conservation Service and the Texas A&M Forest Service. Planting trees wasn't enough. The trees needed to be suitable for the region. The first round of trees planted included: Texas Walnut, Pecan, Mexican Buckeye, Green Ash, and Bur Oak.

Riparian trees, shrubs, and other vegetation protect the stream from pollutants and runoff, which can greatly improve water quality. They also absorb excess nutrients, including nitrogen and phosphorus, from farm and livestock operations. Trees also play a pivotal role in streambank stabilization. Trees and other vegetation along the riparian zone help to provide a barrier against moving water, which causes erosion over time and can weaken and eventually wash away large sections of a riverbank.

Riparian restoration is never a one-time event. Some of the trees lovingly planted by BRA aquatic scientists will most likely be eaten by wildlife. Others may succumb to damages resulting from water releases at the dam. BRA aquatic scientists understand this is a marathon of love, not a sprint. They plan to revisit the site each fall for the next several years to plant more saplings in the hopes that this little stretch of the Navasota's native riparian community can be restored.

Given that diversity is the key to any healthy ecosystem, the trees selected for future plantings may be different from those planted in the first year. Additionally, to document the success and hopeful restoration of the riparian zones, aquatic scientists will visit the site periodically throughout the year to assess the growth of the saplings. They will also begin a Black willow stem cutting project in which suitable stems from an existing Black willow stand will be cut and replanted in the riparian zone. The BRA's goal is to achieve low-cost erosion control in an environmentally friendly manner. Only time will tell the success of the aquatic scientists' efforts, but projects like this can have a lasting positive effect on rivers and streams throughout the Brazos River basin.

In addition to helping protect and improve the water quality, trees within the riparian zone also provide critical habitat for upland wildlife and aquatic species. Trees can provide shade and a temperature refuge for fish species in summer months where stream temperatures increase, and oxygen levels decrease. Also, tree roots and debris provide excellent instream habitat for many different fish species, amphibians, and macroinvertebrates who call the river or stream environment their home.

ZEBRA MUSSEL EARLY DETECTION MONITORING

Zebra Mussels are an invasive species. Once they become established in a body of water, there isn't much that can be done to remove them. With that in mind, the Brazos River Authority's environmental team, in cooperation with the Texas Parks and Wildlife Department, has taken an active role in the surveillance and monitoring of BRA System reservoirs for zebra mussel infestations.

Currently, zebra mussels have not been found in the three Brazos River Authority reservoirs: Possum Kingdom Lake, Lake Granbury and Lake Limestone. However, infestations have been found in several reservoirs throughout the Brazos River basin. All it takes is one trip between an infested lake and a noninfected lake with an unclean watercraft to do irreversible damage.

Throughout the state of Texas, there are 19 lakes and five river basins infested with zebra mussels. Four of these lakes occur within the Brazos River basin. They include Lake Belton, Lake Granger, Lake Georgetown, and Stillhouse Hollow Lake.

Recent monitoring and surveillance activities have occurred at lakes Georgetown and Granger, where crews have conducted vertical plankton net tows near the dams and docks on the lake along with setting substrate samplers on courtesy docks for the detection of adult zebra mussels. Samples are then sent off for testing to determine the presence of zebra mussel DNA and the presence of veligers, which are the larval stage of a zebra mussel.

These field sampling methods are critical in the early detection of zebra mussels and provide vital information to the BRA on how to address and slow the potential impact to our water supply infrastructure.

Lake Limestone will be the focus of zebra mussel early detection sampling for BRA aquatic scientists now that Lakes Georgetown and Granger have tested positive. TPWD biologists are performing similar monitoring on Possum Kingdom Lake and Lake Granbury.

All of us need to play an active role in preventing the spread of zebra mussels. But more importantly, the responsibility falls in the laps of the boating community.

Remember to “Clean, Drain, and Dry” your boat. Transport of zebra mussels may occur in all sizes of watercraft, includes kayaks, canoes, and inflatable rafts.

For more information on zebra mussels, go here. For how to properly Clean, Drain, and Dry your boat and any other information on aquatic invasive species, visit the Texas Parks and Wildlife Zebra Mussel page.

CANDIDATE CONSERVATION AGREEMENT WITH ASSURANCES FOR THE FALSE SPIKE AND TEXAS FAWNSFOOT IN THE BRAZOS RIVER BASIN

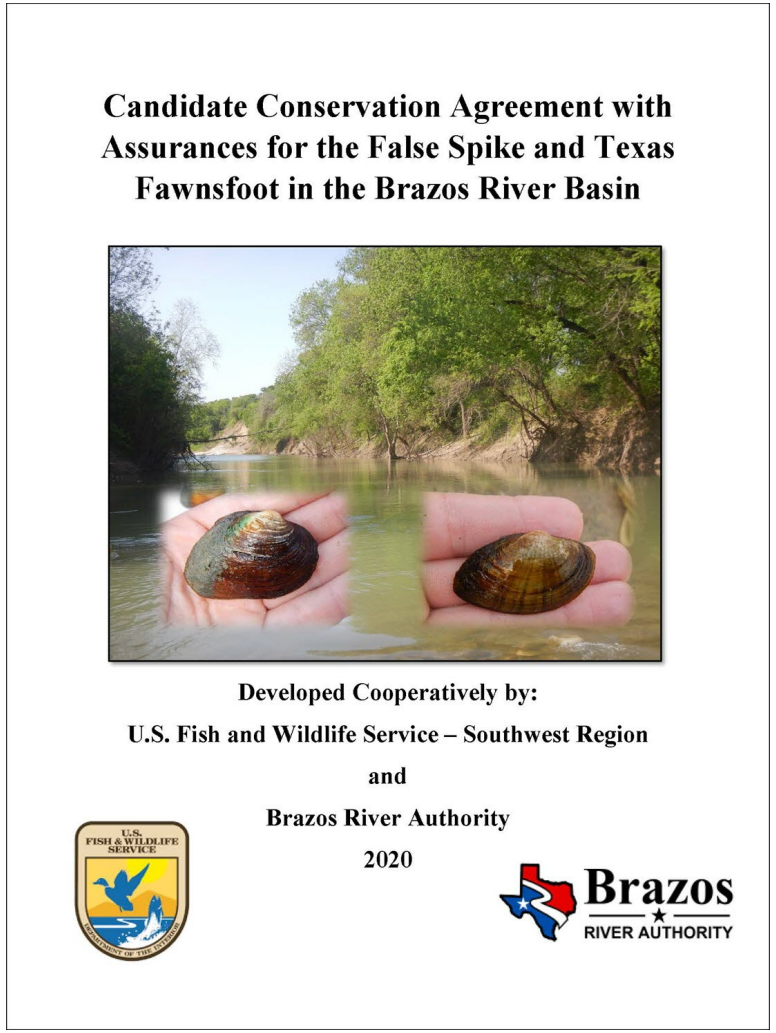
Over the past two years, the Brazos River Authority has been negotiating a Candidate Conservation Agreement with Assurances (CCAA) with the US Fish and Wildlife Service. The CCAA solidifies a voluntary partnership between the BRA and the USFWS to address the conservation needs of the two Brazos basin species of freshwater mussels currently under review for Endangered Species Act protection.

Two federal candidate-listed freshwater mussels are known to occur in the Brazos River basin. The Texas fawnsfoot, TRUNCILLA MACRODON, and the false spike, FUSCONAIA MITCHELLI, are currently under consideration for federal protection under the Endangered Species Act. The US Fish and Wildlife Service is expected to publish its final decision on the species status in late 2020. Federal law created three main categories where a species in danger may be placed:

- threatened,
- endangered, and
- candidate.

A candidate species is a plant or animal that has the potential for being listed as either threatened or endangered by the US Fish and Wildlife Service, but it is a species that the agency does not have the resources to move forward in listing at that time.

The CCAA includes activities related to research and monitoring to further knowledge of the two species, avoidance to protect existing populations, education and outreach from engaging the public and employing both collaborative conservation and adaptive management principles. It also includes the development of conservation zones and future hydrology modeling to prioritize areas for implementation of specific conservation measures designed to reduce current and future threats to the species.



The CCAA was submitted to USFWS for formal consideration in August 2020. It is anticipated that it will undergo at least a six-month review process by the United States Fish and Wildlife Service before being finalized.

BRAZOS BASIN INSTREAM FLOW MONITORING PROGRAM TO INFORM ON ENVIRONMENTAL FLOW STANDARDS

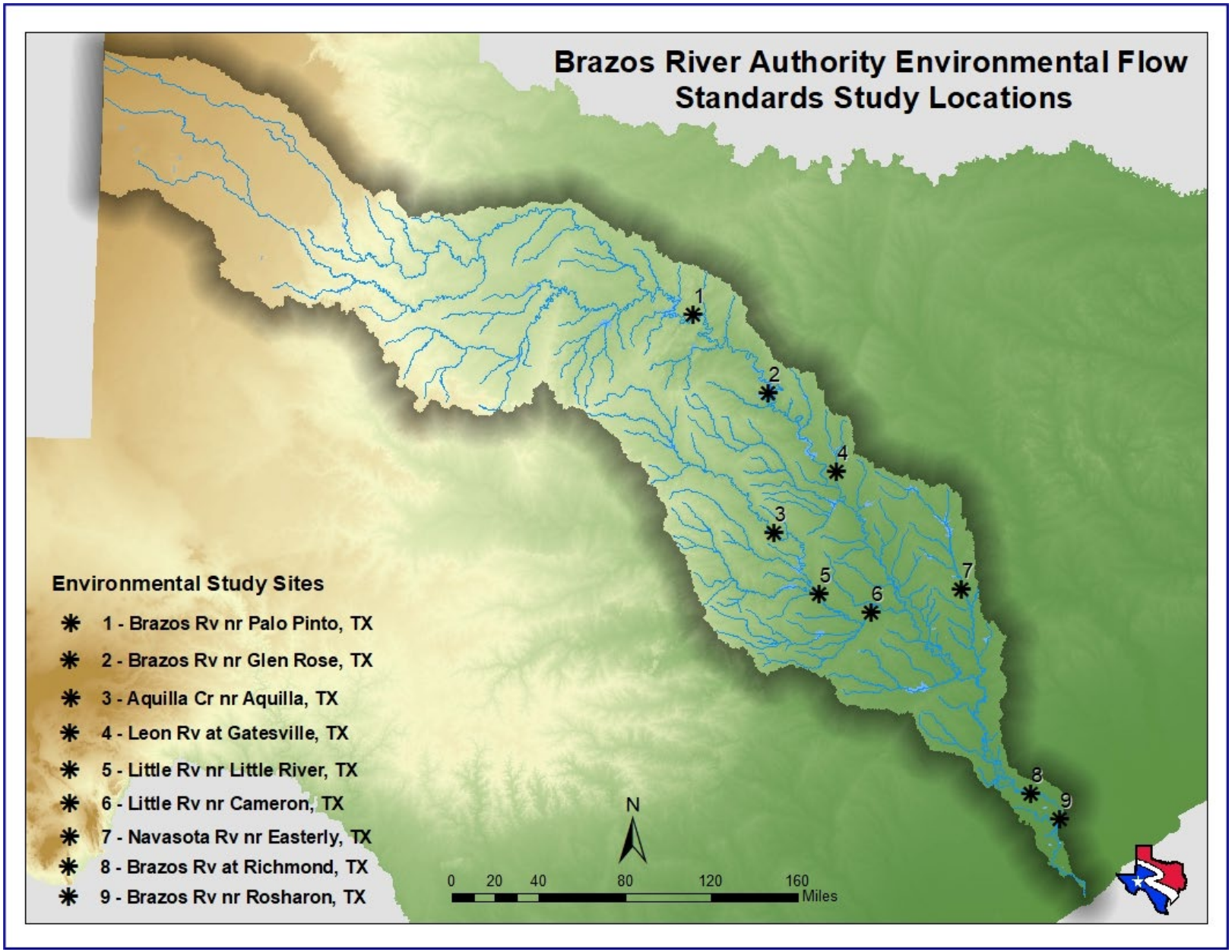
Senate Bill 2, enacted in 2001 by the 77th Texas Legislature, established the Texas Instream Flow Program (TIFP). The purpose of the TIFP is to perform scientific studies to determine flow conditions necessary to support a sound ecological environment in the rivers and streams of Texas. With passage of Senate Bill 3 (SB3) in 2007, the Texas Legislature restated the importance of maintaining the health and vitality of the State's surface-water resources and further created a stakeholder process that would result in science and policy based environmental flow regime recommendations to protect instream flows and freshwater inflows on a basin-by-basin basis. Instream flow studies function to provide scientific information that can be utilized during the adaptive management process within SB3 to inform environmental flow recommendations. These studies consist of multi-disciplinary assessments of biology, hydrology, water quality, geomorphology, and connectivity (where possible). Flow conditions are framed in the form of flow regimes comprising several components: subsistence, base flows, high flow pulses, and overbanking flows. As part of the TIFP process, the agency partners identified the middle and lower Brazos River as a priority sub-basin study area.

In 2012, the BRA initiated a program to perform extensive environmental studies at select locations (Figure I-3) in the Brazos River basin to gather data related to the TCEQ's adopted Senate Bill 3 (SB3) environmental flow baseline. The goal of these studies is to develop a baseline data set documenting habitat and species present in the river and riparian zones across the range of adopted subsistence and base flows for each selected location. When the next review of the environmental flow standards commences, all data will be provided to the Brazos Basin and Bay Expert Science Team (BBEST) and Basin and Bay Area Stakeholder Committee (BBASC) for their consideration when determining whether revisions to the environmental flow standards are warranted.

Many of the control points, or study sites for the TIFP chosen are at established USGS gage locations because flow can easily be determined at these sites. Because many of the studies require access to private property and because some USGS gage locations may not have much variety in habitat, the BRA may not be able to complete all studies at the exact location of the USGS gage. On the sites where studies have begun, the BRA has made every effort to site the studies as close to the proposed gage locations as prudent and as close to each other as prudent.

Components of the studies performed at each site include:

- Discharge, velocity and depth point measurements
- Temperature, pH, Conductivity, and Dissolved Oxygen Concentration
- Fixed photography, instream cover, habitat types, and channel surveys
- Macroinvertebrates, mussels (if present), and fish assemblage
- Riparian tree surveys
- Channel cross-section surveys
- Sediment sampling at the cross-sections



These studies are highly dependent on the occurrence of specific flow levels, so an accurate timeline for completion of all studies is difficult to predict. Table 1 displays the number of each type of sampling event that BRA has completed to date.

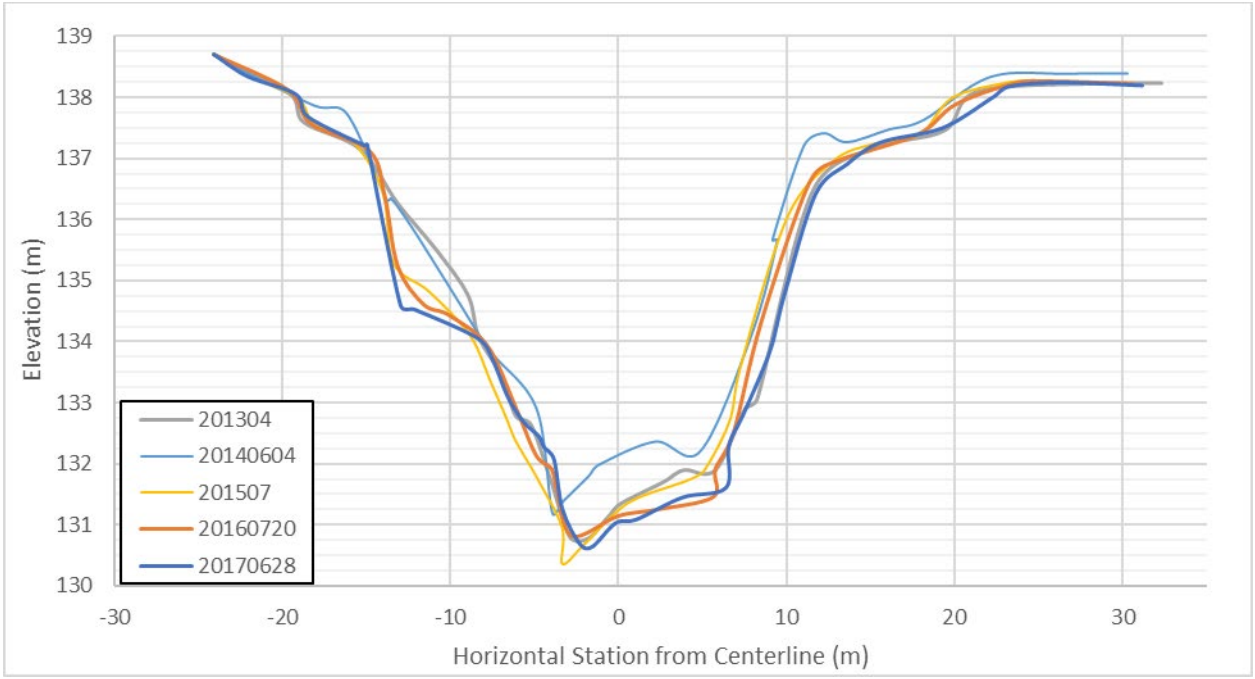
Table 1. Number and type of sampling event completed by BRA to date.

Site	Water Quality	Instream Habitat Mapping	Micro-Habitat Fish	Meso-Habitat Fish	Mussels	Invertebrates	Riparian Trees	Riparian Species	Riparian Seedlings	Channel Surveys	Sediment Samples
Brazos River near Palo Pinto	102	11	9	11	14	14	5	5	5	5	3
Brazos River near Glen Rose	102	5	4	5	5	7	5	5	5	5	3
Aquilla Creek near Aquilla	34	11	8	10	11	11	5	5	5	5	4
Leon River near Gatesville	95	2		2	2	2	2	2	2	2	2
Little River near Little River	22										
Little River near Cameron	101										
Navasota River near Easterly	33	9	5	8	8	8	5	5	5	5	5
Brazos River near Richmond	101	7	5	6	5	5	3	3	3	3	2
Brazos River near Rosharon	69	4	2	3	4	4	4	4	4	4	4

The three-year period of FY18 thru FY20 proved to be challenging for the completion of field sampling events due to either flows needed being too high or too low and with the additional challenges of attempting field work with facing with COVID-19 related constraints in FY20. Total Instream Flow Program events completed FY18-FY20 is 18 (13 Biological and 5 Riparian assessments), with no events completed in 2020.

Baseline data collection has been completed at three sites, the Brazos River near Palo Pinto, Aquilla Creek near Aquilla and the Brazos River near Rosharon. Collection of baseline data will continue at the remaining sites and a new site on the Leon River near Gatesville was added in 2018. Initial analysis of physical, aquatic, and riparian data has begun, to identify potential baseline characteristics or metrics for long term monitoring and adaptive management. For example, cross-section data can be used to track cross-section changes over time (Figure 1.) Cross-sectional area changes, vertical shifts, and horizontal shifts encompass overall changes to each cross section and may be suitable metrics for selecting a range of variability at this site. The Authority will continue to collect and analyze flow-targeted data on sites that require it and shift to a long-term monitoring strategy on sites with completed baseline data sets.

Figure 1. Aquilla Creek upstream cross-section for survey years 2013 through 2017



NORTH BOSQUE RIVER TMDL IMPLEMENTATION PLAN

The North Bosque River and Waco Lake, formed by an impoundment of the Bosque River, serve as the primary drinking water supplies for more than 200,000 people in the Waco area. Water quality testing found high levels of nutrients in the North Bosque. In 1992 North and Upper North Bosque Rivers (Segments 1226 and 1255) were listed as impaired on the 303 (d) List. In 1996, TCEQ identified excessive algal growth as a problem in these segments and the Bosque River Advisory Committee formed. High concentrations of nutrients can cause excessive growth of algae and other aquatic plants possibly impairing water quality, leading to taste and odor problems in drinking water, or reducing dissolved oxygen for fish and other aquatic life. The North Bosque River TMDL project, initiated in 1998, addresses the elevated levels of the limiting nutrient in the watershed, phosphorus.

In 2001 TCEQ adopted and the EPA approved the developed TMDLs to reduce phosphorus in Segments 1226 and 1255. An Implementation Plan was approved by TCEQ and TSSWCB by 2003. The Implementation Plan identified four feasible measures to be implemented through six management strategies and defined specific water quality measures of success.

Feasible Measures

- Establish phosphorus application rates for waste application fields (WAFs)
- Reduce phosphorus in diet of dairy cows
- Remove approximately half the dairy-generated manure for disposal or use outside the watershed
- Establish effluent limits for phosphorus at wastewater treatment facilities (WWTFs)

Management Strategies

- Comprehensive nutrient management planning for all identifiable agricultural sources
- Microwatershed approach to water quality monitoring and agricultural producer assistance
- Establishing commercial composting facilities in the region and a sustainable market for compost products
- Establishing phosphorus permit limits for municipal
- Monitoring water quality for TMDL model refinement and goal attainment WWTFs
- Adapting rules, permit reviews, and enforcement activities, including changes to the CAFO regulations

TCEQ held an open stakeholder meeting in September 2020 to assess progress in the watershed. At the suggestion of the stakeholders, TCEQ has formed a small work group to recommend next steps for this watershed. Membership of the North Bosque River TMDL Advisory Work Group is made up of volunteers from among the general stakeholder group. Membership in the work group is closed, but meetings are open to the public. For more information on the North Bosque River TMDL Plan, meeting notices and summaries or annual status reports, please visit the North Bosque River: Implementing a TMDL to Protect General Uses webpage.

WATERSHED PROTECTION PLAN FOR THE LEON RIVER

The Leon River below Proctor Lake, Segment 1221, was placed on the State's 303(d) List in 1998 for having bacteria levels. Placement of the Leon River on the List caused the TCEQ to initiate the development of a Total Maximum Daily Load (TMDL) on the portion of the river downstream of Lake Proctor and upstream of Hamilton in 2002. Upon completion of the TMDL modeling report in 2006, local stakeholders requested the BRA to facilitate the development of a Watershed Protection Plan (WPP) for the Leon River to assist the TCEQ in the selection of appropriate implementation strategies for the watershed. The BRA received funding for the project through the Texas State Soil and Water Conservation Board (TSSWCB) and began hosting stakeholder meetings in 2007. Stakeholders worked diligently toward the development of a WPP document and a draft WPP was completed and released for public comment in December 2011. The WPP was submitted to the EPA in 2012. The Leon River Watershed Protection Plan was approved by the EPA in early 2015 and is now in the implementation phase. While the primary focus of the WPP was on the impaired reaches, other water quality that may come about or are raised by local stakeholders will be addressed by this WPP.

A Watershed Coordinator through a grant from the TSSWCB and contracted through the Central Texas Council of Governments works to coordinate implementation of the voluntary WPP by educating and informing local citizens on local surface water quality issues and encouraging citizens to implement Best Management Practices (BMPs) identified in the WPP on their properties. Examples of identified BMPs in the WPP for implementation in the Leon River watershed involve Feral Hogs, OSSFs, Grazing Management, Urban Strategies, Deer Population Management, and Dead Animal Disposal.

The Watershed Coordinator also seeks additional government funding to continue implementation of the WPP. You can visit http://leonriver.tamu.edu/ for further information on the Leon Watershed and the WPP or their Facebook page.

WATERSHED PROTECTION PLAN FOR NOLAN CREEK/SOUTH NOLAN CREEK

The Nolan Creek/South Nolan Creek (Segment 1218) was first included on the 303(d) list as impaired for elevated bacteria concentrations in 1996. In the 2020 IR Segment 1218 remains listed as impaired for recreational use.

A characterization project, led by TIAER, began in August 2012 and ended in February 2015. The Nolan Creek Watershed Partnership began meeting in 2013 and provided local input for development of the WPP. In February 2019, the Watershed Protection Plan for Nolan Creek/South Nolan Creek was accepted by the EPA. The Texas Institute for Applied Environmental Research facilitated development of this WPP through Clean Water Act 319(h) project funding via the TCEQ. The Nolan Creek/South Nolan Creek WPP focuses on activities to control bacteria contributions as the main water quality impairment, but also addresses concerns related to elevated nutrients. Some of the practices include: education and outreach, adding pet waste stations, promoting low impact development, developing water quality management plans for livestock and horse owners, trapping feral hogs, and organizing creek clean up events. For more information on the Nolan Creek WPP please visit http://www.nolancreekwpp.com/.

WATERSHED PROTECTION PLAN FOR THE LAMPASAS RIVER

The Lampasas River, Segment 1217, was identified for watershed protection plan development due to concerns about elevated levels of bacteria, as reported in the 2002 IR. In 2009, the Lampasas River Watershed Partnership, area residents and other stakeholders worked to develop a WPP to address water quality concerns within the watershed. The Partnership has evaluated water quality issues and made

recommendations for voluntary pollutant load reductions and management measures. Through the WPP process, stakeholders will holistically address the sources and causes of impairments and threats to both surface and ground water resources within the watershed. The WPP, with the support of stakeholders, will assure the long-term health of the watershed with strategies for protecting unimpaired waters and restoring impaired waters. The Lampasas River Watershed Protection Plan was approved by the EPA in May 2013 and by the Steering Committee in September 2013. The project is in the implementation phase.

Texas A&M AgriLife Research at BREC has maintained a full time Watershed Coordinator through the life of this project. The Watershed Coordinator is responsible for coordinating management measures by overseeing project activities, coordinating outreach and education efforts organizing regular updates for the Partnership, maintaining the website, and seeking additional funding. Recommended management measures identified in the WPP include a host of agriculture nonpoint source measures, wildlife and feral hog management measures and urban management measures.

Various educational and informational meetings and workshops are advertised and hosted through the WPP's webpage. For more information visit the web site at Lampasas River Watershed Protection Plan.

BIG ELM CREEK WATERSHED PROTECTION PLAN

Big Elm Creek, 1213A, was first identified in the 2010 IR as impaired for primary contact recreation due to elevated bacteria. In the 2020 IR Big Elm Creek remains impaired for bacteria and has a concern for nitrate. In addition to the contact recreation impairment, Little Elm Creek (1213B), a tributary to Big Elm Creek, has concerns for dissolved oxygen and nitrate. The Texas Water Resources Institute (TWRI) identified potential sources of pollution, pollution loads, and possible management measures in a previous watershed characterization project.

This project built on the existing watershed characterization project for the larger Little River watershed. Data produced under the watershed characterization supported the development of this WPP for Big Elm Creek. Data from the characterization also assisted stakeholders in choosing management measures and determine load reductions in the watershed. Management measures include: promoting and implementing Water Quality Management Plans (WQMP) or Conservation Plans, promoting technical and direct operational assistance to landowners for feral hog control, identifying, inspecting and repairing or replacing failing on-site sewage systems, reducing pet waste mixing into waterbodies, implementing and expanding urban and impervious surface stormwater runoff management, identifying potential wastewater conveyance system failure and prioritize system repairs or replacement, reducing illicit dumping and promote street cleanups, conducting soil tests for both agriculture and urban areas, additional monitoring on Big Elm Creek close to the landfill areas, and conducting landowner education workshops. This WPP project built upon existing stakeholder involvement, surveys, and outreach that was initiated during the watershed characterization process. Stakeholder meetings took place February 2019 through September 2019. A Technical Draft – Big Elm Creek Watershed Protection Plan was completed in December 2019 and is under review by stakeholders.

CHARACTERIZING THE MIDDLE YEGUA, DAVIDSON CREEK AND DEER CREEK WATERSHEDS

The Middle Yegua Creek, 1212A, was first listed as impaired for recreational use due to elevated bacteria in the 2010 IR. Davidson Creek, 1211A, was first listed as impaired for recreational use due to elevated bacteria in the 2002 IR, and for depressed dissolved oxygen in the 2010 IR. Deer Creek, 1242J, was first listed as impaired for recreational use due to elevated bacteria in the 2006 IR. These listings remain in the 2020IR. Recreational Use Attainability Analyses were conducted on each creek and showed that primary contact recreation occurs on all three segments. The primary objectives of this project were to evaluate existing data within the project areas, identify causes and sources of pollution, engage local stakeholders, provide educational programs, and assess water quality. Water quality data, flow, wildlife and livestock estimates, number of septic systems, etc. was collected and evaluated to assist in identifying causes and sources of parameters impairing water quality. This thorough characterization of the Middle Yegua Creek, Davidson Creek and Deer Creek watersheds will help stakeholders with future watershed planning efforts. A final report Characterizing the Middle Yegua, Davidson Creek and Deer Creek Watersheds was completed in May 2020.

WATERSHED CHARACTERIZATION OF THE THOMPSONS CREEK WATERSHED

This watershed characterization study focused on three segments in the Thompson Creek Watershed. Portions of Cottonwood Branch (1242B_01 and 1242B_02) first listed in 2006, Still Creek (1242C_02), first listed in 2006 and Thompsons Creek (1242D_01 and 1242D_02), first listed in 2002, are all listed as impaired for recreational use due to elevated bacteria in the 2020 IR. The portion of Thompsons Creek from the confluence of Still Creek upstream to the confluence of Thompson's Branch (1242D_02) is also listed as impaired in the 2020 IR for depressed dissolved oxygen and has been since 2006.

This characterization addresses the bacterial impairments in the in the noted segment with water quality monitoring and a review of demographic, climatic, physical, and hydrological conditions of the Thompson's Creek watershed. Existing data for water quality parameters, flow, livestock, wildlife, stormwater permits, and a number of on-site sewage facilities were analyzed to develop a better understanding of potential causes and sources of bacteria pollution. As is the goal with these watershed characteristic studies data collected will help stakeholders with future watershed planning efforts. A final report Watershed Characterization of the Thompsons Creek Watershed was completed in June 2020.

WATERSHED PROTECTION PLAN FOR THE NAVASOTA RIVER BELOW LAKE LIMESTONE

The Navasota River and several tributaries were first listed as impaired for recreational use due to elevated bacteria in the 2002 IR. Low dissolved oxygen (DO) in Duck Creek also resulted in a water quality impairment and concerns for elevated nutrients and chlorophyll-a, and depressed DO exist in several locations.

To address this need, watershed stakeholders organized to develop the Navasota River Below Lake Limestone Watershed Protection Plan. Recommended management measures focus on reducing *E. coli* loading to waterbodies by retaining it on the landscape or removing the source in the case of feral hogs. Management recommendations focus on sources that are feasibly managed including feral hogs, livestock, on-site

sewage facilities (OSSFs), pets, and wastewater. All management recommended is voluntary and when implemented, will reduce *E. coli* loading to the Navasota River and its tributaries.

The Navasota River Below Lake Limestone WPP was completed and accepted by EPA in early 2017. The WPP is currently being implemented and additional funding is being sought to further implementation efforts.

Navasota River watershed stakeholders also decided to pursue development of a total maximum daily load (TMDL) and a TMDL Implementation Plan in addition to the WPP. The TMDL and Implementation Plan include the same management measures in the WPP. The TMDL was adopted by TCEQ in August 2019 and approved by the EPA in October 2019. The Implementation plan was approved by TCEQ in August 2019. For more information visit the web site at http://navasota.tamu.edu/.

MILL CREEK WATERSHED PROTECTION PLAN

In 2008, Mill Creek was listed on the Texas Water Quality Inventory List of Sources of Impairment and Concern related to the fish community. Mill Creek was originally listed in 2010 and continues to be listed in the 2020IR as impaired for recreational use due to elevated bacteria. In 2013, the TSSWCB and TWRI identified Mill Creek for WPP development. Public meetings were held in Bellville and Brenham in November 2014, and shortly thereafter the Mill Creek Watershed Partnership was formed to guide the WPP development process. The Mill Creek Watershed Protection Plan was approved and signed by the Steering Committee in January of 2016 and accepted by EPA in February of 2016. The project is in the implementation phase.

The Mill Creek Watershed Partnership and Steering Committee recommended management measures to reduce bacteria levels in the Mill Creek Watershed focusing on urban management measures, wastewater management measures, agricultural management measures and feral hog management measures.

Various educational and informational meetings and workshops are advertised and hosted through the WPP's webpage. For more information visit the web site at Mill Creek Watershed Partnership or visit their Facebook page.

PUBLIC INVOLVEMENT AND OTHER INFORMATION

BRAZOS RIVER BASIN CLEAN RIVERS PROGRAM STEERING COMMITTEE

The size and diversity of issues across the Brazos River basin continues to present a challenge for the large group of stakeholders in our basin. The Brazos River Clean Rivers Program (CRP) Steering Committee participants represent diverse interests that are represented by government agencies, municipalities, industry, agriculture, organized local stakeholder groups, individuals, and environmental groups.
The BRA holds an annual meeting that provides the Steering Committee with an opportunity to hear results of water quality monitoring and CRP special studies and gives them a forum where they may voice opinions, make recommendations and interact with other stakeholder participants

and BRA staff. Steering Committee members also participate by providing input into planning water quality monitoring activities, prioritizing problems within the basin for prospective CRP special studies, identifying problem areas, developing actions to address potential problem areas in the basin and commenting on the current year's draft Basin Highlights or Summary Report.

How to get involved with the Brazos Basin CRP?

BRA promotes communication and participation from the general public. If you are interested in serving on the Brazos River Basin CRP Steering Committee, send an email to jenna.olson@brazos.org. Please indicate what topics you are interested in and provide an email address so that you can receive electronic notices of meetings and reports. In addition, the information you provide will help us to develop more effective meetings and provide direction to the program. We highly encourage participation in our meetings and input on water quality issues in the basin.

BRAZOS BASIN CRP WEBSITE

The BRA maintains both a **river authority website** with a dedicated **CRP webpage** as a mechanism to keep the public informed. These websites provide information on topics of interest in the basin and also provide links to a range of information, including:

Water Supply

Clickable buttons provide information on Drought, Conservation, Planning, Contracting, System Operations, and a Reservoir Accounting Summary.

Environmental

Clickable buttons provide information on Water and Wastewater Treatment, the Texas Clean Rivers Program, and Watershed Protection Plans.

Brazos River Watershed – Overview of what a watershed is, highlighting the Brazos River Watershed
Environmental Services – Information on BRA's Environmental Services department with clickable videos for "Brazos River Authority Water Sampling" and "Brazos River Authority River Health"
Water and Wastewater Treatment – Information regarding wastewater treatment plants the BRA operates and maintains in the basin
Species in the Brazos Basin – Links to "Species of Interest", "Invasive Species" and "Harmful Algal Blooms"
Water Quality – An introduction to the importance of water quality with links to the "**Clean Rivers Program**" page, BRA's "Chloride Model" and information on "Weird Water Event" and "Waterborne Illnesses"
What Can You Do – Describes various things the public can do to help protect water quality

Clear Rivers Program

Clicking on the Texas Clean Rivers Program button will take you to the BRA hosted CRP webpage. There is a clickable map with water quality data generated by the BRA available in a searchable format that can be easily downloaded to an Excel file. This site is updated

weekly. For water quality data generated by entities other than the BRA, stations are linked to TCEQ's Surface Water Quality Web Reporting Tool. This is also where all of the required CRP information and documents can be found. Including:

CRP Public Outreach – Information on becoming a Steering Committee member
CRP Calendar of Events – Steering Committee Meeting are announced
Program Documents – Required program documents

- Current Work Plan
- Quality Assurance Project Plan
- Coordinated Monitoring Schedule
- TCEQ CRP Data Tool
- Surface Water Quality Web Reporting Tool

Reports, Presentations and Meeting Minutes – Basin Highlights Reports and past Steering Committee Meeting agendas and presentations
Basin Summary Report
Links to other CRP Resources – Links to other CRP partners and the TCEQ
CRP Data – Direct link to the searchable database of BRA collected CRP data
Watershed Action Planning – Link to the TCEQ hosted Watershed Action Planning webpage

Reservoirs

Information on Brazos Basin Reservoirs with clickable buttons providing information on Possum Kingdom Lake, Lake Granbury, Lake Limestone, Allen's Creek Reservoir (proposed), Federal Reservoirs, and Lake Safety. There are also links to several BRA informational videos: "Do You Know the Brazos River Authority", "Why Water Levels Fluctuate" and "Gate Operations"

Education

Information is provided on all things water (Water School), a Speakers Bureau, the Major Rivers Program, and a Resource Library.

News

Information is provided on current BRA news, the BRA newsletters and the BRA News Room.

Water Levels

Clickable buttons provide information on River and Reservoir Levels, Water Supply and Reservoir Data and River Safety.

Brazos River Basin Highlights Report

2021

Brazos River Authority

THE TEXAS CLEAN RIVERS PROGRAM

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

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