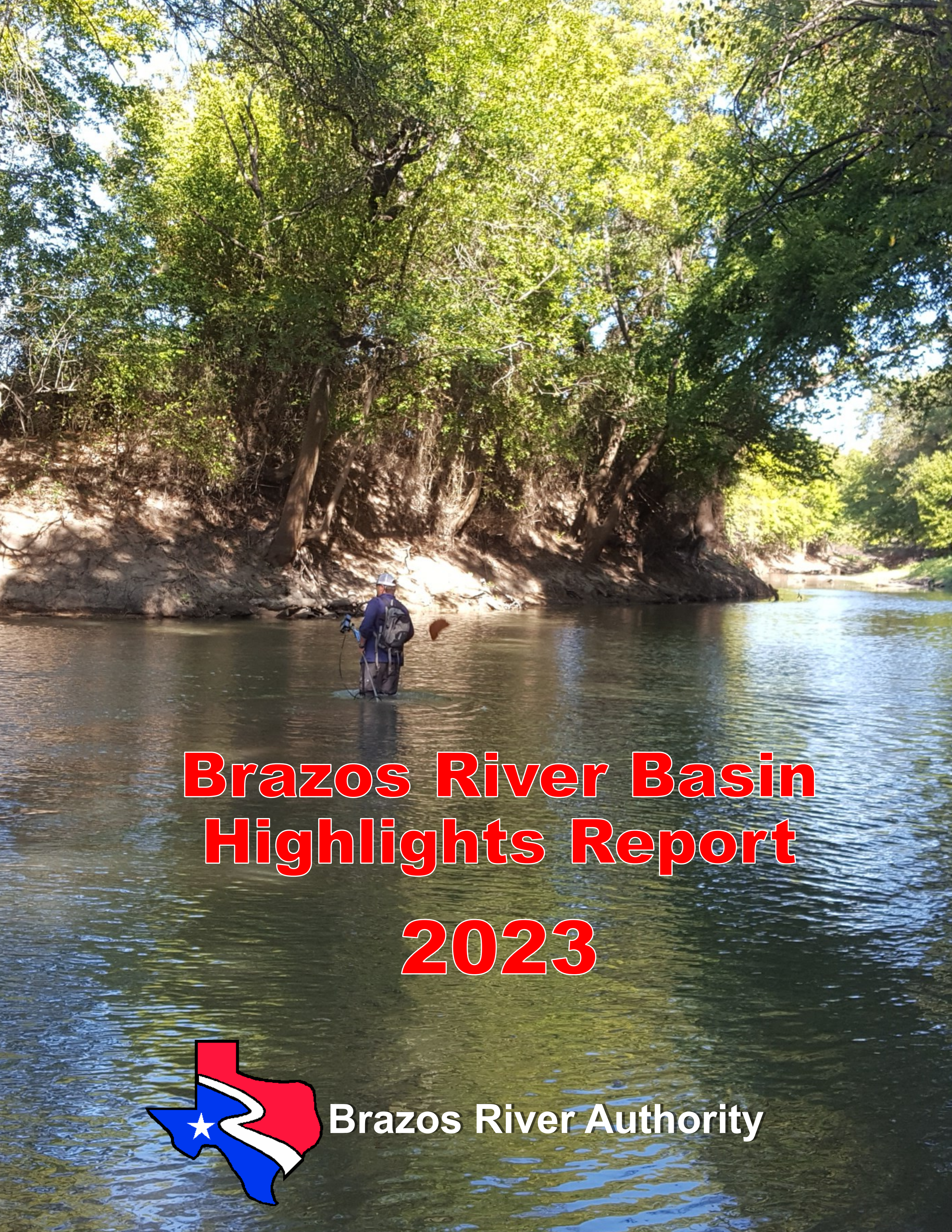


Brazos River Basin Highlights Report

2023

Brazos River Authority

BRAZOS RIVER BASIN HIGHLIGHTS REPORT 2023

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 2023, and summarization of the 2022 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 and 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 2022 Guidance for Assessing and Reporting Surface Water Quality in Texas. The 2022 IR, on which the following information is based, provides an assessment of water quality results using data acquired from December 1, 2013 through November 30, 2020. Please click here for more information and to review the 2022 Texas Integrated Report for Clean Water Act Sections 305(b) and 303(d). On July 7, 2022, the 2022 Texas Integrated Report for Clean Water Act Sections 305(b) and 303(d) was approved by the USEPA.

The 2022 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.

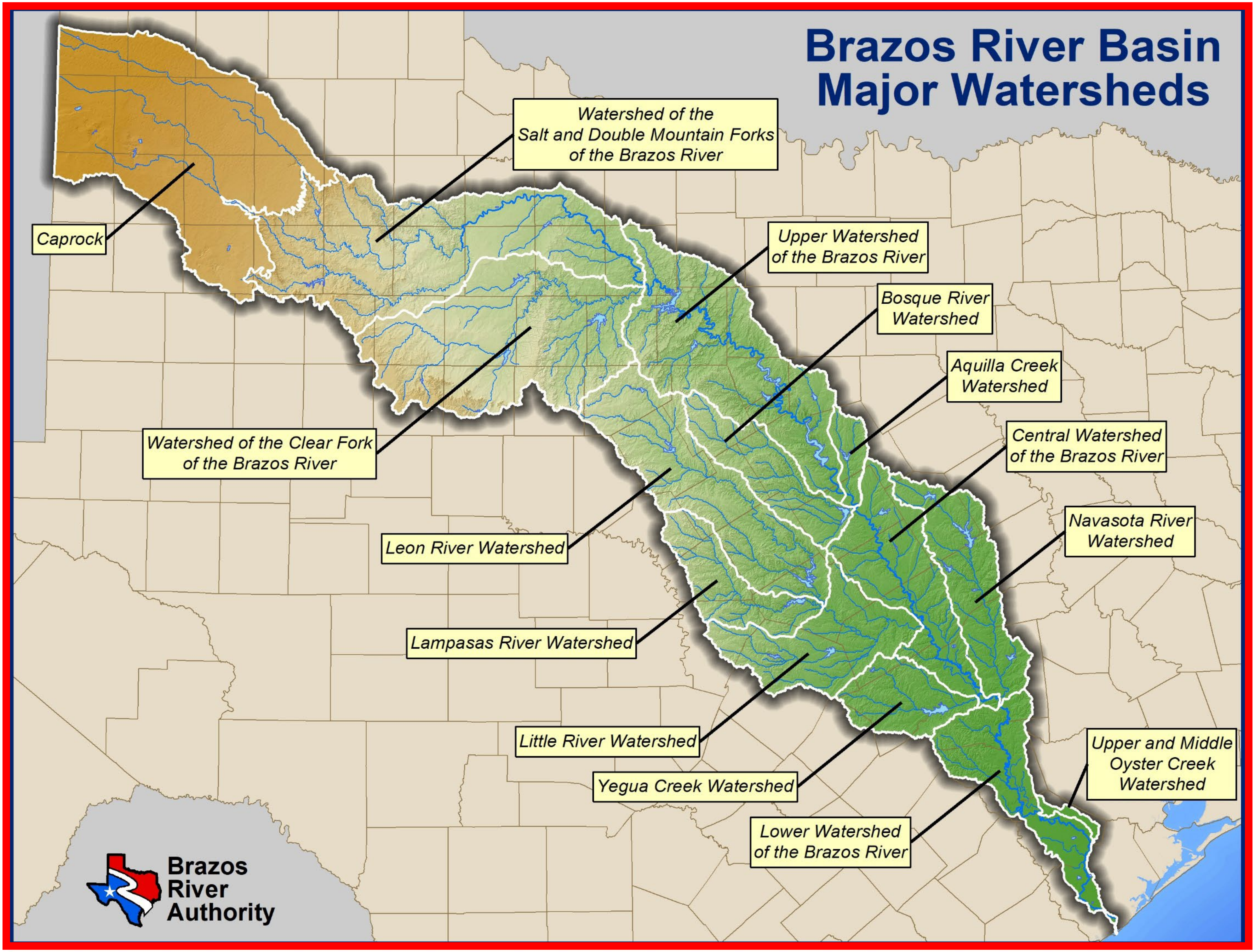
Screening levels for chlorophyll *a* and nutrients are applied to waterbodies statewide and are based on the 85th percentile of nutrient values in the statewide water quality database. Waterbodies that exhibit frequent (>25% of the time) elevated concentrations of nutrients or chlorophyll *a* are referred 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

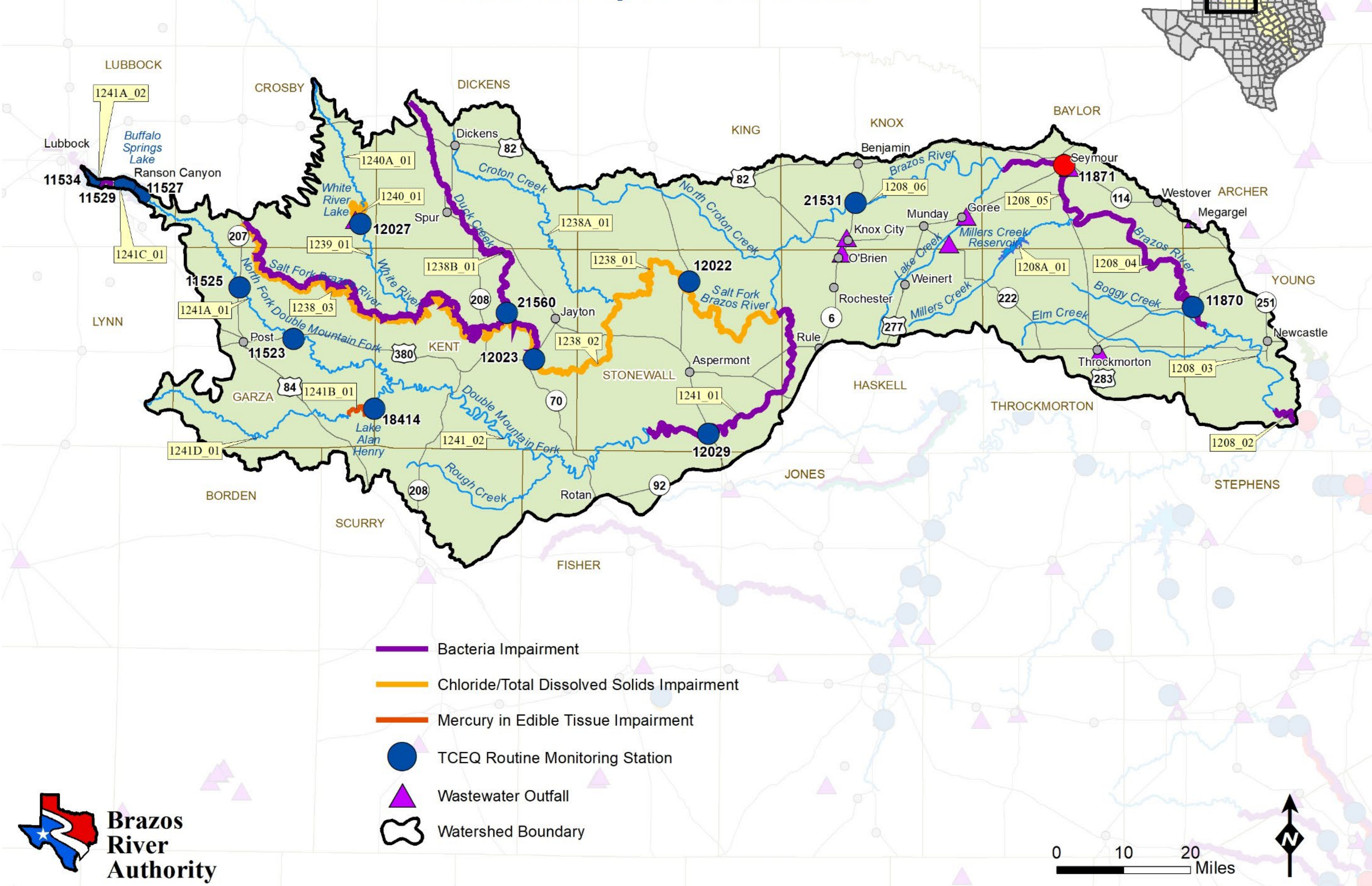
<table>
<tr><td colspan="10">Table 1. FY 2023 Summary of Known Sampling for the Brazos River Basin (September 2022 through August 2023)</td></tr>
<tr><th>Sampling Entity</th><th>Field</th><th>Conventional</th><th>Bacteria</th><th>24-hr DO</th><th>Biological and Habitat</th><th>Metals in Water</th><th>Organics in Water</th><th>Metals in Sediment</th><th>Organics in Sediment</th></tr>
<tr><td>BRA</td><td colspan="3">30 monthly
70 quarterly
7 semi-annually</td><td>4 - 5 times per year</td><td>6 semi-annually (Insteam Flow Studies)</td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">TCEQ</td><td colspan="3">95 quarterly
13 semi-annually</td><td>2 quarterly
2 semi-annually
1 - 6 times per year</td><td>1 semi-annually</td><td>3 quarterly
5 semi-annually</td><td>2 semi-annually</td><td>1 annually
6 semi-annually</td><td>3 semi-annually</td></tr>
<tr><td>1 semi-annually</td><td colspan="2"></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>TIAER</td><td colspan="3">10 monthly
7 semi-monthly
8 quarterly</td><td>1 yearly</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>TWRI</td><td>9 monthly</td><td></td><td>9 monthly</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

(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 20202 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 and water quality impairments. There are also tables summarizing segments in each watershed that are listed in the 2022 IR as possessing impairments or concerns and what parameter was evaluated that contributed to the listing as well as segments that have no impairment or concerns. For each table, there is a field for “Parameter(s) of Impairment” indicating if a segment is non-supporting for a designated use, or impaired. There is also a field for “Concern(s) based on Screening Level or Near Non-Attainment” indicating if a segment has a concern for water quality based on screening levels or has concern for near non-attainment of applicable water quality standards.

Watershed of the Salt and Double Mountain Forks of the Brazos River
FY23 Water Quality Monitoring and
2022 IR Impairment Status

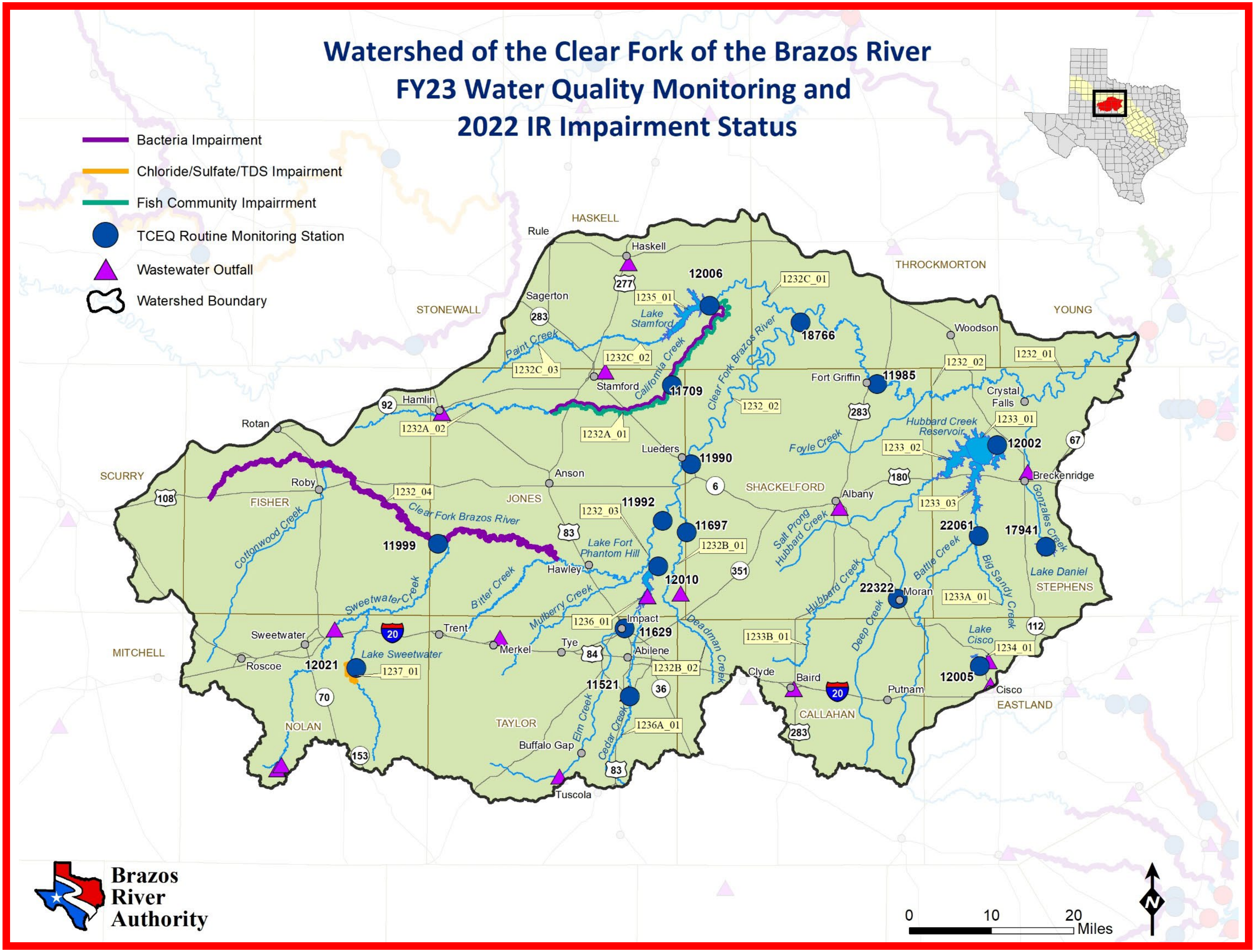


Watershed of the Salt Fork and Double Mountain Fork of the Brazos River

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

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
Brazos River Above Possum Kingdom Lake	1208_02	Bacteria	Chlorophyll-*a*
	1208_03		
	1208_04	Bacteria	Chlorophyll-*a*
	1208_05	Bacteria	Chlorophyll-*a*
	1208_06		Bacteria Chlorophyll-*a*
Millers Creek Reservoir	1208A_01		
Salt Fork Brazos River	1238_01	Chloride	Temperature
	1238_02	Chloride	
	1238_03	Bacteria Chloride	
Croton Creek	1238A_01		Bacteria
Duck Creek	1238B_01	Bacteria	Chlorophyll-*a*
White River	1239_01		
White River Lake	1240_01	Chloride Total Dissolved Solids	
White River above White River Reservoir	1240A_01		
	1240A_02		
Double Mountain Fork Brazos River	1241_01	Bacteria	Chlorophyll-*a*
	1241_02		
North Fork Double Mountain Fork Brazos River	1241A_01		Chlorophyll-*a* Nitrate
	1241A_02	Bacteria	Ammonia, Chlorophyll-*a* Nitrate
Lake Alan Henry	1241B_01	Mercury in edible tissue	

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
Buffalo Springs Lake	1241C_01		
South Fork Double Mountain Fork Brazos River	1241D_01		
Lake Ransom Canyon	1241E_01		



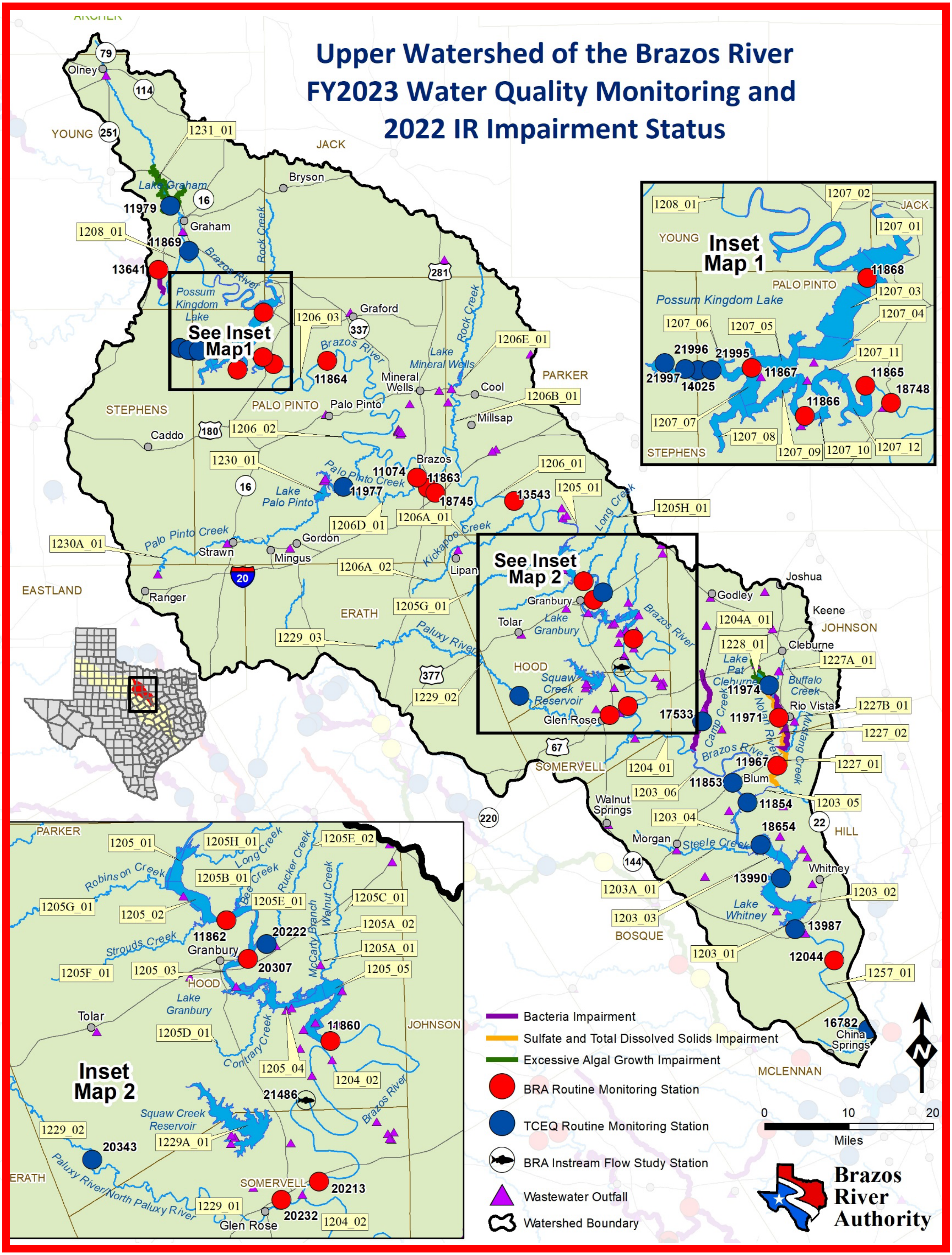
Watershed of the Clear Fork of the Brazos River
FY23 Water Quality Monitoring and
2022 IR Impairment Status
Bacteria Impairment
Chloride/Sulfate/TDS Impairment
Fish Community Impairrment
TCEQ Routine Monitoring Station
Wastewater Outfall
Watershed Boundary
HASKELL
THROCKMORTON
YOUNG
STONEWALL
SCURRY
FISHER
JONES
SHACKELFORD
STEPHENS
MITCHELL
NOLAN
TAYLOR
CALLAHAN
EASTLAND
Haskell
Rule
Sagerton
Stamford
Hamlin
Rotan
Roby
Anson
Lueders
Fort Griffin
Woodson
Crystal Falls
Albany
Breckenridge
Hawley
Impact
Abilene
Tye
Merkel
Trent
Sweetwater
Roscoe
Buffalo Gap
Tuscola
Clyde
Baird
Putnam
Moran
Cisco
12006
18766
11985
11709
11990
11992
11697
11999
12010
11629
11521
12021
12002
22061
17941
22322
12005
1235_01
1232C_01
1232C_02
1232C_03
1232_01
1232_02
1232A_01
1232A_02
1232_04
1232_03
1232B_01
1232B_02
1233_01
1233_02
1233_03
1233A_01
1233B_01
1234_01
1236_01
1236A_01
1237_01
Lake Stamford
Paint Creek
California Creek
Clear Fork Brazos River
Foyle Creek
Hubbard Creek Reservoir
Salt Prong Hubbard Creek
Hubbard Creek
Battle Creek
Big Sandy Creek
Gonzales Creek
Lake Daniel
Deep Creek
Lake Cisco
Cottonwood Creek
Sweetwater Creek
Bitter Creek
Mulberry Creek
Lake Fort Phantom Hill
Deadman Creek
Lake Sweetwater
Elm Creek
Cedar Creek
277
283
92
108
6
180
67
83
351
84
36
70
153
20
112
Brazos River Authority
0
10
20
Miles
N

Watershed of the Clear Fork of the Brazos River

Table 3: Waterbodies of the Clear Fork Watershed IR status

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
Clear Fork Brazos River	1232_01		
	1232_02		Chlorophyll-*a*
	1232_03		Chlorophyll-*a*
	1232_04	Bacteria	Chlorophyll-*a* Nitrate
California Creek	1232A_01	Bacteria Impaired fish community	Chlorophyll-*a* Impaired macrobenthic community Nitrate
	1232A_02		
Deadman Creek	1232B_01		Nitrate Total Phosphorus
	1232B_02		Bacteria
Paint Creek	1232C_01		
	1232C_02		
	1232C_03		
Lake Daniel	1232D_01		
Hubbard Creek Reservoir	1233_01		
	1233_02		
	1233_03		
Big Sandy Creek	1233A_01		Chlorophyll-*a*
Hubbard Creek	1233B_01		
Lake Cisco	1234_01		
Lake Stamford	1235_01		
Fort Phantom Hill Reservoir	1236_01		
Cedar Creek	1236A_01		Chlorophyll-*a*

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
Lake Sweetwater	1237_01	Chloride Sulfate Total Dissolved Solids	


Upper Watershed of the Brazos River
FY2023 Water Quality Monitoring and
2022 IR Impairment Status
Inset Map 1
Possum Kingdom Lake
See Inset Map1
See Inset Map 2
Inset Map 2
Bacteria Impairment
Sulfate and Total Dissolved Solids Impairment
Excessive Algal Growth Impairment
BRA Routine Monitoring Station
TCEQ Routine Monitoring Station
BRA Instream Flow Study Station
Wastewater Outfall
Watershed Boundary
0 10 20
Miles
Brazos River Authority

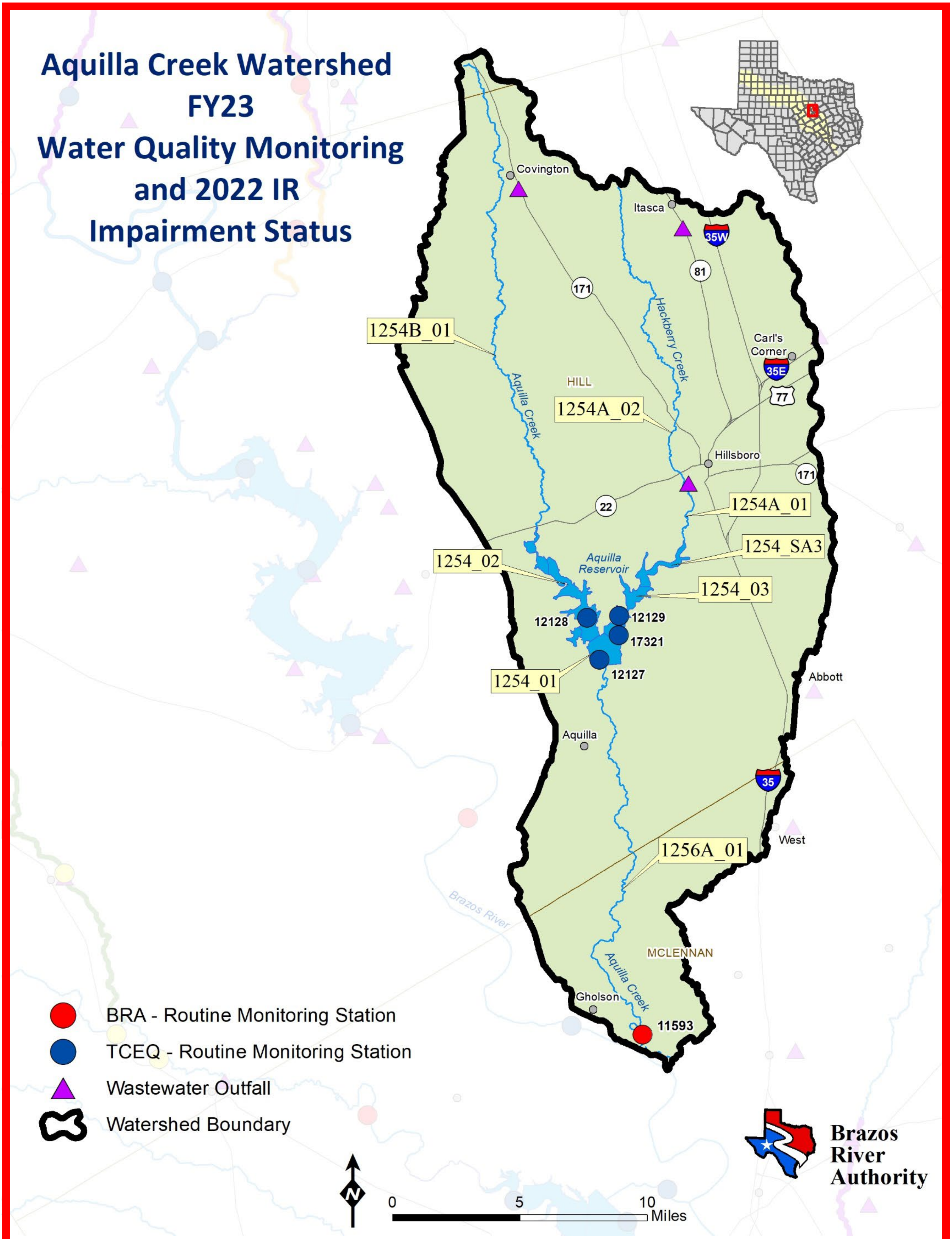
Upper Watershed of the Brazos River

Table 4: Waterbodies of the Upper Watershed IR status

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
Whitney Lake	1203_01		
	1203_02		
	1203_03		
	1203_04		
	1203_05		
	1203_06		
Steele Creek	1203A_01		
Brazos River Below Lake Granbury	1204_01		
	1204_02		Chlorophyll-a Impaired habitat Impaired macrobenthic community
Camp Creek	1204A_01	Bacteria	
Lake Granbury	1205_01		
	1205_02		
	1205_03		
	1205_04		
	1205_05		
	1205_SA1		
	1205_SA2		
	1205_SA3		
	1205_SA4		
	1205_SA5		
McCarthy Branch	1205A_01		
	1205A_02		

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
Bee Creek	1205B_01		
Walnut Creek	1205C_01		Nitrate
Contrary Creek	1205D_01		
Rucker Creek	1205E_01		
Rucker Creek	1205E_02		
Strouds Creek	1205F_01		
Robinson Creek	1205G_01		
Long Creek	1205H_01		
Brazos River Below Possum Kingdom Lake	1206_01		Chlorophyll-*a* Impaired habitat
	1206_02		
	1206_03		
Kickapoo Creek	1206A_01		
	1206A_02		
Rock Creek	1206B_01		
	1206B_02		
Unnamed Tributary of Rock Creek	1206C_01		
Palo Pinto Creek	1206D_01		
Lake Mineral Wells	1206E_01		
Possum Kingdom Lake	1207_01		
	1207_02		
	1207_03		
	1207_04		
	1207_05		
	1207_06		
	1207_07		
	1207_08		
	1207_09		
	1207_10		

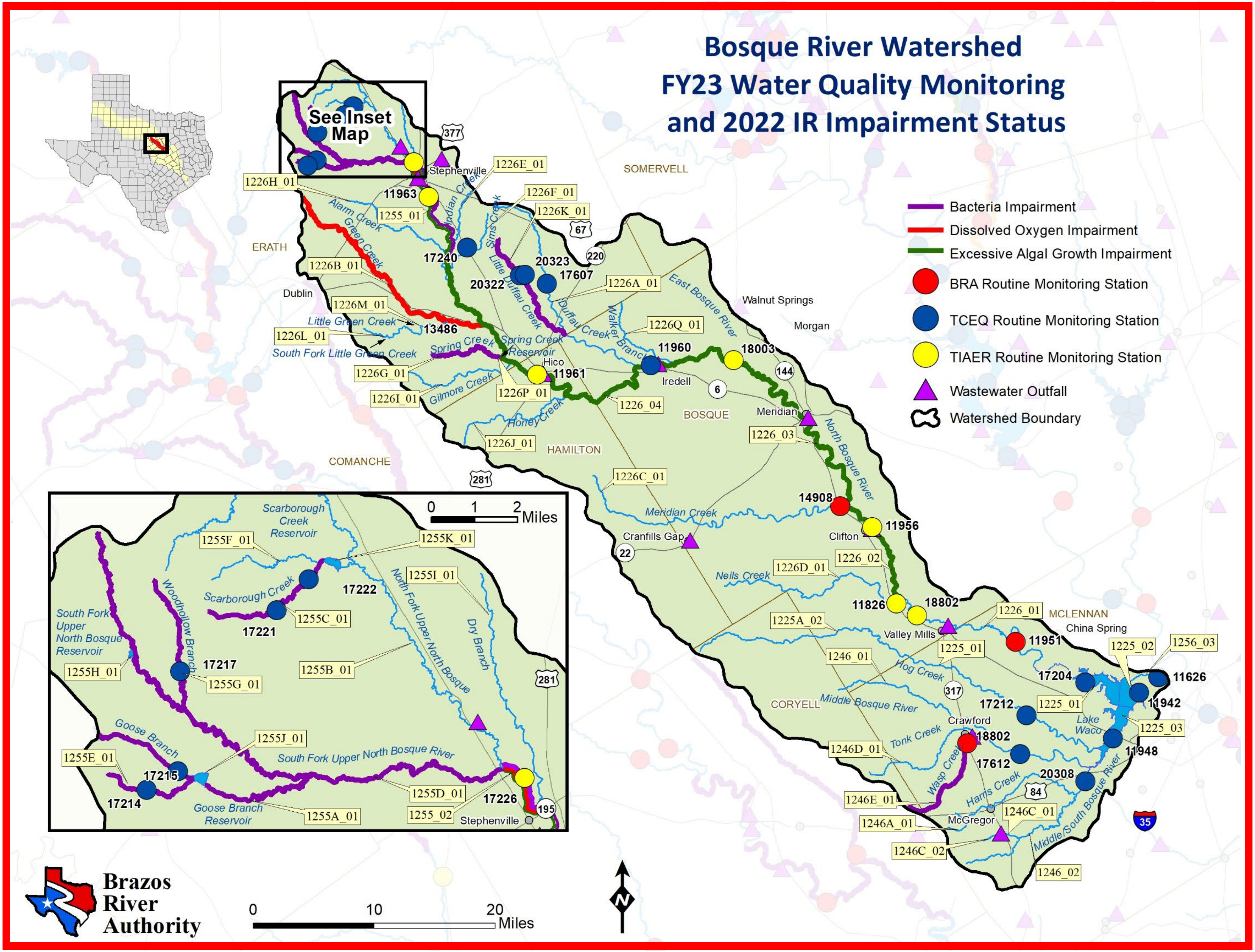
Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
	1207_11		
	1207_12		
Brazos River Above Possum Kingdom Lake	1208_01		Chlorophyll-*a*
	1208_02	Bacteria	Chlorophyll-*a*
Nolan River	1227_01	Sulfate Total Dissolved Solids	Bacteria
	1227_02	Bacteria Sulfate Total Dissolved Solids	Chlorophyll-*a* Nitrate Total Phosphorus
Buffalo Creek	1227A_01		Bacteria Nitrate Total Phosphorus
Mustang Creek	1227B_01		
Lake Pat Cleburne	1228_01	Excessive algal growth	
Paluxy River /North Paluxy River	1229_01		
	1229_02		
	1229_03		
Squaw Creek Reservoir	1229A_01		
Lake Palo Pinto	1230_01		
Palo Pinto Creek above Lake Palo Pinto	1230A_01		
Lake Graham	1231_01	Excessive algal growth	
Brazos River Below Lake Whitney	1257_01		
	1257_02		


Aquilla Creek Watershed
FY23
Water Quality Monitoring
and 2022 IR
Impairment Status
Covington
Itasca
35W
81
171
1254B_01
Hackberry Creek
Carl's Corner
35E
77
HILL
Aquilla Creek
1254A_02
Hillsboro
171
22
1254A_01
1254_SA3
Aquilla Reservoir
1254_02
1254_03
12128
12129
17321
12127
1254_01
Abbott
Aquilla
35
West
1256A_01
Brazos River
MCLENNAN
Gholson
Aquilla Creek
11593
BRA - Routine Monitoring Station
TCEQ - Routine Monitoring Station
Wastewater Outfall
Watershed Boundary
N
0
5
10
Miles
Brazos River Authority

Aquilla Creek Watershed

Table 5: Waterbodies of the Aquilla Creek Watershed IR status

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
Aquilla Reservoir	1254_01		Excessive algal growth
	1254_02		Excessive algal growth
	1254_03		Excessive Algal Growth Arsenic in sediment
	1254_SA2		
	1254_SA3		
Hackberry Creek	1254A_01		Ammonia Depressed dissolved oxygen Nitrate
	1254A_02		
Aquilla Creek upstream of Aquilla Reservoir	1254B_01		
Aquilla Creek	1256A_01		Bacteria



Bosque River Watershed
FY23 Water Quality Monitoring
and 2022 IR Impairment Status
Bacteria Impairment
Dissolved Oxygen Impairment
Excessive Algal Growth Impairment
BRA Routine Monitoring Station
TCEQ Routine Monitoring Station
TIAER Routine Monitoring Station
Wastewater Outfall
Watershed Boundary
See Inset Map
Stephenville
ERATH
SOMERVELL
Dublin
COMANCHE
HAMILTON
BOSQUE
CORYELL
MCLENNAN
Hico
Iredell
Meridian
Walnut Springs
Morgan
Cranfills Gap
Clifton
Valley Mills
China Spring
Crawford
McGregor
Lake Waco
1226H_01
1226E_01
1226F_01
1226K_01
1255_01
1226B_01
1226A_01
1226M_01
1226L_01
1226Q_01
1226G_01
1226I_01
1226P_01
1226_04
1226J_01
1226_03
1226C_01
1226_02
1226D_01
1225A_02
1226_01
1246_01
1225_01
1225_02
1256_03
1225_03
1246D_01
1246E_01
1246A_01
1246C_01
1246C_02
1246_02
11963
17240
20323
17607
20322
13486
11960
18003
11961
14908
11956
11826
18802
11951
17204
11626
17212
11942
11948
17612
20308
Alarm Creek
Green Creek
Indian Creek
Sims Creek
Little Duffau Creek
Duffau Creek
Walker Branch
East Bosque River
Little Green Creek
South Fork Little Green Creek
Spring Creek
Spring Creek Reservoir
Gilmore Creek
Honey Creek
North Bosque River
Meridian Creek
Neils Creek
Hog Creek
Middle Bosque River
Tonk Creek
Wasp Creek
Harris Creek
Middle/South Bosque River
Scarborough Creek Reservoir
Scarborough Creek
South Fork Upper North Bosque Reservoir
Woodhollow Branch
North Fork Upper North Bosque
Dry Branch
Goose Branch
Goose Branch Reservoir
South Fork Upper North Bosque River
1255F_01
1255K_01
1255I_01
1255C_01
1255H_01
1255G_01
1255B_01
1255J_01
1255E_01
1255D_01
1255A_01
1255_02
17222
17221
17217
17215
17214
17226
0 1 2 Miles
0 10 20 Miles
Brazos River Authority

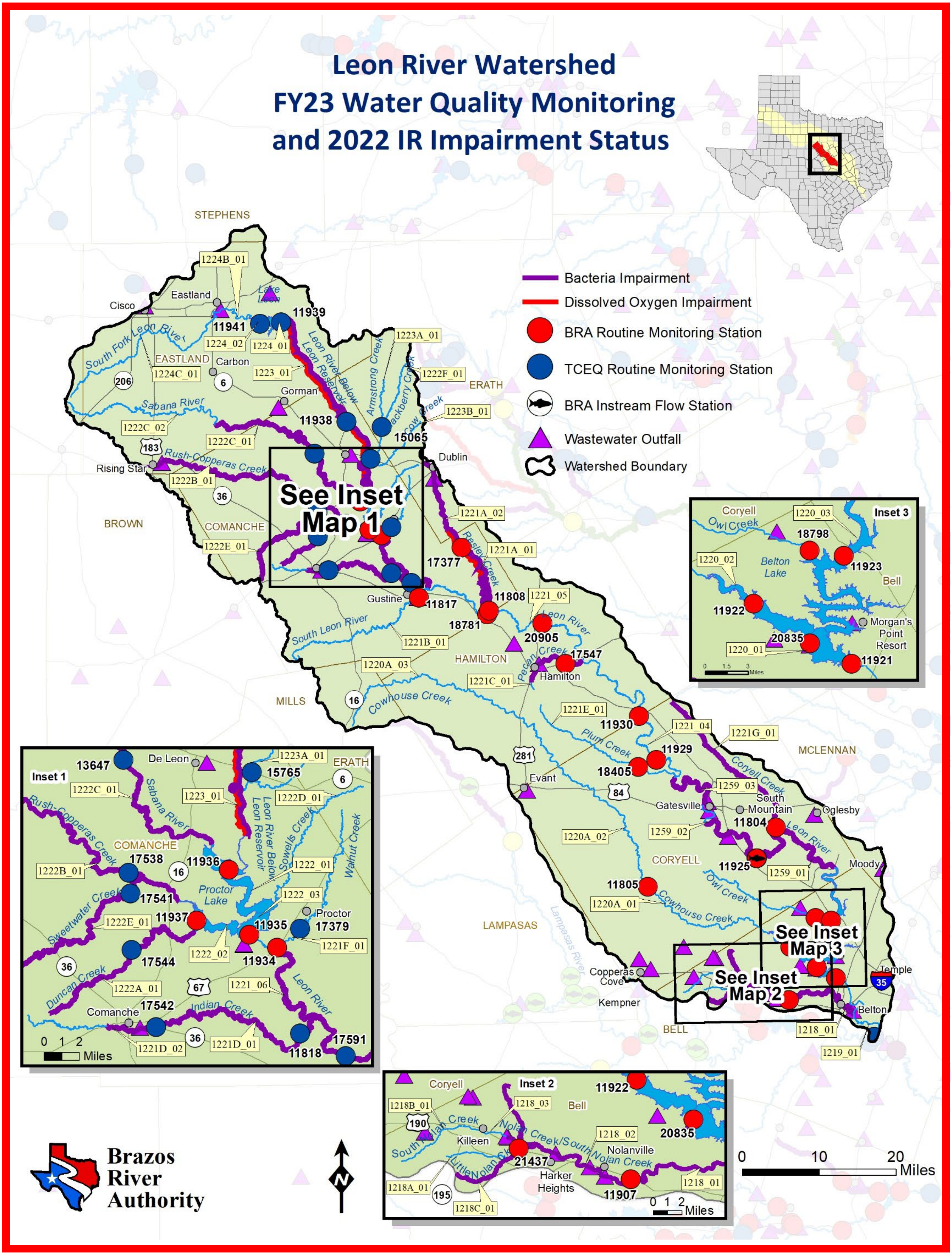
Bosque River Watershed

Table 6: Waterbodies of the Bosque River Watershed IR status

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
Waco Lake	1225_01		
	1225_02		
	1225_03		
Hog Creek	1225A_01		
	1225A_02		
North Bosque River	1226_01		
	1226_02	Excessive algal growth	Chlorophyll-*a* Depressed dissolved oxygen
	1226_03	Excessive algal growth	Chlorophyll-*a*
	1226_04	Excessive algal growth	Chlorophyll-*a* Impaired macrobenthic community
Duffau Creek	1226A_01		Bacteria Chlorophyll-*a*
Green Creek	1226B_01	Depressed dissolved oxygen	Chlorophyll-*a*
Meridian Creek	1226C_01		
Neils Creek	1226D_01		
Indian Creek	1226E_01		Chlorophyll-*a*
Sims Creek	1226F_01		Nitrate
Spring Creek	1226G_01	Bacteria	
Alarm Creek	1226H_01		Chlorophyll-*a*
Gilmore Creek	1226I_01		
Honey Creek	1226J_01		
Little Duffau Creek	1226K_01	Bacteria	Nitrate Total Phosphorus
South Fork Little Green Creek	1226L_01		

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
Little Green Creek	1226M_01		
Indian Creek Reservoir	1226N_01		
Sims Creek Reservoir	1226O_01		Depressed dissolved oxygen
Spring Creek Reservoir	1226P_01		
Walker Branch	1226Q_01		
Middle Bosque/South Bosque River	1246_01		Nitrate
	1246_02		Nitrate
Harris Creek	1246A_01		
	1246A_02		
Comanche Springs Spring Brook	1246B_01		
Unnamed Tributary of South Bosque River	1246C_01		
Unnamed Tributary of South Bosque River	1246C_02		
Tonk Creek	1246D_01		
	1246D_02		Nitrate
Wasp Creek	1246E_01	Bacteria	Nitrate
Upper North Bosque River	1255_01	Bacteria Excessive algal growth	Chlorophyll-*a* Nitrate
	1255_02	Bacteria, Depressed dissolved oxygen Excessive algal growth	Chlorophyll-*a* Depressed dissolved oxygen
Goose Branch	1255A_01	Bacteria	Ammonia Chlorophyll-*a* Nitrate Total Phosphorus
North Fork Upper North Bosque River	1255B_01		Chlorophyll-*a*
Scarborough Creek	1255C_01	Bacteria	Chlorophyll-*a* Nitrate

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
			Total Phosphorus
	1255C_02		
South Fork North Bosque River	1255D_01	Bacteria	Chlorophyll-*a*
Unnamed Tributary of Goose Branch	1255E_01	Bacteria	Ammonia Nitrate Total Phosphorus
	1255F_01		
Woodhollow Branch	1255G_01	Bacteria	
South Fork Upper North Bosque River Reservoir	1255H_01		Depressed dissolved oxygen
Dry Branch	1255I_01		
Goose Branch Reservoir	1255J_01		
Scarborough Creek Reservoir	1255K_01		
Brazos River/Lake Brazos	1256_03		Chlorophyll-*a*


Leon River Watershed
FY23 Water Quality Monitoring
and 2022 IR Impairment Status
Bacteria Impairment
Dissolved Oxygen Impairment
BRA Routine Monitoring Station
TCEQ Routine Monitoring Station
BRA Instream Flow Station
Wastewater Outfall
Watershed Boundary
STEPHENS
EASTLAND
ERATH
BROWN
COMANCHE
MILLS
HAMILTON
CORYELL
LAMPASAS
BELL
MCLENNAN
Eastland
Cisco
Carbon
Gorman
Rising Star
Dublin
Gustine
Hamilton
Evant
Gatesville
South Mountain
Oglesby
Moody
Copperas Cove
Kempner
Temple
Belton
Lake Leon
South Fork Leon River
Sabana River
Rush-Copperas Creek
Leon River Below Leon Reservoir
Armstrong Creek
Blackberry Creek
Cow Creek
Resley Creek
South Leon River
Leon River
Pecan Creek
Cowhouse Creek
Plum Creek
Coryell Creek
Owl Creek
Lampasas River
1224B_01
1224_02
1224_01
1224C_01
1223_01
1223A_01
1222F_01
1223B_01
1222C_02
1222C_01
1222B_01
1222E_01
1221A_02
1221A_01
1221_05
1221B_01
1220A_03
1221C_01
1221E_01
1221_04
1221G_01
1259_03
1259_02
1259_01
1220A_02
1220A_01
1218_01
1219_01
11941
11939
11938
15065
17377
11817
11808
18781
20905
17547
11930
11929
18405
11804
11925
11805
See Inset Map 1
See Inset Map 2
See Inset Map 3
Inset 1
13647
De Leon
1223A_01
15765
ERATH
1222C_01
1223_01
1222D_01
Sabana River
Rush-Copperas Creek
Leon River Below Leon Reservoir
Sowells Creek
Walnut Creek
COMANCHE
17538
11936
1222_01
1222B_01
Proctor Lake
17541
1222_03
Proctor
Sweetwater Creek
1222E_01
11937
11935
17379
1221F_01
1222_02
11934
17544
Duncan Creek
1222A_01
1221_06
Leon River
Comanche
17542
Indian Creek
1221D_02
1221D_01
11818
17591
0 1 2
Miles
Inset 2
Coryell
1218_03
Bell
11922
1218B_01
Creek
Killeen
1218_02
20835
South Nolan Creek
Nolan Creek/South Nolan Creek
Nolanville
21437
Little Nolan Creek
Harker Heights
1218A_01
11907
1218_01
1218C_01
0 1 2
Miles
Inset 3
Coryell
Owl Creek
1220_03
18798
1220_02
Belton Lake
11923
Bell
11922
Morgan's Point Resort
20835
1220_01
11921
0 1.5 3
Miles
0 10 20
Miles
Brazos River Authority

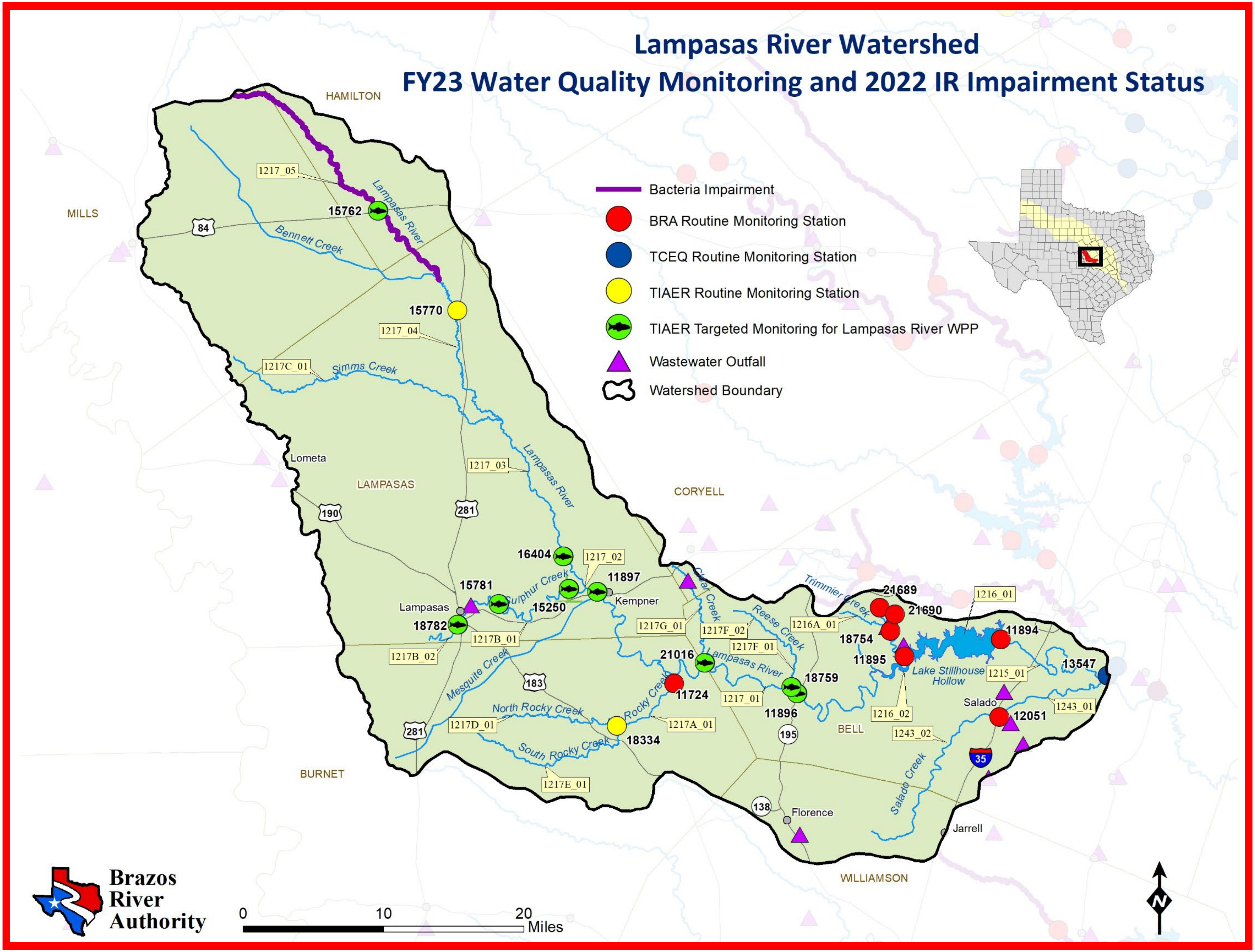
Leon River Watershed

Table 7: Waterbodies of the Leon River Watershed IR status

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
Nolan Creek/ South Nolan Creek	1218_01	Bacteria	Nitrate Total Phosphorus
	1218_02	Bacteria	Nitrate Total Phosphorus
	1218_03		
Unnamed Tributary to Little Nolan Creek	1218A_01		Bacteria
South Nolan Creek	1218B_01		
Little Nolan Creek	1218C_01	Bacteria	
Long Branch	1218D_01	Bacteria	
Leon River Below Belton Lake	1219_01		Nitrate Total Phosphorus
Belton Lake	1220_01		
	1220_02		
	1220_03		Depressed dissolved oxygen
Cowhouse Creek	1220A_01		
	1220A_02		
	1220A_03		
Leon River Below Proctor Lake	1221_04		Bacteria Chlorophyll-*a*
	1221_05		Chlorophyll-*a* Depressed dissolved oxygen
	1221_06	Bacteria	Chlorophyll-*a*
	1221_07		Chlorophyll-*a*

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
			Depressed dissolved oxygen
Resley Creek	1221A_01	Bacteria Depressed dissolved oxygen	Chlorophyll-*a*
	1221A_02	Bacteria	Chlorophyll-*a*
South Leon River	1221B_01		Bacteria Impaired habitat
Pecan Creek	1221C_01	Bacteria	Chlorophyll-*a*
	1221C_02		
Indian Creek	1221D_01	Bacteria	Chlorophyll-*a*
	1221D_02	Bacteria	Chlorophyll-*a* Nitrate Total Phosphorus
	1221D_03		
Plum Creek	1221E_01		
Walnut Creek	1221F_01		
Coryell Creek	1221G_01	Bacteria	
Proctor Lake	1222_01		
	1222_02		
	1222_03		
Duncan Creek	1222A_01	Bacteria	Chlorophyll-*a*
Rush-Copperas Creek	1222B_01	Bacteria	
Sabana River	1222C_01	Bacteria	
	1222C_02		
Sowells Creek	1222D_01		Bacteria
Sweetwater Creek	1222E_01	Bacteria	
Hackberry Creek	1222F_01		Bacteria Depressed dissolved oxygen
Leon River Below Leon Reservoir	1223_01	Bacteria Depressed dissolved oxygen	Chlorophyll-*a*

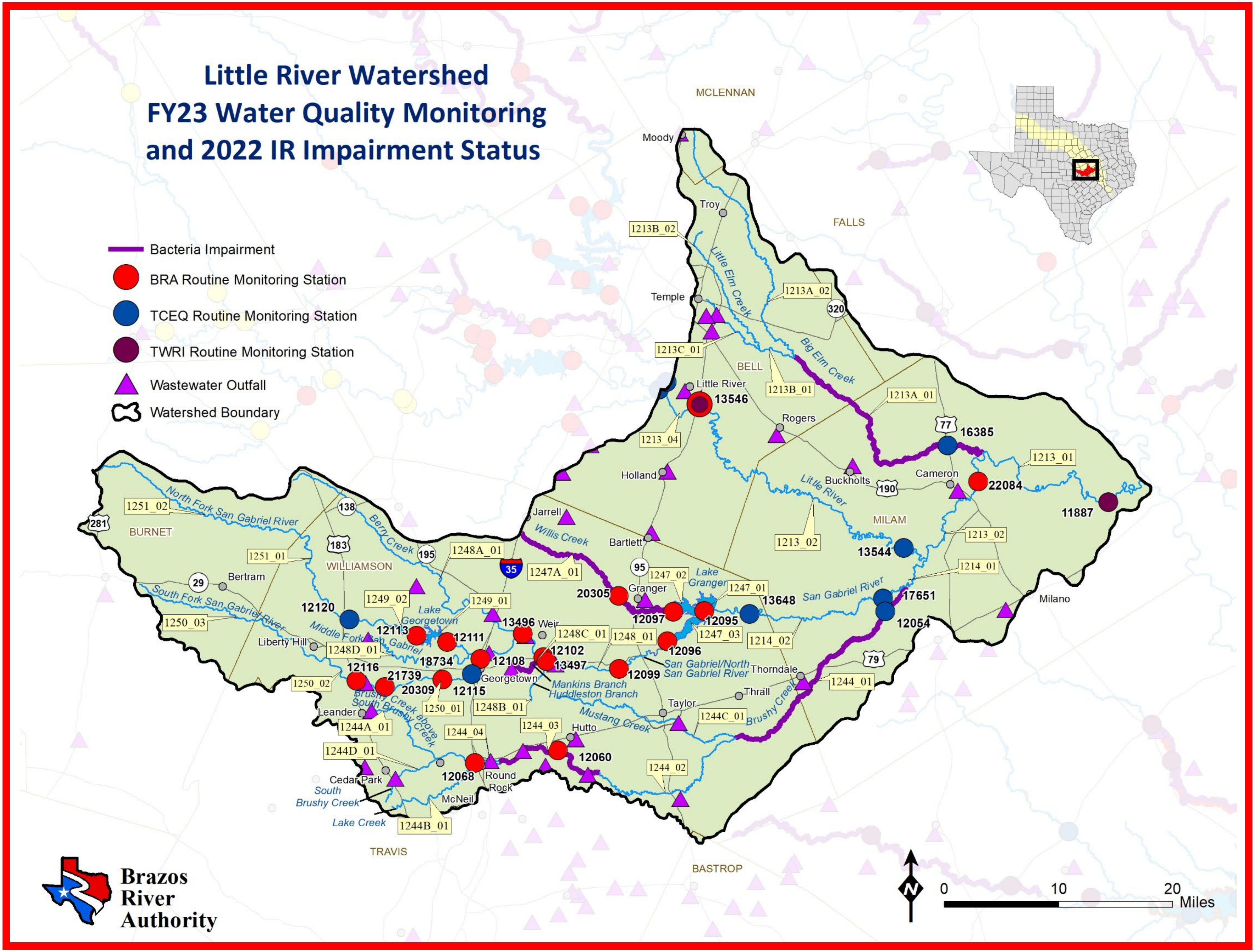
Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
Armstrong Creek	1223A_01		Nitrate
Cow Creek	1223B_01		Bacteria
Leon Reservoir	1224_01		
	1224_02		
Leon River Above Leon Reservoir	1224A_01		
South Fork Leon River	1224C_01		
Leon River Above Belton Lake	1259_01	Bacteria	Chlorophyll-*a*
	1259_02		Nitrate
	1259_03	Bacteria	Chlorophyll-*a*


Lampasas River Watershed
FY23 Water Quality Monitoring and 2022 IR Impairment Status
Bacteria Impairment
BRA Routine Monitoring Station
TCEQ Routine Monitoring Station
TIAER Routine Monitoring Station
TIAER Targeted Monitoring for Lampasas River WPP
Wastewater Outfall
Watershed Boundary
HAMILTON
MILLS
LAMPASAS
CORYELL
BURNET
BELL
WILLIAMSON
Lometa
Lampasas
Kempner
Florence
Salado
Jarrell
Lampasas River
Bennett Creek
Simms Creek
Sulphur Creek
Mesquite Creek
North Rocky Creek
South Rocky Creek
Rocky Creek
Clear Creek
Reese Creek
Trimmier Creek
Salado Creek
Lake Stillhouse Hollow
15762
15770
16404
15781
15250
11897
18782
21016
11724
18334
18759
11896
21689
21690
18754
11895
11894
13547
12051
1217_05
1217_04
1217C_01
1217_03
1217_02
1217B_01
1217B_02
1217D_01
1217E_01
1217A_01
1217G_01
1217F_02
1217F_01
1217_01
1216A_01
1216_01
1216_02
1215_01
1243_01
1243_02
84
190
281
183
195
138
35
Brazos River Authority
0
10
20
Miles
N

Lampasas River Watershed

Table 8: Waterbodies of the Lampasas River Watershed IR status

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
Lampasas River Below Stillhouse Hollow Lake	1215_01		
Stillhouse Hollow Lake	1216_01		
	1216_02		
	1216_SA1		
Trimmier Creek	1216A_01		
Onion Creek	1216B_01		
Pleasant Branch	1216C_01		Bacteria
Unnamed tributary of Trimmier Creek	1216D_01	Bacteria	
Lampasas River Above Stillhouse Hollow Lake	1217_01		
	1217_02		
	1217_03		
	1217_04		
	1217_05	Bacteria	Chlorophyll-*a*
Rocky Creek	1217A_01		
Sulphur Creek	1217B_01		
	1217B_02		Depressed dissolved oxygen
Simms Creek	1217C_01		
North Fork Rocky Creek	1217D_01		
South Rocky Creek	1217E_01		
Reese Creek	1217F_01		
	1217F_02		
Clear Creek	1217G_01		
Salado Creek	1243_01		Nitrate
	1243_02		Nitrate

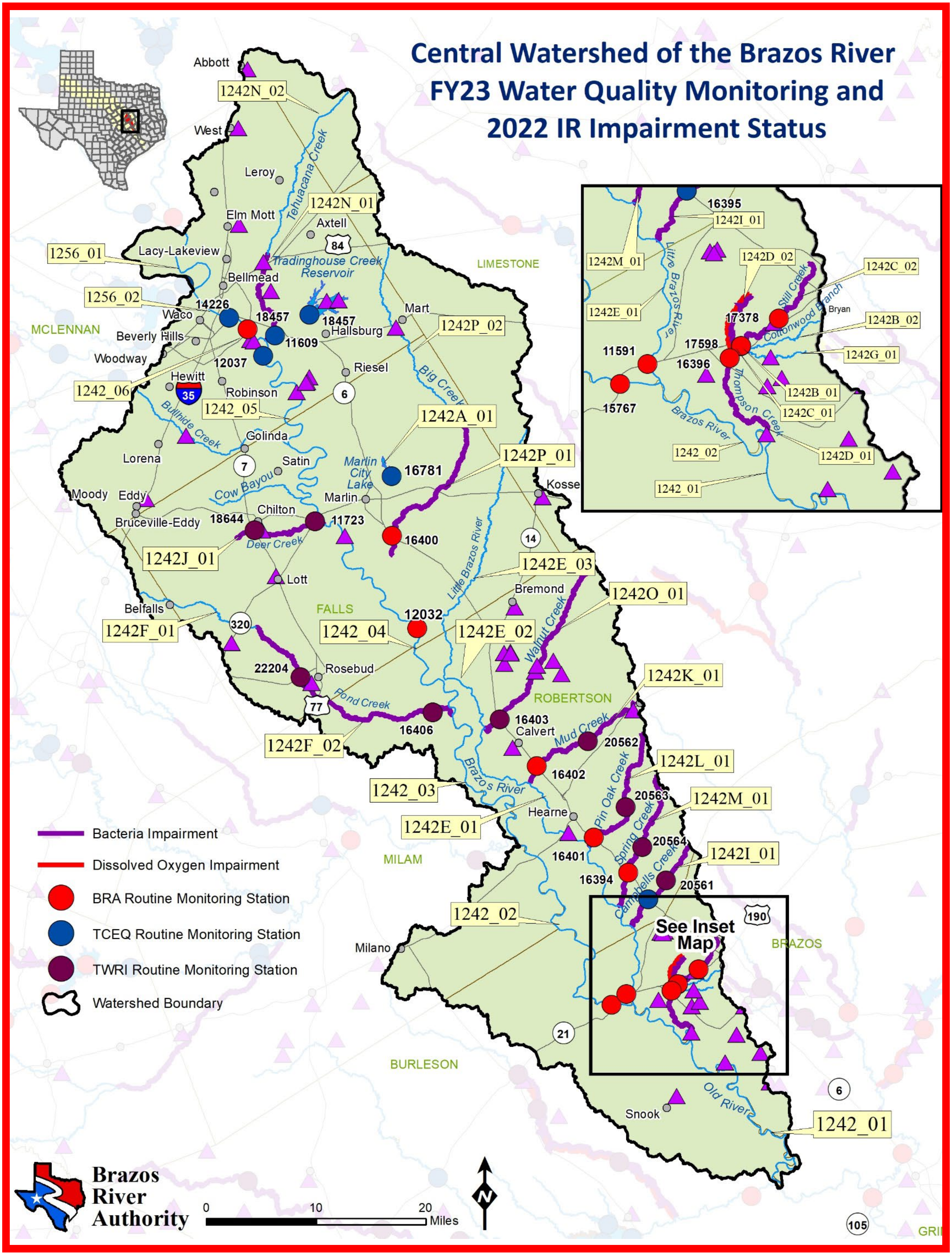

Little River Watershed
FY23 Water Quality Monitoring
and 2022 IR Impairment Status
Bacteria Impairment
BRA Routine Monitoring Station
TCEQ Routine Monitoring Station
TWRI Routine Monitoring Station
Wastewater Outfall
Watershed Boundary
MCLENNAN
FALLS
BELL
MILAM
BURNET
WILLIAMSON
TRAVIS
BASTROP
Moody
Troy
Temple
Little River
Rogers
Holland
Buckholts
Cameron
Jarrell
Bartlett
Granger
Weir
Georgetown
Liberty Hill
Bertram
Leander
Cedar Park
McNeil
Round Rock
Hutto
Taylor
Thrall
Thorndale
Milano
Little Elm Creek
Big Elm Creek
Little River
San Gabriel River
North Fork San Gabriel River
South Fork San Gabriel River
Middle Fork San Gabriel
Berry Creek
Willis Creek
Lake Georgetown
Lake Granger
San Gabriel/North San Gabriel River
Mankins Branch
Huddleston Branch
Mustang Creek
Brushy Creek
Brushy Creek above South Brushy Creek
South Brushy Creek
Lake Creek
1213B_02
1213A_02
1213C_01
1213B_01
1213A_01
1213_04
1213_01
1213_02
1214_01
1214_02
1251_02
1251_01
1248A_01
1247A_01
1247_02
1247_01
1247_03
1249_02
1249_01
1250_03
1248D_01
1248C_01
1248_01
1250_02
1250_01
1248B_01
1244A_01
1244D_01
1244_04
1244_03
1244C_01
1244_02
1244_01
1244B_01
13546
16385
22084
11887
13544
17651
12054
13648
20305
12097
12095
12096
12099
12120
12113
12111
13496
18734
12108
12102
13497
12116
21739
20309
12115
12060
12068
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) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
Little River	1213_01		Bacteria Chlorophyll-*a* Nitrate
	1213_02		Nitrate
	1213_03		Nitrate
	1213_04		Nitrate
Big Elm Creek	1213A_01	Bacteria	
	1213A_02		
Little Elm Creek	1213B_01		Depressed dissolved oxygen Nitrate
	1213B_02		
Unnamed Tributary of Little Elm Creek	1213C_01		Nitrate
San Gabriel River	1214_01		Bacteria Nitrate
	1214_02		Nitrate
Brushy Creek	1244_01	Bacteria	Nitrate
	1244_02		Bacteria Nitrate
	1244_03	Bacteria	Fish kill Nitrate
	1244_04		
Brushy Creek Above South Brushy Creek	1244A_01		
Lake Creek	1244B_01		
Mustang Creek	1244C_01		

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
	1244C_02		
South Brushy Creek	1244D_01		
Granger Lake	1247_01		
	1247_02		
	1247_03		
Willis Creek	1247A_01	Bacteria	Nitrate
San Gabriel/North Fork San Gabriel River	1248_01		Nitrate
Berry Creek	1248A_01		
Berry Creek	1248A_02		
Huddleston Branch	1248B_01		Bacteria Nitrate
Mankins Branch	1248C_01	Bacteria	Impaired habitat Nitrate Total Phosphorus
Middle Fork San Gabriel River	1248D_01		
Lake Georgetown	1249_01		
	1249_02		
South Fork San Gabriel River	1250_01		
	1250_02		
	1250_03		Depressed dissolved oxygen
North Fork San Gabriel River	1251_01		
	1251_02		

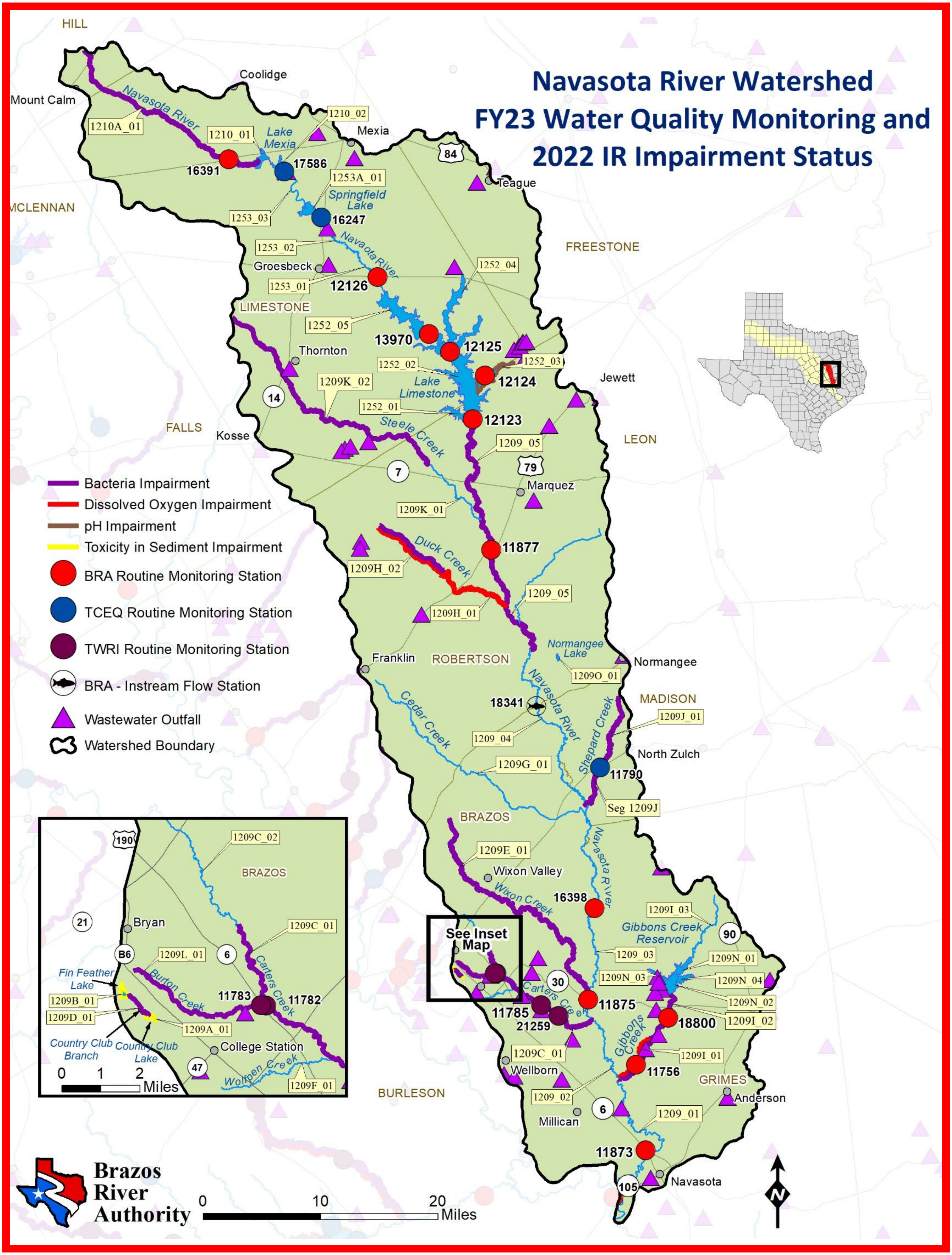

Central Watershed of the Brazos River
FY23 Water Quality Monitoring and
2022 IR Impairment Status
Bacteria Impairment
Dissolved Oxygen Impairment
BRA Routine Monitoring Station
TCEQ Routine Monitoring Station
TWRI Routine Monitoring Station
Watershed Boundary
Brazos
River
Authority
0
10
20
Miles
MCLENNAN
LIMESTONE
FALLS
ROBERTSON
MILAM
BURLESON
BRAZOS
Abbott
West
Leroy
Elm Mott
Axtell
Lacy-Lakeview
Bellmead
Waco
Beverly Hills
Woodway
Hewitt
Robinson
Hallsburg
Mart
Riesel
Golinda
Lorena
Satin
Marlin
Moody
Eddy
Bruceville-Eddy
Chilton
Lott
Belfalls
Rosebud
Bremond
Kosse
Calvert
Hearne
Milano
Snook
Bryan
Tehuacana Creek
Tradinghouse Creek Reservoir
Big Creek
Bullhide Creek
Cow Bayou
Marlin City Lake
Deer Creek
Little Brazos River
Walnut Creek
Pond Creek
Mud Creek
Brazos River
Pin Oak Creek
Spring Creek
Campbells Creek
Old River
Still Creek
Cottonwood Branch
Thompson Creek
1242N_02
1242N_01
1256_01
1256_02
1242_06
1242_05
1242P_02
1242A_01
1242P_01
1242J_01
1242E_03
1242O_01
1242F_01
1242_04
1242E_02
1242K_01
1242F_02
1242L_01
1242_03
1242M_01
1242E_01
1242I_01
1242_02
1242_01
1242D_02
1242C_02
1242E_01
1242B_02
1242G_01
1242B_01
1242C_01
1242D_01
14226
18457
11609
12037
16781
18644
11723
16400
12032
22204
16406
16403
20562
16402
20563
20564
16401
16394
20561
16395
17378
17598
11591
16396
15767
See Inset Map
84
35
6
7
14
320
77
21
190
105

Central Watershed of the Brazos River Basin

Table 10: Waterbodies of the Central Watershed IR status

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
Brazos River Above Navasota River	1242_01		Chlorophyll-*a*
	1242_02		Chlorophyll-*a*
	1242_03		
	1242_04		Chlorophyll-*a*
	1242_05		Chlorophyll-*a* Nitrate
	1242_06		Chlorophyll-*a*
Marlin City Lake System	1242A_01		
	1242A_02		
Cottonwood Branch	1242B_01	Bacteria	Nitrate Total Phosphorus
Cottonwood Branch	1242B_02		
Still Creek	1242C_01		
	1242C_02	Bacteria	Depressed dissolved oxygen Nitrate Total Phosphorus
Thompsons Creek	1242D_01	Bacteria	Impaired fish community Nitrate Total Phosphorus
	1242D_02	Bacteria Depressed dissolved oxygen	Ammonia Chlorophyll-*a* Impaired macrobenthic community
Little Brazos River	1242E_01		
	1242E_02		
	1242E_03		
Pond Creek	1242F_01	Bacteria	

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
	1242F_02		
Unnamed Tributary of Cottonwood Branch	1242G_01		
Tradinghouse Reservoir	1242H_01		Fish kill
Campbells Creek	1242I_01	Bacteria	Depressed dissolved oxygen
Deer Creek	1242J_01	Bacteria	Impaired macrobenthic community
Mud Creek	1242K_01	Bacteria	
Pin Oak Creek	1242L_01	Bacteria	
Spring Creek	1242M_01	Bacteria	Depressed dissolved oxygen
Tehuacana Creek	1242N_01	Bacteria	Chlorophyll-*a* Fish Kill Nitrate Total Phosphorus
	1242N_02		
Walnut Creek	1242O_01	Bacteria	
Big Creek	1242P_01	Bacteria	
	1242P_02		
Bull Hide Creek	1242Q_01		Nitrate
	1242Q_02		
Cow Bayou	1242R_01		
Brazos River/Lake Brazos	1256_01		
	1256_02		

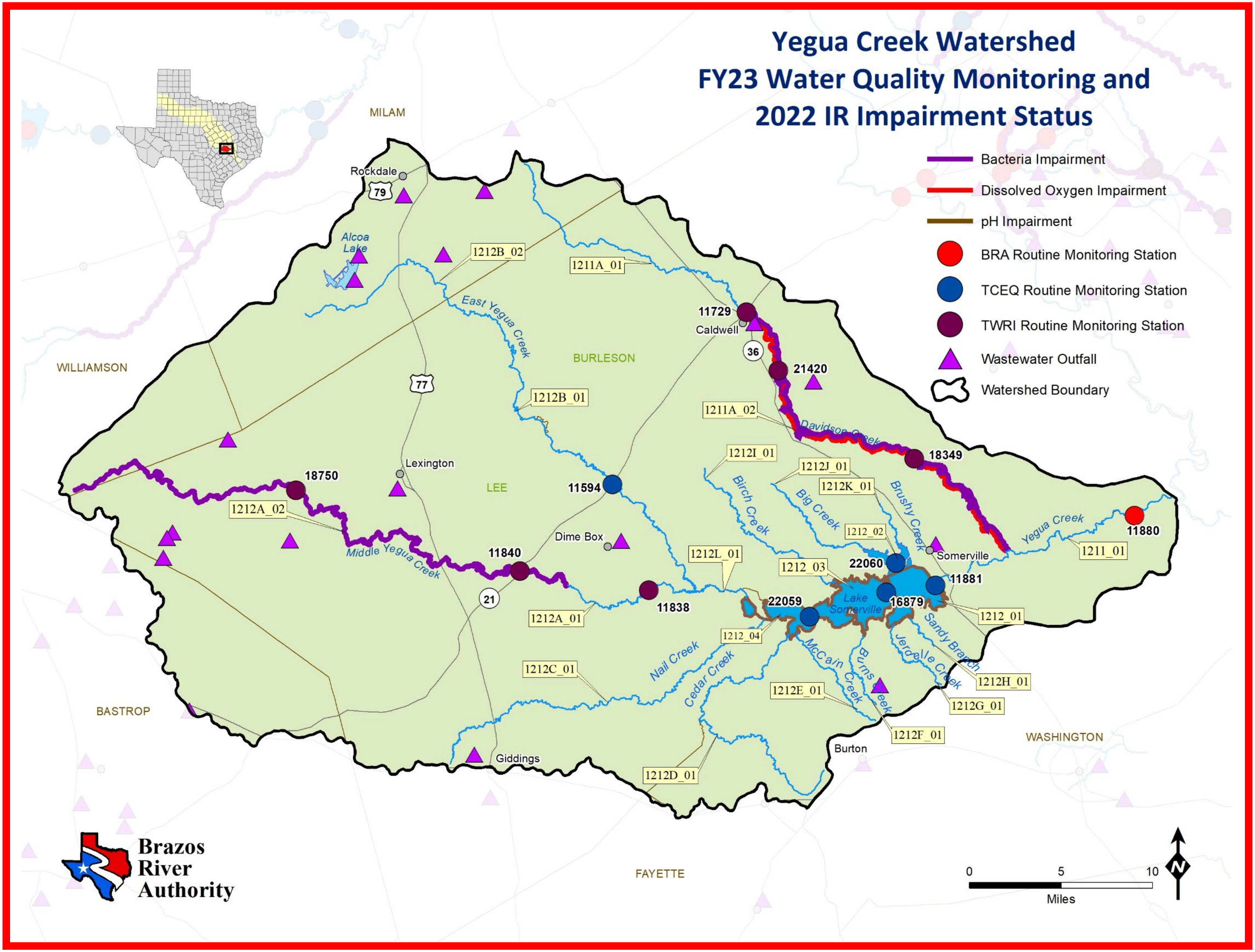

Navasota River Watershed
FY23 Water Quality Monitoring and
2022 IR Impairment Status
Bacteria Impairment
Dissolved Oxygen Impairment
pH Impairment
Toxicity in Sediment Impairment
BRA Routine Monitoring Station
TCEQ Routine Monitoring Station
TWRI Routine Monitoring Station
BRA - Instream Flow Station
Wastewater Outfall
Watershed Boundary
HILL
Coolidge
Mount Calm
Mexia
Teague
MCLENNAN
FREESTONE
Groesbeck
LIMESTONE
Thornton
Jewett
FALLS
Kosse
LEON
Marquez
Franklin
ROBERTSON
Normangee
MADISON
North Zulch
BRAZOS
Wixon Valley
GRIMES
Anderson
Wellborn
Millican
BURLESON
Navasota
Navasota River
Lake Mexia
Springfield Lake
Lake Limestone
Steele Creek
Duck Creek
Normangee Lake
Cedar Creek
Shepard Creek
Wixon Creek
Gibbons Creek Reservoir
Gibbons Creek
Carters Creek
See Inset Map
1210A_01
1210_01
1210_02
1253A_01
1253_03
1253_02
1253_01
1252_04
1252_05
1252_02
1252_03
1252_01
1209K_02
1209_05
1209K_01
1209H_02
1209H_01
1209O_01
1209J_01
1209_04
1209G_01
Seg 1209J
1209E_01
1209I_03
1209_03
1209N_01
1209N_03
1209N_04
1209N_02
1209I_02
1209C_01
1209I_01
1209_02
1209_01
16391
17586
16247
12126
13970
12125
12124
12123
11877
18341
11790
16398
11875
11785
21259
18800
11756
11873
84
14
7
79
90
30
6
105
190
21
B6
47
Bryan
College Station
Fin Feather Lake
Country Club Branch
Country Club Lake
Burton Creek
Wolf Pen Creek
1209C_02
1209L_01
1209B_01
1209D_01
1209A_01
1209F_01
11783
11782
0 1 2 Miles
Brazos River Authority
0 10 20 Miles

Navasota River Watershed

Table 11: Waterbodies of the Navasota River Watershed IR status

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
Navasota River Below Lake Limestone	1209_01		Nitrate Total Phosphorus
	1209_02		
	1209_03		
	1209_04		
	1209_05	Bacteria	
Country Club Lake	1209A_01	Toxicity in sediment	Arsenic in sediment
Fin Feather Lake	1209B_01	Toxicity in sediment	Arsenic Chromium Copper DDD DDE Zinc in sediment
Carters Creek	1209C_01	Bacteria	Chlorophyll-*a* Nitrate Total Phosphorus
	1209C_02		
Country Club Branch	1209D_01	Bacteria	
Wickson Creek	1209E_01	Bacteria	
Wolfpen Creek	1209F_01		
Cedar Creek	1209G_01		Bacteria Depressed dissolved oxygen
Duck Creek	1209H_01	Depressed dissolved oxygen	Depressed dissolved oxygen
	1209H_02	Bacteria Depressed dissolved oxygen	Depressed dissolved oxygen
Gibbons Creek	1209I_01	Bacteria	Depressed dissolved oxygen

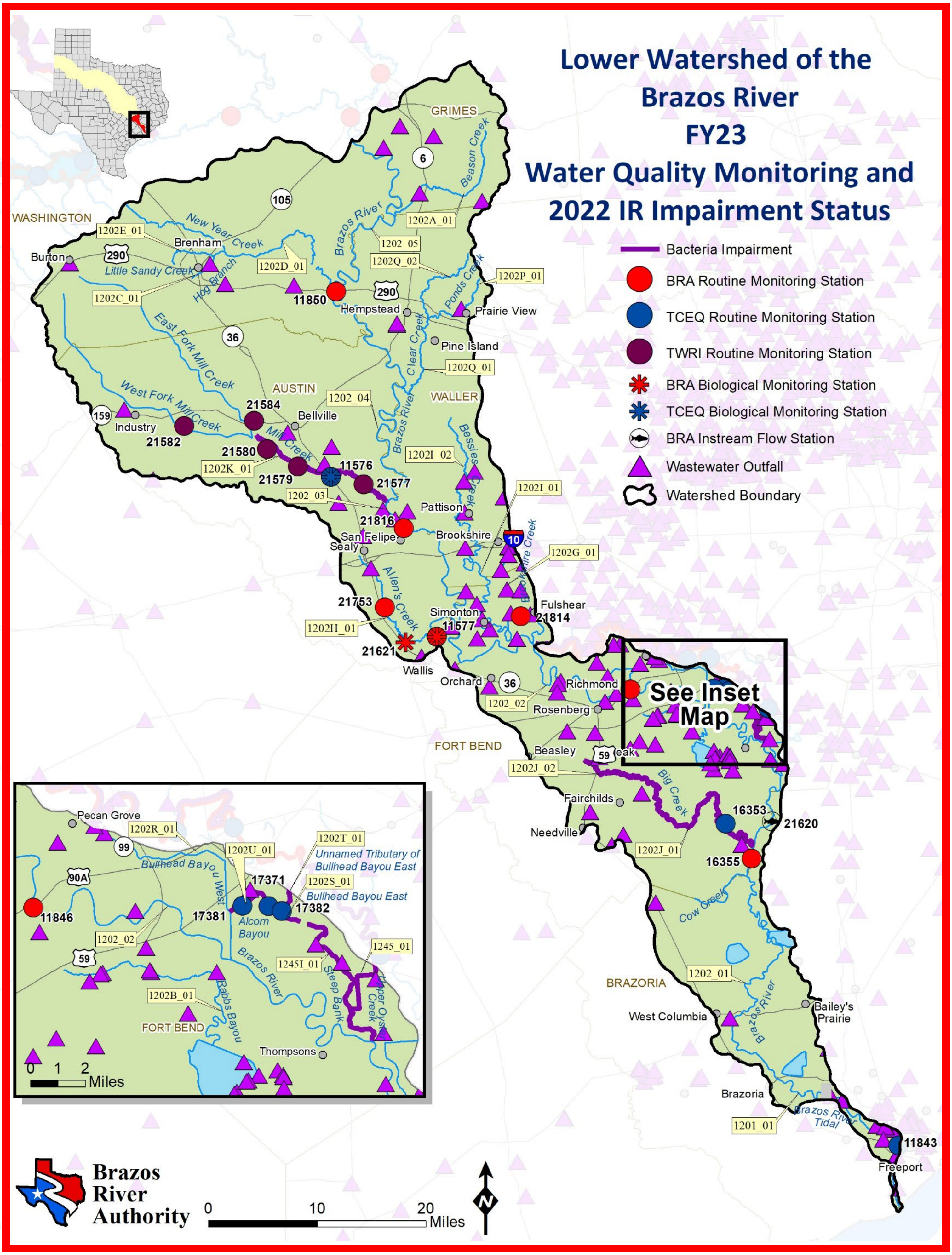
Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
		Depressed dissolved oxygen	
	1209I_02	Bacteria	
	1209I_03		
Shepherd Creek	1209J_01	Bacteria	
Steele Creek	1209K_01		
	1209K_02	Bacteria	
Burton Creek	1209L_01	Bacteria	Nitrate
Gibbons Creek Reservoir	1209N_01		
	1209N_02		
	1209N_03		
	1209N_04		
Normangee Lake	1209O_01		Arsenic in sediment
Clear Creek	1209P_01		
Lake Mexia	1210_01		Depressed dissolved oxygen
	1210_02		
Navasota River Above Lake Mexia	1210A_01	Bacteria	
Lake Limestone	1252_01		
	1252_02		
	1252_03	pH	Depressed dissolved oxygen
	1252_04		
	1252_05		
Navasota River Below Lake Mexia	1253_01		Chlorophyll-*a*
	1253_02		Depressed dissolved oxygen
	1253_03		
Springfield Lake	1253A_01		Depressed dissolved oxygen


Yegua Creek Watershed
FY23 Water Quality Monitoring and
2022 IR Impairment Status
Bacteria Impairment
Dissolved Oxygen Impairment
pH Impairment
BRA Routine Monitoring Station
TCEQ Routine Monitoring Station
TWRI Routine Monitoring Station
Wastewater Outfall
Watershed Boundary
MILAM
WILLIAMSON
BURLESON
LEE
BASTROP
FAYETTE
WASHINGTON
Rockdale
Lexington
Caldwell
Dime Box
Somerville
Giddings
Burton
Alcoa Lake
Lake Somerville
East Yegua Creek
Middle Yegua Creek
Davidson Creek
Yegua Creek
Birch Creek
Big Creek
Brushy Creek
Nail Creek
Cedar Creek
McCain Creek
Burns Creek
Jerdelle Creek
Sandy Branch
1212B_02
1211A_01
1212B_01
1211A_02
1212I_01
1212J_01
1212K_01
1212_02
1212A_02
1212L_01
1212_03
1212_01
1211_01
1212A_01
1212_04
1212C_01
1212E_01
1212H_01
1212G_01
1212F_01
1212D_01
11729
21420
18349
11880
18750
11594
11840
11838
22060
11881
16879
22059
79
77
36
21
Brazos River Authority
0
5
10
Miles
N

Yegua Creek Watershed

Table 12: Waterbodies of the Yegua Creek Watershed IR status

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
Yegua Creek	1211_01		Bacteria Chlorophyll-*a*
Davidson Creek	1211A_01		
	1211A_02	Bacteria Depressed dissolved oxygen	
Somerville Lake	1212_01	pH	Excessive algal growth
	1212_02		Excessive algal growth
	1212_03	pH	Excessive algal growth
	1212_04	pH	Excessive algal growth
Middle Yegua Creek	1212A_01		Bacteria
	1212A_02	Bacteria	Depressed dissolved oxygen Impaired habitat
East Yegua Creek	1212B_01		
	1212B_02		
Nail Creek	1212C_01		
Cedar Creek	1212D_01		
McCain Creek	1212E_01		
Burns Creek	1212F_01		
Jerdelle Creek	1212G_01		
Sandy Branch	1212H_01		
Birch Creek	1212I_01		
Big Creek	1212J_01		
Brushy Creek	1212K_01		
Yegua Creek	1212L_01		Chlorophyll-*a*
	1211_01		Bacteria Chlorophyll-*a*

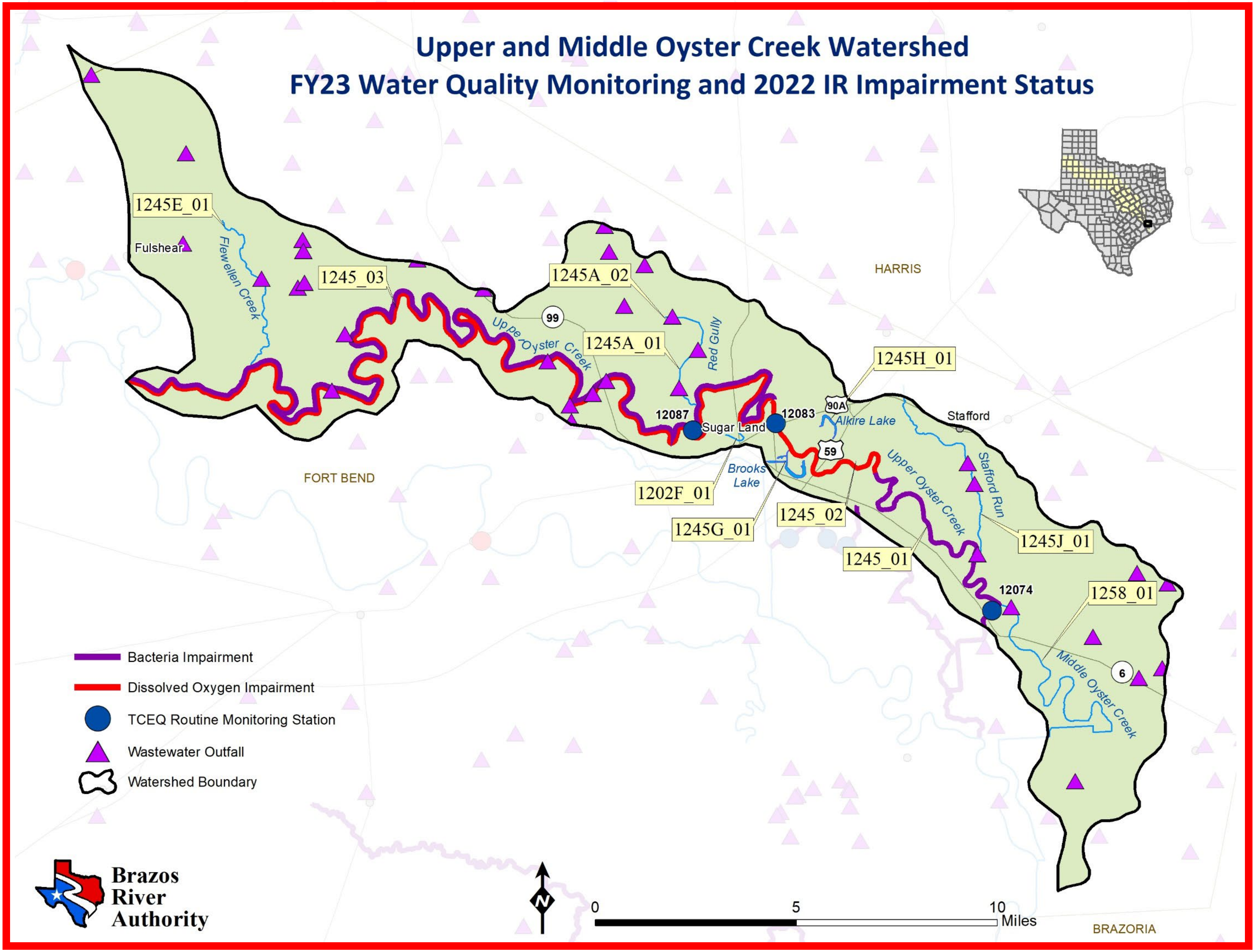

Lower Watershed of the Brazos River
FY23
Water Quality Monitoring and 2022 IR Impairment Status
Bacteria Impairment
BRA Routine Monitoring Station
TCEQ Routine Monitoring Station
TWRI Routine Monitoring Station
BRA Biological Monitoring Station
TCEQ Biological Monitoring Station
BRA Instream Flow Station
Wastewater Outfall
Watershed Boundary
GRIMES
WASHINGTON
AUSTIN
WALLER
FORT BEND
BRAZORIA
Burton
Brenham
Hempstead
Prairie View
Pine Island
Bellville
Industry
Pattison
San Felipe
Sealy
Brookshire
Fulshear
Simonton
Wallis
Orchard
Richmond
Rosenberg
Beasley
Fairchilds
Needville
West Columbia
Bailey's Prairie
Brazoria
Freeport
New Year Creek
Little Sandy Creek
Hog Branch
East Fork Mill Creek
West Fork Mill Creek
Mill Creek
Brazos River
Beason Creek
Ponds Creek
Clear Creek
Bessies Creek
Allen's Creek
Bookshire Creek
Big Creek
Cow Creek
Brazos River Tidal
1202E_01
1202C_01
1202D_01
1202A_01
1202_05
1202Q_02
1202P_01
1202Q_01
1202_04
1202I_02
1202K_01
1202_03
1202I_01
1202G_01
1202H_01
1202_02
1202J_02
1202J_01
1202_01
1201_01
11850
21584
21582
21580
21579
11576
21577
21816
21753
21621
11577
21814
16353
21620
16355
11843
See Inset Map
Pecan Grove
1202R_01
1202U_01
1202T_01
Unnamed Tributary of Bullhead Bayou East
17371
1202S_01
Bullhead Bayou East
Bullhead Bayou West
11846
17381
17382
Alcorn Bayou
1202_02
1245I_01
1245_01
Brazos River
Steep Bank
Upper Oyster Creek
1202B_01
Rabbs Bayou
FORT BEND
Thompsons
0 1 2 Miles
Brazos River Authority
0 10 20 Miles
N

Lower Watershed of the Brazos River Basin

Table 13: Waterbodies of the Lower Watershed IR status

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
Brazos River Tidal	1201_01		
Brazos River Below Navasota River	1202_01		Chlorophyll-*a*
	1202_02		Chlorophyll-*a*
	1202_03		Chlorophyll-*a*
	1202_04		
	1202_05		Chlorophyll-*a*
Beason Creek	1202A_01		
	1202A_02		
Rabbs Bayou	1202B_01		
Hog Branch	1202C_01		
New Year Creek	1202D_01		
Little Sandy Creek	1202E_01		
	1202E_02		
Brookshire Creek	1202G_01		
Allen's Creek	1202H_01		Nitrate Total Phosphorus
Bessie's Creek	1202I_01		Bacteria Depressed dissolved oxygen Nitrate Total Phosphorus
	1202I_02		
	1202I_03		
Big Creek	1202J_01	Bacteria	Depressed dissolved oxygen Impaired fish community Impaired habitat

Water Body	Segment	Parameter(s) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
	1202J_02	Bacteria	Depressed dissolved oxygen Nitrate Total Phosphorus
Mill Creek	1202K_01	Bacteria	Impaired habitat
Pond Creek	1202P_01		
Clear Creek	1202Q_01		
Bullhead Bayou West	1202R_01		
Bullhead Bayou East	1202S_01	Bacteria	
Unnamed Tributary of Bullhead Bayou East	1202T_01	Bacteria	
Alcorn Bayou	1245F_01		
(Portion of) Upper Oyster Creek	1245_01	Bacteria	Chlorophyll-*a* Nitrate Total Phosphorus
Steep Bank Creek	1245I_01	Bacteria	Nitrate


Upper and Middle Oyster Creek Watershed
FY23 Water Quality Monitoring and 2022 IR Impairment Status
1245E_01
Fulshear
Flewellen Creek
1245_03
1245A_02
99
Upper Oyster Creek
1245A_01
Red Gully
12087
Sugar Land
12083
90A
Alkire Lake
1245H_01
Stafford
HARRIS
59
Brooks Lake
1202F_01
1245G_01
1245_02
Upper Oyster Creek
Stafford Run
1245J_01
1245_01
12074
1258_01
6
Middle Oyster Creek
FORT BEND
BRAZORIA
Bacteria Impairment
Dissolved Oxygen Impairment
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) of Impairment	Concern(s) based on Screening Level or Near Non-Attainment
Unnamed Oxbow Slough	1202F_01		
Upper Oyster Creek	1245_01	Bacteria	Chlorophyll-*a* Nitrate Total Phosphorus
	1245_02	Depressed dissolved oxygen	Chlorophyll-*a*
	1245_03	Bacteria Depressed dissolved oxygen	Chlorophyll-*a*
Red Gully	1245A_01		Bacteria Nitrate
	1245A_02		
Flewellen Creek	1245E_01		Bacteria
Brooks Lake	1245G_01		
Alkire Lake	1245H_01		
Stafford Run	1245J_01		Bacteria
Middle Oyster Creek	1258_01		

OTHER WATER QUALITY RELATED PROJECTS IN THE BASIN

GRANBURY STILLING BASIN DISSOLVED OXYGEN PROJECT

Brazos River Authority Environmental Services implemented a dissolved oxygen (DO) study in June 2020 below De Cordova Dam at Lake Granbury following a fish kill in the stilling basin in July 2019 (Figure 1). A stilling basin is the area below a dam that provides a means to absorb or dissipate the energy from the spillway discharge and protects the spillway area from erosion and undermining. The fish kill in 2019 was predominately composed of striped bass. The fish kill immediately followed a period of prolonged flood release, where the discharge of water was abruptly stopped. These prolonged flood releases ended in high heat summer months. This combination of events resulted in fish being trapped in the stilling basin during a period of time where water temperatures did not support high dissolved oxygen saturation, thus resulting in a fish kill.

Figure1. Dead striped bass following a fish kill on 7/22/2019 below De Cordova Dam at Lake Granbury.

In response, BRA Environmental Services installed two dissolved oxygen/ temperature meters, one in the stilling basin and one in a pool immediately downstream of the stilling basin.

Reconnaissance was conducted in early Summer of 2020 to determine the best locations and best mounting methods for the HOBO units, one in stilling basin below Gate 8 and one downstream behind a boulder (Figure 2). A HOBO logger was initially mounted to the sidewall inside the stilling basin below Gate 1 during our first attempt. However, this unit was completely destroyed during the first gate release, resulting in the relocation of the unit to the middle of the dam, making retrieval of the unit much more precarious.

The Granbury maintenance team designed a mounting system using PVC tubing with 1-inch holes drilled throughout attached to the concrete baffles and a downstream boulder using metal strapping. The HOBO is then attached to an eye bolt using a length of coated cable, and then the unit is dropped down into the PVC tubing at a depth of approximately 0.4 meters. Dissolved oxygen (mg/L) and temperature (°C) were set to record once per hour on the hour and deployed in their respective PVC tubes.

Figure 2. Locations of each of two HOBO units deployed the De Cordova Dam at Lake Granbury. The Stilling Basin unit is located below Gate 8, and the Downstream unit is located on the backside of a large boulder.

Download and maintenance of the units was performed once a month as deemed necessary by earlier deployments due to biofouling on the probe.

Data on dissolved oxygen, water temperature, and dam discharge were collected continuously and assessed from June 2020 until November 2022 for this report. Data collection is ongoing. DO and temperature data collected during this effort reflect typical diel and seasonal patterns. The parameters also exhibit stabilization responses to dam releases, meaning as water is being released from the lake and mixed with water in the stilling basin and river below, dissolved oxygen and temperature do not fluctuate and remain at constant levels. Conditions were observed during this study that fall outside the range of preferred DO and temperature criteria for striped bass; however, no fish kill was observed. It has been postulated that the 2019 fish kill may have been caused by a dissolved oxygen crash following the sudden cessation of dam releases after a prolonged high flow release event. In response to the 2019 fish kill in the stilling basin below Lake Granbury, BRA's Water Services Department has revised their protocols for the cessation of high flow releases to incrementally reduce the release volume to allow for fish to retreat to other habitats downstream. Since this revision of gate operations protocols, no fish kill of similar magnitude has been observed.

BRAZOS RIVER AUTHORITY'S HARMFUL ALGAL BLOOM (HAB) REPORTING TOOL

Many types of algae occur naturally in all surface water in Texas. Algae is a base organism in the aquatic food pyramid. Algae are photosynthetic, meaning they harness energy from sunlight and turn it into chemical energy. Any number of the different types of Algae may exist in one waterbody at the same time. While most algae are not problematic, some types have the potential to produce toxins that are harmful to aquatic organisms and, in some cases, also harmful to humans, pets, livestock and wildlife. Toxic algae events are called "blooms."

These blooms can discolor the water and produce scum or foam, and during this process, they grow out of control, and can produce harmful toxins. An algal bloom is a sudden, massive growth of microscopic or macroscopic organisms that develop in surface water. The rapid growth is often associated with water bodies with excessive nutrients. Blooms can occur in warm freshwaters, marine waters or brackish waters.

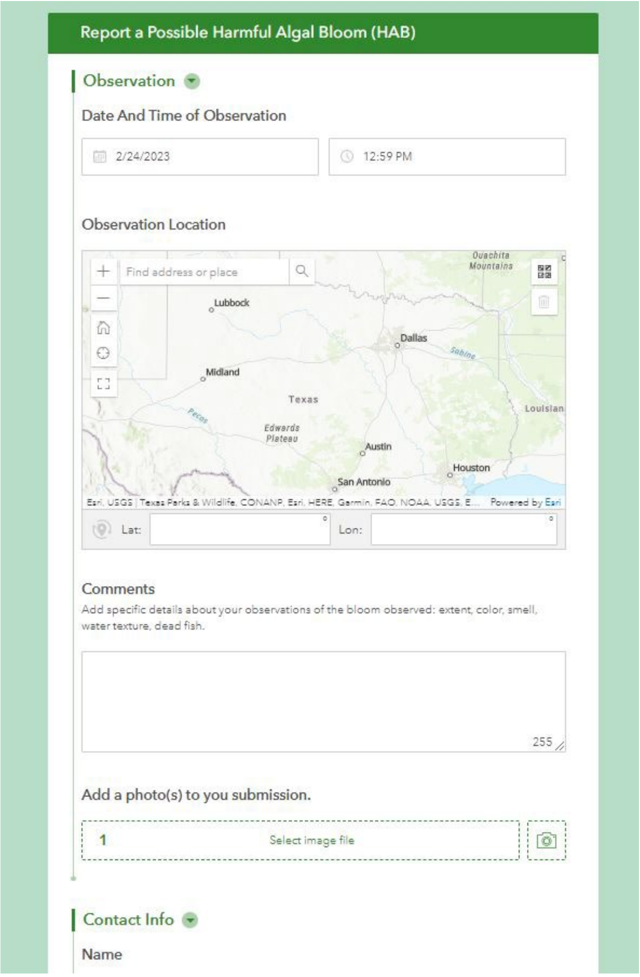
Harmful algal blooms are becoming more frequent in Texas and the Brazos River Basin. Water bodies with an ongoing bloom may look blue, green, brown, yellow, orange, or red. If you've visited a basin lake with strangely colored water or seen dead or dying fish, it could be an algae bloom.

One of several species of alga that live in the lakes in the Upper and Central portions of the Brazos River Basin year-round,

Figure 3. Cyanobacteria bloom of *Aphanizomenon* sp.

Prymnesium parvum or golden algae, is a microscopic organism found worldwide in surface waters, especially water with higher salinity levels. It usually remains dormant; however, when a bloom occurs, it could cause the death of several or even thousands of fish.

Golden alga was first identified in 1985 as the cause of a fish kill in the Pecos River. Since then, it's been attributed as the cause of fish kills in the Colorado, Canadian, Wichita, Red and Brazos river systems.



Golden algae blooms often occur during colder months in Texas, usually after a major temperature shift, though fish kills caused by the algae have been noted during summer months as well. During a bloom, the alga releases a toxin that affects fish's gills. Smaller fish, such as shad, usually succumb first with larger game fish dying as the bloom continues or appears with higher toxicity levels. Water is often discolored, appearing brown, much like the color of tea. Often a foamy substance will also appear.

According to the Texas Parks and Wildlife Department, no risk to human health is associated with golden alga; however, people are warned not to consume dead or dying fish. Likewise, creatures that consume dead or dying fish, such as pelicans or other animals, are unaffected.
According to the TPWD, over the past 30 years, golden alga blooms have killed an estimated 34 million fish throughout the state.
Lake Granbury in the Upper Brazos River Basin for instance has experienced numerous fish kills since 2001, including the largest in 2003 when an estimated 5 million fish, from shad to large game fish, were lost.

To help track possible harmful algal blooms, the Brazos River Authority has established a Harmful Algal Bloom Reporting Tool where you can report a suspected algal bloom that can then be researched to determine what action is warranted. If you are in the Brazos River Basin and observe strangely colored water or see dead or dying fish and suspect a harmful algal bloom you can report the time, location, observations and upload any photos to https://arcg.is/14COnK.

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

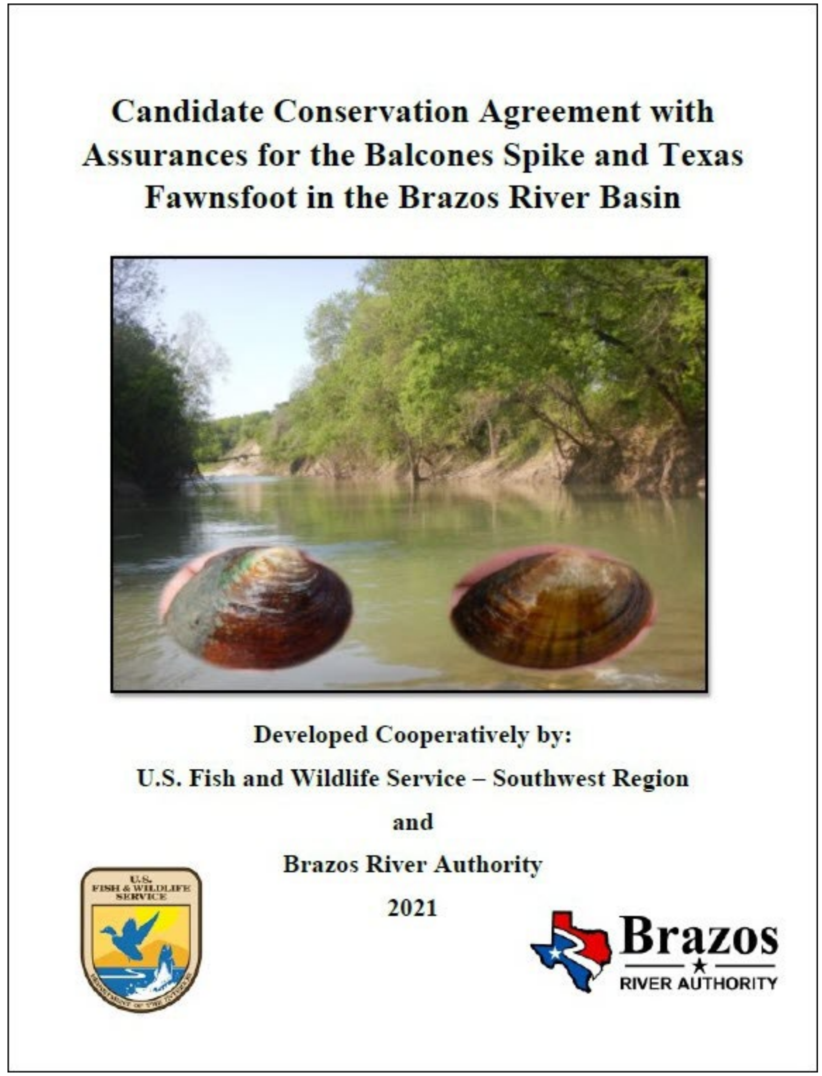
The Brazos River Authority has negotiated a Candidate Conservation Agreement with Assurances (CCAA) with the US Fish and Wildlife Service and began implementation in October of 2021. The CCAA solidifies a voluntary partnership between the BRA and the USFWS to address the conservation needs of the two Brazos basin species of freshwater mussels listed for Endangered Species Act protection.

The Texas fawnsfoot, *Truncilla macrodon*, and the Balcones Spike, *Fusconaia inheringi*, are currently listed with critical habitat established in the Brazos River basin. The US Fish and Wildlife Service is expected to publish its final decision on the species status in 2023. 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. If you would like more information on this project or to request an educational presentation, please contact justin.grimm@brazos.org.


Candidate Conservation Agreement with Assurances for the Balcones Spike and Texas Fawnsfoot in the Brazos River Basin

Developed Cooperatively by:

U.S. Fish and Wildlife Service – Southwest Region

and

Brazos River Authority

2021

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 October 2021 to inform on the status of I-Plan measure implementation, water quality status and recommendations of the North Bosque River TMDL Work Group. 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 that exceeded designated standards. 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 http://www.lampasasriver.org/.

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. Development of the Big Elm Creek Watershed Protection Plan was initiated in the fall of 2018. This was a stakeholder driven process and was facilitated by the Texas Water Resources Institute (TWRI). The final draft of the Big Elm Creek Watershed Protection Plan was accepted by the EPA in February 2021, and implementation of the plan has started.

CHARACTERIZATION OF MIDDLE YEGUA, DAVIDSON AND DEER CREEKS WATERSHEDS

Middle Yegua Creek, Davidson Creek, and Deer Creek have all been identified to be impaired for elevated concentrations of *Escherichia coli* (*E. coli*) in the *2020 Texas Integrated Report of Surface Water Quality for the Clean Water Act Sections 305(b) and 303(d)* (Texas Integrated Report; TCEQ 2019). Davidson Creek was also listed in the *2020 Texas Integrated Report* as impaired for depressed dissolved oxygen (TCEQ 2019). Elevated levels of *E. coli* have been identified in the Middle Yegua Creek watershed since as early as 2010 (TCEQ 2011). For the Davidson Creek watershed, elevated bacteria levels were first identified in 2002 (TCEQ 2002), and depressed dissolved oxygen were first identified in 2010 (TCEQ 2011). For the Deer Creek watershed, the bacteria impairment was first identified in 2006 (TCEQ 2008). This characterization addresses the *E. coli* impairments in the Middle Yegua Creek, Davidson Creek, and Deer Creek watersheds with supplementary water quality monitoring and a review of the current demographic, climatic, physical, and hydrological conditions of the watersheds.

Activities for the project have included water quality monitoring, trainings, and meeting with soil and water conservation districts in each watershed to discuss the goals and objectives of addressing the bacteria impairments. Educational programs were delivered to stakeholders to inform them of watershed management and increase their understanding of what factors contribute to bacteria impairments. Existing data for water quality parameters, flow, livestock, wildlife, stormwater permits, and number of on-site sewage facilities have been analyzed to develop a better understanding of potential causes and sources of bacteria pollution. A final Characterization of Middle Yegua, Davidson, and Deer Creeks Watersheds report was completed in October 2022.

STREAMFLOW AND WATER QUALITY PROPERTIES IN THE THOMPSONS CREEK WATERSHED IN THE VICINITY OF BRYAN/COLLEGE STATION, 2020–2022

To support the determination and development of approaches for addressing bacteria impairments in the Thompsons Creek watershed, continuous streamflow was measured from March 2020 to March 2021 and collected discrete streamflow and water quality data from January 2020 to March 2022 in the Thompsons Creek watershed. The project's goal was to collect data and information vital for improving understanding of the hydrology (streamflow and water quality) of Thompsons Creek and its tributaries and identifying the presence or absence of impairments.

Continuous flow data measurements were made at surface water quality monitoring stations 16396 and 16397 on Thompsons Creek and station 16882 on Still Creek. Measured continuous data was used to develop discharge-stage rating relationships, which were then used to develop long-term daily streamflow data at the three stations. The derived long-term daily streamflow data was then used for estimation of flows at three additional unmonitored stations (17378 on Still Creek and 17597 and 17598 on Cottonwood Branch) using the drainage-area ratio method. Discrete streamflow and water quality parameters (temperature, transparency, specific conductance, pH, dissolved oxygen concentration, and *E. coli* loads) were also measured at the above six stations monthly.

This report describes the study area, sample collection, and processing methods for streamflow and water quality data from six sites located in the Thompsons Creek watershed. The data and methods presented in this report support analyses of the relations among water quality impairment status and causes and basin hydrology in the watershed. A final Streamflow and Water Quality Properties in the Thompsons Creek Watershed in the Vicinity of Bryan/College Station, 2020–2022 was completed in September 2022.

TECHNICAL SUPPORT DOCUMENT FOR FIVE TOTAL MAXIMUM DAILY LOADS FOR INDICATOR BACTERIA IN THE THOMPSONS CREEK WATERSHED, TEXAS

TCEQ first identified bacteria impairments within Thompsons Creek in the 2002 IR and within Cottonwood Branch and Still Creek in the 2006 IR. Bacteria impairments have been identified in each subsequent edition through 2022.

The technical support document considers five bacteria impairments in five AUs of the Cottonwood Branch, Still Creek, and Thompsons Creek. The impaired AUs are:

- Cottonwood Branch (1242B_01, 1242B_02)
- Still Creek (1242C_01)
- Thompsons Creek (1242D_01, 1242D_02)

The Thompsons Creek watershed TMDL project was initiated through a contract between TCEQ and TWRI. The tasks of this project were to (1) develop, approve, and adhere to a quality assurance project plan; (2) develop a technical support document for the impaired watershed; and (3) assist TCEQ with public participation. The purpose of this report is to provide technical documentation and supporting information for developing the bacteria TMDLs for the impaired assessment units. The report contains:

- Information on historical data
- Watershed properties and characteristics
- Summary of historical bacteria data that confirms the Texas 303(d) listings of impairment due to concentrations of *E. coli*
- Development of load duration curves (LDCs)
- Application of the LDC approach for developing the pollutant load allocation

A robust stakeholder involvement program process was undertaken to develop partnerships and gain insight into local stakeholders' preferences for managing impairments in the Thompsons Creek watershed. Stakeholders highlighted the need for implementing integrated management measures that address all the impairments in the watershed. Because of the rapid urbanization and increased population pressures in the watershed, stakeholders proposed that a more dynamic and voluntary stakeholder-driven approach would be more suited for addressing environmental challenges in the watershed. The Technical Support Document for Five Total Maximum Daily Loads for Indicator Bacteria in the Thompsons Creek Watershed, Texas was completed in January 2023.

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

Clean 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

- 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 Authority

THE TEXAS CLEAN RIVERS PROGRAM

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

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