

A wide river flows through a lush green forest. The water is dark blue with white foam from rapids in the foreground. The banks are covered in dense green trees and bushes. The sky is blue with scattered white clouds.

Brazos River Basin Basin Highlights Report 2013

Brazos River Basin Highlights Report 2013

INTRODUCTION.....	9
THIS YEARS HIGHLIGHTS.....	9
Bacterial Impairments	9
Revisions to Contact Recreation Standards	10
Table 1. EPA approved <i>E. coli</i> standards for freshwater for each category of recreational use	11
Table 2. Waterbodies with completed RUAA studies having contact recreational use category recommendations from upstream to downstream in the basin.....	11
Table 3. Waterbodies with RUAA studies in progress or planned from upstream to downstream in the basin.....	12
Nutrient Standards for Reservoirs	14
Table 4. Proposed Nutrient Standards and Current Status of Brazos River Basin Reservoirs.....	14
Watershed Protection Plan for Lake Granbury	15
Watershed Protection Plan for the Leon River	16
Watershed Protection Plan for the Lampasas River.....	16
Watershed Characterization for Nolan Creek	16
PUBLIC INVOLVEMENT AND OTHER INFORMATION.....	17
Brazos River Basin Clean Rivers Program Steering Committee	17
Brazos River Authority and CRP Website	17

WATER QUALITY MONITORING	19
Monitoring in the Brazos River Basin	20
Map - Brazos River Basin Major Watersheds.....	21
Table 5. FY 2013 Summary of Known Sampling for the Brazos River Basin (September 2012 through August 2013).....	22
Map - Watershed of the Salt Fork and Double Mountain Fork of the Brazos River	23
Watershed of the Salt Fork and Double Mountain Fork of the Brazos River	24
Brazos River above Possum Kingdom Reservoir (Segment 1208)	24
Miller's Creek Reservoir (Segment 1208A)	25
Salt Fork of the Brazos River (Segment 1238)	25
Croton Creek (Segment 1238A)	25
White River (Segment 1239)	25
White River Lake (Segment 1240)	25
Double Mountain Fork of the Brazos River (Segment 1241)	25
North Fork Double Mountain Fork of the Brazos River (Segment 1241A)	25
Lake Alan Henry (Segment 1241B)	25
Buffalo Springs Lake (Segment 1241C)	26
Map - Watershed of the Clear Fork of the Brazos River	27
Watershed of the Clear Fork of the Brazos River	28
Clear Fork of the Brazos River (Segment 1232)	28
California Creek (Segment 1232A)	28
Deadman Creek (Segment 1232B)	28
Paint Creek (Segment 1232C)	29
Hubbard Creek Reservoir (Segment 1233)	29
Big Sandy Creek (1233A)	29
Lake Cisco (Segment 1234)	29

Lake Stamford (Segment 1235)	29
Fort Phantom Hill Reservoir (Segment 1236).....	29
Lake Sweetwater (Segment 1237).....	29

Map - Upper Watershed of the Brazos River 30

Upper Watershed of the Brazos River 31

Lake Whitney (Segment 1203).....	32
Brazos River below Lake Granbury (Segment 1204).....	32
Camp Creek (Segment 1204A).....	32
Lake Granbury (Segment 1205).....	32
Brazos River below Possum Kingdom Reservoir (Segment 1206).....	32
Palo Pinto Creek (Segment 1206D).....	33
Possum Kingdom Lake (Segment 1207)	33
Brazos River above Possum Kingdom Reservoir (Segment 1208).....	33
Nolan River (Segment 1227)	33
Lake Pat Cleburne (Segment 1228).....	33
Paluxy River (Segment 1229).....	33
Squaw Creek Reservoir (Segment 1229A)	33
Lake Palo Pinto (Segment 1230)	33
Lake Graham (Segment 1231).....	34
Brazos River below Lake Whitney (Segment 1257)	34

Map – Aquilla Creek Watershed 35

Aquilla Creek Watershed 36

Aquilla Reservoir (Segment 1254)	36
Hackberry Creek (Segment 1254A).....	36
Brazos River below Lake Whitney (Segment 1257)	36

Map - Bosque River Watershed	37
Bosque River Watershed	38
Waco Lake (Segment 1225).....	39
North Bosque River (Segment 1226)	39
Duffau Creek (Segment 1226A), Meridian Creek (Segment 1226C), Neils Creek (Segment 1226D), Spring Creek (Segment 1226G), Gilmore Creek (Segment 1226I), Honey Creek (Segment 1226J), Spring Creek Reservoir (Segment 1226P), Green Creek (Segment 1226B), Indian Creek (Segment 1226E), Sims Creek (Segment 1226F), Alarm Creek (Segment 1226H), Little Duffau Creek (Segment 1226K), Little Green Creek (Segment 1226M), Indian Creek Reservoir (Segment 1226N) and Sims Creek Reservoir (Segment 1226O).....	40
Middle Bosque/South Bosque River (Segment 1246)	40
Tonk Creek (Segment 1246D) and Wasp Creek (Segment 1246E)	40
Upper North Bosque River (Segment 1255)	41
Goose Branch (Segment 1255A), North Fork Upper North Bosque River (Segment 1255B), Scarborough Creek (Segment 1255C), South Fork North Bosque River (Segment 1255D), Unnamed Tributary to Goose Creek (Segment 1255E), Dry Branch (Segment 1255I), Unnamed Tributary to Scarborough Creek (Segment 1255F), Woodhollow Branch (Segment 1255G), South Fork Upper North Bosque River Reservoir (Segment 1255H), Goose Branch Reservoir (Segment 1255J) and Scarborough Creek Reservoir (Segment 1255K)	41
Map - Leon River Watershed	42
Leon River Watershed	43
Nolan Creek/South Nolan Creek (Segment 1218).....	44
Little Nolan Creek (Segment 1218C).....	44
Leon River Below Belton Lake (Segment 1219)	45
Belton Lake Segment (Segment 1220).....	45
Cowhouse Creek (Segment 1220A)	45
Leon River Below Proctor Lake (Segment 1221)	45
Resley Creek (Segment 1221A), South Leon River (Segment 1221B), Indian Creek (Segment 1221D), Walnut Creek (Segment 1221F), Pecan Creek (Segment 1221C).....	45

Proctor Lake (Segment 1222)	46
Duncan Creek (Segment 1222A), Rush-Copperas Creek (Segment 1222B), Sabana River (Segment 1222C), Sweetwater Creek (Segment 1222E), Sowell's Creek (Segment 1222D) and Hackberry Creek (Segment 1222F).....	46
Leon River Below Leon Reservoir (Segment 1223)	46
Armstrong Creek (Segment 1223A) and Cow Creek (Segment 1223B).....	46
Leon Reservoir (Segment 1224)	46
Map - Lampasas River Watershed	47
Lampasas River Watershed	48
Lampasas River Below Stillhouse Hollow Lake (Segment 1215)	48
Stillhouse Hollow Lake (Segment 1216)	48
Trimmier Creek (Segment 1216A).....	48
Lampasas River Above Stillhouse Hollow Lake (Segment 1217)	48
Sulphur Creek (Segment 1217B).....	49
North Rocky Creek (Segment 1217D)	49
Salado Creek (Segment 1243)	49
Map - Little River Watershed	50
Little River Watershed	51
Little River (Segment 1213)	52
Big Elm Creek (Segment 1213A)	52
Little Elm Creek (Segment 1213B)	52
Unnamed tributary of Little Elm Creek (Segment 1213C).....	52
San Gabriel River (Segment 1214)	52
Brushy Creek (Segment 1244)	53
Granger Lake (Segment 1247)	53
Willis Creek (Segment 1247A)	53
San Gabriel/North Fork San Gabriel River (Segment 1248)	53
Huddleston Branch (Segment 1248B).....	53

Mankins Branch (Segment 1248C).....	54
Lake Georgetown (Segment 1249)	54
South Fork San Gabriel River (Segment 1250)	54
North Fork San Gabriel River (Segment 1251)	54
Map - Central Watershed of the Brazos River Basin	55
Central Watershed of the Brazos River Basin	56
Brazos River above Navasota (Segment 1242)	57
Marlin City Lake System (Segment 1242A), Tradinghouse Reservoir (Segment 1242H), Cottonwood Branch (Segment 1242B), Still Creek (Segment 1242C), Thompson’s Creek (Segment 1242D), Pond Creek (Segment 1242F), Campbell’s Creek (Segment 1242I), Deer Creek (Segment 1242J), Mud Creek (Segment 1242K), Pin Oak Creek (Segment 1242L), Spring Creek (Segment 1242M), Walnut Creek (Segment 1242O), Big Creek (Segment 1242P) and Tehuacana Creek (Segment 1242N).	57
Brazos River/Lake Brazos (Segment 1256)	58
Map - Navasota River Watershed	59
Navasota River Watershed	60
Navasota River Below Lake Limestone (Segment 1209).....	61
Carter’s Creek (Segment 1209C), Country Club Branch (Segment 1209D), Wickson (Segment 1209E), Cedar (Segment 1209G), Duck (Segment 1209H), Gibbons (Segment 1209I), Shepherd (Segment 1209J), Steele (Segment 1209K), and Burton (Segment 1209L) Creeks.....	61
Country Club (Segment 1209A) and Fin Feather Lake (Segment 1209B)	62
Lake Mexia (Segment 1210)	62
The Navasota River above Lake Mexia (Segment 1210A)	62
Lake Limestone (Segment 1252).....	62
Navasota River Below Lake Mexia (Segment 1253)	62
Springfield Lake (Segment 1253A).....	62

Map - Yegua Creek Watershed 63

Yegua Creek Watershed 64

Yegua Creek (Segment 1211) 64

 Davidson Creek (Segment 1211A) 64

Somerville Lake (Segment 1212) 64

 Middle Yegua Creek (Segment 1212A) 65

 East Yegua Creek (Segment 1212B) 65

Map - Lower Watershed of the Brazos River Basin 66

Lower Watershed of the Brazos River Basin 67

Brazos River Tidal (Segment 1201) 67

Brazos River Below Navasota River (Segment 1202) 68

 Allen’s Creek (Segment 1202H) 68

 Big Creek (Segment 1202J) 68

 Mill Creek (Segment 1202K) 68

 Pond Creek (Segment 1202P) 68

 Bullhead Bayou (Segment 1245C) and the Unnamed Tributary to Bullhead Bayou (Segment 1245D) 68

 Alcorn Bayou (Segment 1245F) 68

 Steep Bank Creek (Segment 1245I) 69

Map - Upper Oyster Creek Watershed 70

Upper Oyster Creek Watershed 71

Upper Oyster Creek (Segment 1245) 71

 Red Gully (Segment 1245A) 71

 Flewellen Creek (Segment 1245E) 71

 Stafford Run (Segment 1245J) 71

The Brazos River Authority, 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 *Brazos River Basin Highlights Report 2013*. This report is a programmatic update that contains the information needed to answer questions about water quality in the lakes and streams of the Brazos River basin. It also summarizes the results of the ongoing water quality assessment activities in the Brazos River basin under the Texas Clean Rivers Program.

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 on these lists 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.

INTRODUCTION

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, and 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 will identify and evaluate water quality issues, establish priorities for corrective action, work to implement those actions, and adapt to changing priorities.

This report serves as an update to the activities that occurred in Fiscal Year 2013 and what is coming up in Fiscal Year 2014 in the Brazos River Basin under the Clean Rivers Program. The Brazos River Authority (BRA) carries out the water quality management efforts in the basin under contract with TCEQ. The activities described in this report include summaries of water quality monitoring results and planned monitoring for 2014, a summary of the 2012 Integrated Report (IR) results, a status update of proposed changes to surface water quality standards, and a summary of other water quality studies being conducted in the Brazos River Basin in response to water quality issues.

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 see where it takes you. 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, either close the web page or press Alt+ ← and you will return to where you were in the document.

THIS YEARS HIGHLIGHTS

Bacterial Impairments

Bacterial impairments remain the primary reason for impairments in the Brazos River Basin. 16 of the 55 classified segments and 67 of the 137 unclassified segments evaluated in the 2012 IR in the Brazos River basin do not meet State water quality standards. Of those 83 segments with water quality impairments, 73 of them are bacteria-related. That is, 88% of the water quality impairments in the Brazos River Basin are attributed to having higher concentrations of bacteria than is allowed under the State of Texas water

quality standards. Many of the bacteria-impaired waterbodies in the Brazos River basin are small, prairie streams with little to no flow for most of the year, so when water is present in these streams, it is a result of storm events. Stormwater is known to accumulate high levels of both bacteria and nutrients as it travels over land. These pollutants are then deposited in the small streams where they can cause impairment and also contribute to other concerns such as excessive algal growth and low dissolved oxygen levels. As a result of little to no consistent flow (e.g. flow contributed by springs or other streams), the stormwater and its associated pollutants tend to stay and accumulate in the stream. In contrast these pollutants would be diluted and distributed throughout the system in a larger stream with constant flow.

There has been a long-standing concern about the appropriateness of monitoring such streams in Texas and the efficacy of applying water quality standards meant for large river segments to small, ephemeral streams. The bacteria standards are designed to protect the safety of contact recreation in state waters; however, this standard has been applied to all waterbodies in the state regardless of whether they are classified or unclassified or even hold the potential to support contact recreational activities. Recent changes to the Texas Surface Water Quality Standards have been initiated to address this issue.

The amended Texas Surface Water Quality Standards were adopted by the Commission on June 30, 2010 and submitted to the United States Environmental Protection Agency (EPA) on August 4, 2010. The two largest changes that will have the largest impact on the Brazos River basin are the revisions to bacteria standards and the creation of four categories of recreational use and the addition of nutrient standards for reservoirs. As of EPA's August 24, 2012 review letter to TCEQ, the proposed new bacteria standard of 206 MPN/100mL for Primary Contact Recreation was rejected and the standard remains 126 MPN/100mL. The creation of four categories of recreational use was approved and the addition of nutrient standards for reservoirs remains under review by EPA. Below we will briefly discuss these changes. Please click here if you would like more detail on the [2010 Texas Surface Water Quality Standards](#).

Revisions to Contact Recreation Standards

The contact recreation portion is revised to include four categories of recreational use: primary contact recreation (PCR), secondary contact recreation 1 (SCR1), secondary contact recreation 2 (SCR2), and non-contact recreation (NCR) waters. The *E. coli* standard for each category can be found in Table 1. The revisions to the bacteria standards also propose that classified segments are designated for primary contact recreation, unless site-specific information, such as a [Recreational Use Attainability Analysis \(RUAA\)](#) demonstrates that different recreational uses and/or criteria may be justified. PCR will remain the presumed use for all waterbodies; however, SCR1 may be the presumed use for certain types of unclassified waters if primary contact recreation does not occur and if certain depth characteristics are met. Changes also include descriptions for SCR2 and NCR and that no waterbodies are presumed to have these two uses. To have a waterbody reclassified as SCR1 or SCR2 will require the completion of an RUAA

study, recommendation by the TCEQ and approval by the EPA. There are no waterbodies in the Brazos River basin that would qualify for the NCR designation. TCEQ has made recommendations for 12 waterbodies across the basin (Table 2).

Table 1. EPA approved *E. coli* standards for freshwater for each category of recreational use

Use Category	Geometric Mean (MPN/100mL)
Primary Contact Recreation (PCR)	126
Secondary Contact Recreation 1 (SCR1)	630
Secondary Contact Recreation 2 (SCR2)	1,030
Non-contact Recreation (NCR)	2,060

Table 2. Waterbodies with completed RUAA studies having contact recreational use category recommendations from upstream to downstream in the basin.

Major Watershed	Waterbody with Completed RUAA Study	Segment	TCEQ Recommended Contact Recreation Use Category
Upper	Brazos River Above Possum Kingdom Lake	1208	PCR
Leon River	Leon River Below Proctor Lake	1221	PCR
Leon River	Resley Creek	1221A	SCR2
Leon River	South Leon River	1221B	SCR1
Leon River	Indian Creek	1221D	SCR2
Leon River	Walnut Creek	1221F	SCR2
Little River	Brushy Creek	1244	PCR
Navasota River	Navasota River Below Lake Limestone	1209	PCR
Navasota River	Navasota River Below Mexia	1253	SCR1
Yegua Creek	East Yegua Creek	1212B	SCR1
Lower	Bullhead Bayou	1245	SCR1
Lower	Unnamed Tributary of Bullhead Bayou	1245D	SCR1

If these TCEQ recommended category changes are approved by EPA, 8 waterbodies in the Brazos River basin (bolded in Table 2) would likely no longer be impaired for bacteria in future assessments.

A large effort is underway to provide recommendations for numerous other waterbodies in the Brazos River basin. Table 3 indicates the various stages of completion of the RUAA process for Brazos River basin waterbodies as of the publication of this report.

Table 3. Waterbodies with RUAA studies in progress or planned from upstream to downstream in the basin.

Major Watershed	Waterbody	Segment	Stage of RUAA Completion
Bosque River	Upper North Bosque River	1255	Data Collection Complete, Report Under Review
Bosque River	North Fork Upper North Bosque	1255B	Data Collection Complete, Report Under Review
Bosque River	Scarborough Creek	1255C	Data Collection Complete, Report Under Review
Bosque River	Unnamed Tributary of Goose	1255E	Data Collection Complete, Report Under Review
Bosque River	Unnamed Tributary of	1255F	Data Collection Complete, Report Under Review
Bosque River	Woodhollow Branch	1255G	Data Collection Complete, Report Under Review
Bosque River	Dry Branch	1255I	An RUAA is planned
Bosque River	Indian Creek	1226E	Data Collection Complete, Report Under Review
Bosque River	Sims Creek	1226F	Data Collection Complete, Report Under Review
Bosque River	Alarm Creek	1226H	An RUAA is planned
Bosque River	Little Duffau Creek	1226K	Data Collection Complete, Report Under Review
Bosque River	Little Green Creek	1226M	An RUAA is planned
Leon River	Nolan Creek/South Nolan Creek	1218	Data Collection Complete, Report Under Review
Leon River	Duncan Creek	1222A	Data Collection Complete, Report Under Review
Leon River	Rush-Copperas Creek	1222B	An RUAA is planned
Leon River	Sweetwater Creek	1222E	Data Collection Complete, Report Under Review
Leon River	Leon River Below Leon	1223	Data Collection Complete, Report Under Review
Leon River	Armstrong Creek	1223A	Data Collection Complete, Report Under Review
Lampasas River	Trimmier Creek	1216A	An RUAA is planned
Little River	Willis Creek	1247A	Data Collection Complete, Report Under Review
Little River	Mankins Branch	1248C	Data Collection Complete, Report Under Review

Major Watershed	Waterbody	Segment	Stage of RUAA Completion
Central	Cottonwood Branch	1242B	Data Collection Complete, Report Under Review
Central	Still Creek	1242C	Data Collection Complete, Report Under Review
Central	Thompsons Creek	1242D	Data Collection Complete, Report Under Review
Central	Pond Creek	1242F	An RUAA is planned
Central	Campbells Creek	1242I	Data Collection Complete, Report Under Review
Central	Deer Creek	1242J	An RUAA is planned
Central	Mud Creek	1242K	Data Collection Complete, Report Under Review
Central	Pin Oak Creek	1242L	Data Collection Complete, Report Under Review
Central	Spring Creek	1242M	Data Collection Complete, Report Under Review
Central	Walnut Creek	1242O	Data Collection Complete, Report Under Review
Central	Big Creek	1242P	Data Collection Complete, Report Under Review
Navasota River	Carters Creek	1209C	Data Collection Complete, Report Under Review
Navasota River	Country Club Branch	1209D	Data Collection Complete, Report Under Review
Navasota River	Wickson Creek	1209E	Data Collection Complete, Report Under Review
Navasota River	Cedar Creek	1209G	Data Collection Complete, Report Under Review
Navasota River	Duck Creek	1209H	Data Collection Complete, Report Under Review
Navasota River	Gibbons Creek	1209I	Data Collection Complete, Report Under Review
Navasota River	Shepherd Creek	1209J	Data Collection Complete, Report Under Review
Navasota River	Steele Creek	1209K	Data Collection Complete, Report Under Review
Yegua Creek	Davidson Creek	1211A	Data Collection Complete, Report Under Review
Yegua Creek	Middle Yegua Creek	1212A	An RUAA is planned
Lower	Allen's Creek	1202H	Data Collection Complete, Report Under Review

Nutrient Standards for Reservoirs

New criteria are proposed to protect numerous reservoirs from excessive growth of aquatic vegetation related to nutrients. The proposed standards contain median chlorophyll *a* criteria. Standards attainment will be based on the long term median of chlorophyll *a* measurements collected. The median concentration will be compared to the chlorophyll *a* criteria. There is concern for some Brazos River basin reservoirs whose median chlorophyll *a* concentrations are very near the proposed chlorophyll *a* criteria. Table 4 summarizes the proposed nutrient standards for the basin's reservoirs and their current status. The reservoirs highlighted in green are expected to be impaired when the standards become effective.

Table 4. Proposed Nutrient Standards and Current Status of Brazos River Basin Reservoirs.

Segment	Reservoir	Station	Chlorophyll <i>a</i> Criteria (µg/L)	Long term Chlorophyll <i>a</i> Median Concentration (µg/L)
1203	Whitney Lake	11851	18.34	11.1
1205	Lake Granbury	11860	22.16	19.1
1207	Poosum Kingdom Lake	11865	10.74	8.36
1212	Somerville Lake	11881	53.05	40.0
1216	Stillhouse Hollow Lake	11894	5.00	1.50
1220	Belton Lake	11921	6.38	4.4
1222	Proctor Lake	11935	28.15	30.82
1225	Waco Lake	11942	23.16	15.1
1228	Lake Pat Cleburne	11974	19.04	17.16
1231	Lake Graham	11979	6.07	6.39
1233	Hubbard Creek Reservoir	12002	5.61	3.19
1234	Lake Cisco	12005	5.00	10.0
1235	Lake Stamford	12006	16.85	10.0
1237	Lake Sweetwater	12021	13.28	7.80
1240	White River Lake	12027	13.85	14.2
1247	Granger Lake	12095	11.72	9.05
1249	Lake Georgetown	12111	5.00	3.5
1252	Lake Limestone	12123	19.26	14.74
1254	Aquilla Reservoir	12127	14.10	12.35

While the proposed nutrient standards will cause some Brazos Basin lakes to be impaired as soon as the new standards are effective, these proposed nutrient standards will provide TCEQ the tools they need to protect Texas reservoirs from excessive eutrophication and will give the TCEQ the ability to limit nutrient loading from wastewater discharges into the reservoirs of Texas.

Other than Standards revision there are several other efforts under way in the Brazos River Basin with goals of identifying and improving water quality impairments and concerns. Several Watershed Protection Plan projects are in various stages of development and implementation.

Watershed Protection Plan for Lake Granbury

In May 2002, a study began to monitor and assess water quality in the canals and coves of Lake Granbury, Segment 1205. The canals are backwater areas that have little or no circulation and mix slowly with the main body of the reservoir. The result can mean stagnant conditions where pollution problems have the potential to persist. The on-site sewage facilities located along the many canals and coves of Lake Granbury may be a significant source of bacteria and nutrients to the reservoir and may cause water quality concerns in many of the canals. The BRA and TCEQ have helped Stakeholders develop a Watershed Protection Plan (WPP) to address the concerns that these canals present. The Lake Granbury WPP has a large, active stakeholder group with representatives from government agencies, local, state and federal government, municipalities, and other locally interested parties. In addition, a Technical Advisory Group made up of agency representatives provides technical input to the plan development.

The Lake Granbury Watershed Protection Plan Stakeholders group worked together with a Technical Advisory Group made up of agency representatives to develop the Watershed Protection Plan. The Plan was approved by the Stakeholders in June 2010, submitted to the EPA January 2011 and was approved in May 2011. The Lake Granbury WPP is now in the implementation phase. The EPA and TCEQ approved funding for “Implementation of Selected Management Measures from the Lake Granbury Watershed Protection Plan.” The project provides assistance to local stakeholders in implementing the management measures they prescribed in the WPP, tracks implementation effectiveness of management measures in improving water quality, continues facilitation of the Lake Granbury Watershed Protection Plan Stakeholders Group, provides outreach and education requested by stakeholders in the WPP, and seeks funding opportunities to ensure implementation of the management measures recommended in the WPP. The Brazos River Authority has partnered with Texas A&M University AgriLife Research and Extension Center to accomplish the project goals. Please click here for more information on the [Lake Granbury Watershed Protection Plan](#).

Watershed Protection Plan for the Leon River

The Leon River, Segment 1221, was placed on the State's 303(d) List in 1997, and the TCEQ began developing 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, local stakeholders requested the BRA to facilitate the development of a WPP for the Leon River to assist the TCEQ in selection appropriate implementation strategies for the watershed. The BRA received funding for the project through the 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 Plan was submitted to the EPA in 2012 and is currently under review. Please click here for more information on the [Leon River Watershed Protection Plan](#).

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. The Lampasas River Watershed Partnership, area residents and other stakeholders have 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. In January 2013, the draft Lampasas River Watershed Protection Plan was released for public comment and will be submitted to EPA in the Spring of 2013. Please click here for more information on the [Lampasas River Watershed Protection Plan](#).

Watershed Characterization for Nolan Creek

In the early stages, is a project designed to develop a watershed characterization for Nolan Creek, Segment 1218. The project builds on previous water quality monitoring by the City of Killeen which characterized the upper 6.9 miles of the 29 mile segment. The original study provided valuable information for developing a complete assessment of water quality for the entire segment. The purpose of this assessment is to identify causes and sources of pollution in the Nolan Creek/South Nolan Creek Watershed, and to develop an Information/Education Strategy that provides stakeholders and agencies with sufficient information to address the bacteria impairment through future development of a WPP. Nutrient concentrations will be assessed and a comprehensive Geographic Information System (GIS) inventory will be developed.

PUBLIC INVOLVEMENT AND OTHER INFORMATION

Brazos River Basin Clean Rivers Program Steering Committee

The size and diversity of issues across the Brazos River basin presents a challenge for the large group of stakeholders in our basin. The Brazos River Clean Rivers Program 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 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, you may visit the Brazos Basin CRP Website and click on [CRP Public Outreach](#) or send an email to jbarrett@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 River Authority and CRP Website

The BRA maintains both a river authority website (<http://www.brazos.org>) and a CRP website (<http://www.brazos.org/crpHome.asp>) as a mechanism to keep the public informed via the internet. These websites provide information on topics of interest in the basin. The websites provide links to a range of information, including:

Water quality data

Water quality data generated by the BRA is available in a searchable format and can be easily downloaded to an Excel file (<http://crpdata.brazos.org/>). This site is updated weekly. A link to the TCEQ data website is also provided under the Program Documents tab.

Quality Assurance Information

The Quality Assurance Project Plan for CRP and Data Management Plan are available for download in .pdf format.

Schedule of Monitoring Activities

A link is provided to the coordinated monitoring website, which contains a list of the water quality monitoring locations in the state.

Information on Non-CRP Water Quality Projects

Information is provided on a variety of water quality related projects sponsored by the BRA that are not conducted as part of the CRP.

Recreational Information

Information is provided on boating, fishing and other river and lake activities including canoeing maps below Possum Kingdom Lake and Lake Granbury.

River and Reservoir Levels

An interactive map provides information on USGS Stations in the basin, flood stage at each station and current flow at each station.

Current Drought Status

An updated Palmer Drought Index map is provided along with copies of the BRA's Drought Contingency Plan and Water Conservation Plan.

Water Supply Data

Information is provided on reservoir locations, elevations, and capacities and surface area.

WATER QUALITY MONITORING

The TCEQ evaluates the condition of the state's water bodies on a periodic basis under the Clean Water Act (CWA) Section 305(b). The results 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 Act, the IR is updated every two years and includes the review of the past seven years' data collected by many organizations statewide, including the BRA. The 2012 Water Quality Inventory and 303(d) List, on which the following information is based, provides an assessment of water quality results using the most recent seven years of data. Please click here for more information and to review the [2012 Texas Integrated Report for Clean Water Act Sections 305\(b\) and 303\(d\)](#).

The Texas Water Quality Inventory, 305(b) report, 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, 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. The report determines if fish and aquatic insects have adequate oxygen, if people swimming in the water are exposed to pathogens that may cause illness. 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." Once placed on the list the waterbody is targeted for special study and/or corrective action.

Water quality standards numerical criteria are used by TCEQ as the maximum or minimum instream concentrations that may result from permitted discharges and/or nonpoint sources and still meet designated uses. 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. 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. Many streams that are not classified segments are assessed throughout the state and are considered unclassified segments. These unclassified segments 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.

The TCEQ identifies segments where the data conditions are such 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.

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. These screening levels 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

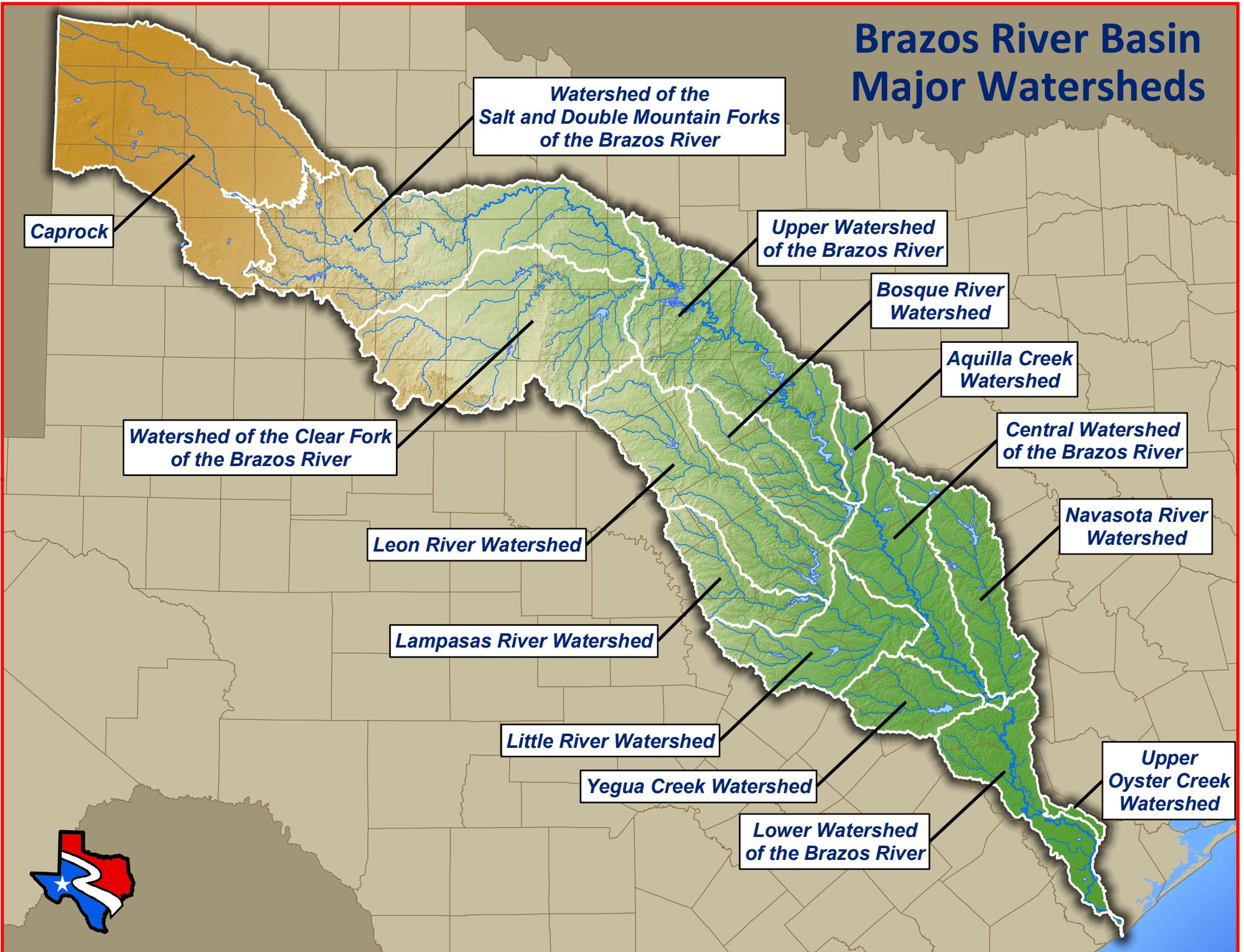


Table 5 outlines the type, frequency and number of stations in the Brazos Basin monitored by various entities as part of the Brazos Basin CRP for FY 2013 (September 2012 through August 2013).

Table 5. FY 2013 Summary of Known Sampling for the Brazos River Basin (September 2012 through August 2013)							
Sampling Entity	Field	Conventional	Bacteria	24-hr DO	Biological and Habitat	Metals in Water	Organics in Water
BRA	37 monthly 70 quarterly 7 semi-annually			10 semi-annually			
TCEQ	66 quarterly 13 semi-annually			4 semi-annually	1 semi-annually	8 quarterly 3 semi-annually	3 semi-annually
	5 quarterly						
	1 semi-annually						
TIAER	14 monthly 7 semi-monthly						

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

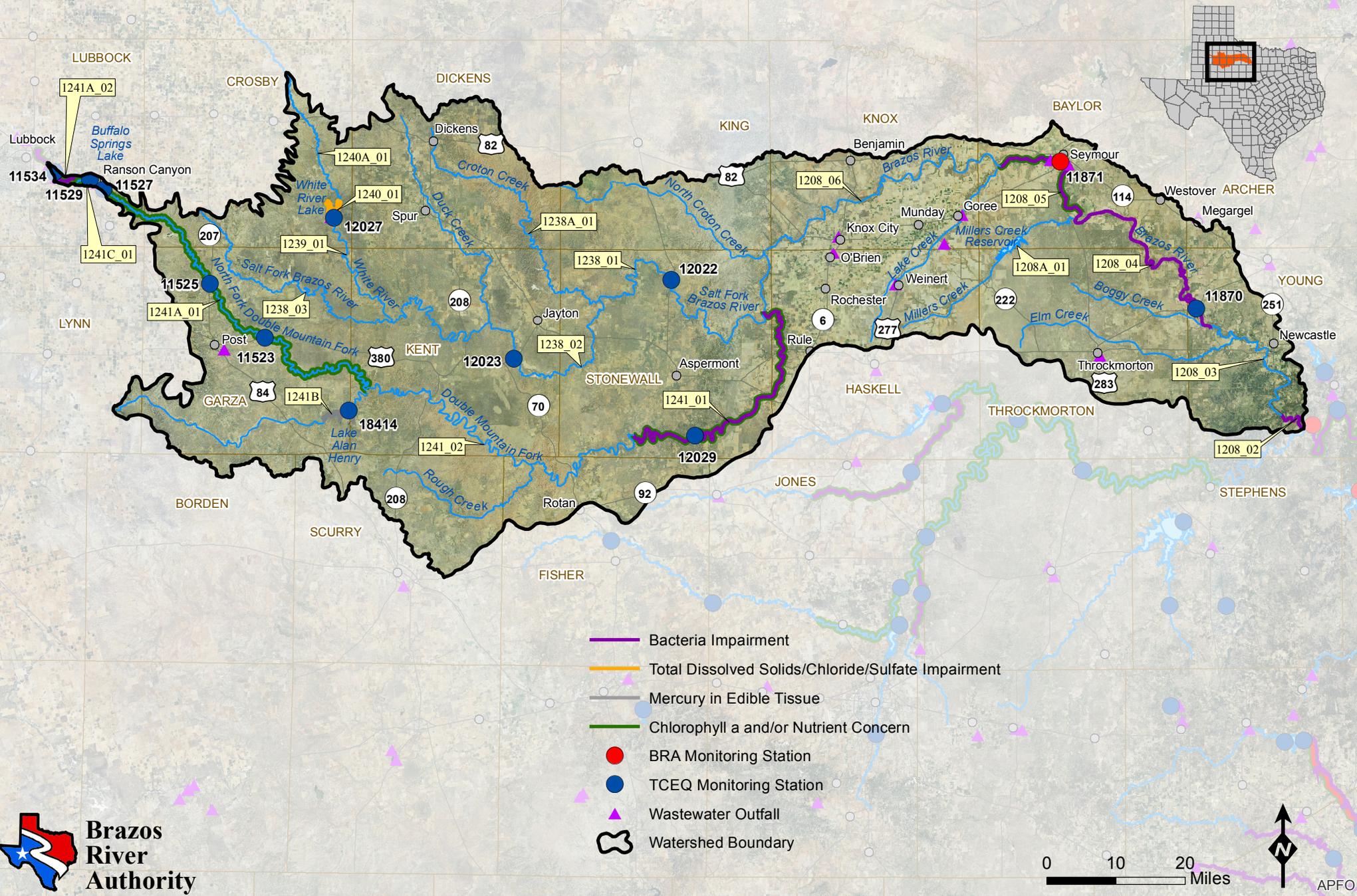
The remainder of this report contains summary water quality assessment results for each of the segments that were evaluated in the Brazos Basin Clean Rivers Program assessment area for the 2012 IR. It is important to remember that the information presented represents a snapshot in time and that water 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 2012 IR as possessing impairments or concerns, what parameter was evaluated that contributed to the listing, and what actions are being taken to address the impairment or concern.

- 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 2012 IR
 - Strike throughs indicate listing removal from the 2012 IR

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

FY13 Water Quality Monitoring and 2012 IR Status



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

Water Body	Segment	Parameter(s) Impairment and/or Concern
North Fork Double Mountain Fork Brazos River	1241A_01	Nutrients and/or Chl <i>a</i> – CS
	1241A_02	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS
Buffalo Springs Lake	1241C_01	Nutrients and/or Chl <i>a</i> – CS
Lake Alan Henry	1241B_01	Mercury in Edible tissue – NS
White River Lake	1240_01	TDS, Cl ⁻ , – NS Sulfate – NS
Double Mountain Fork Brazos River	1241_01	Bacteria – NS TDS, Cl⁻, – NS Nutrients and/or Chl <i>a</i> – CS
	1241_02	TDS, Cl⁻, – NS
Croton Creek	1238A_01	Bacteria – CN
Miller's Creek Reservoir	1208A_01	Bacteria – CN DO – CS
Brazos River Above Possum Kingdom Lake	1208_01	Bacteria – NS
	1208_05	Nutrients and/or Chl <i>a</i> – CS
	1208_02 1208_04	Bacteria – NS

Brazos River above Possum Kingdom Reservoir (Segment 1208)

The Brazos River above Possum Kingdom is listed as having a concern for chlorophyll *a* in the middle portion of the segment from the confluence with Lake Creek to the confluence with Miller's Creek (1208_05) and the downstream portion of the segment from Spring Branch in Young County to Possum Kingdom Reservoir (1208_01). Only a small portion of 1208_01 is in this watershed. The majority of 1208_01 is in the Upper Watershed of the Brazos River. The nutrient sources causing the excessive algal growth are unknown. A larger portion of the segment is listed for bacteria: from the confluence with Lake Creek to the confluence with Boggy Creek (1208_05 and 1208_04) and from the confluence with Fish Creek to Possum Kingdom Reservoir (1208_02 and 1208_01).

Elevated levels of bacteria are attributed to general nonpoint source pollution. An [RUAA](#) has been conducted in segment 1208 and [results](#) have led to the recommendation is that the segment remain classified as a Primary Contact Recreation (PCR) segment.

Miller's Creek Reservoir (Segment 1208A)

Miller's Creek Reservoir has a concern for both bacteria and DO. Potential source for bacteria loading is likely non-point sources due to the rural location of the reservoir with the shallow nature of the reservoir allowing for low DO concentrations.

Salt Fork of the Brazos River (Segment 1238)

This segment has been listed as fully supporting with no impairments.

Croton Creek (Segment 1238A)

Croton Creek Croton Creek has a concern for bacteria with no known source.

White River (Segment 1239)

This segment has been listed as fully supporting with no impairments.

White River Lake (Segment 1240)

White River Lake is listed as not supporting for chloride and TDS. As with this entire watershed the source of the dissolved solids are natural, due to the geology of the watershed.

Double Mountain Fork of the Brazos River (Segment 1241)

The 2012 assessment lists this segment as having concern for chlorophyll and total phosphorus.

North Fork Double Mountain Fork of the Brazos River (Segment 1241A)

This segment is listed as not supporting due to bacteria in the upstream portion of the segment from the confluence with Yellow House Draw to the confluence with Buffalo Springs Lake (1241A_02). Throughout the segment (1241A_01 and 1241A_02), there is concern for chlorophyll *a* and nutrients. A variety of point and non-point sources are likely contributors to the water quality issues in this segment.

Lake Alan Henry (Segment 1241B)

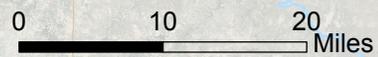
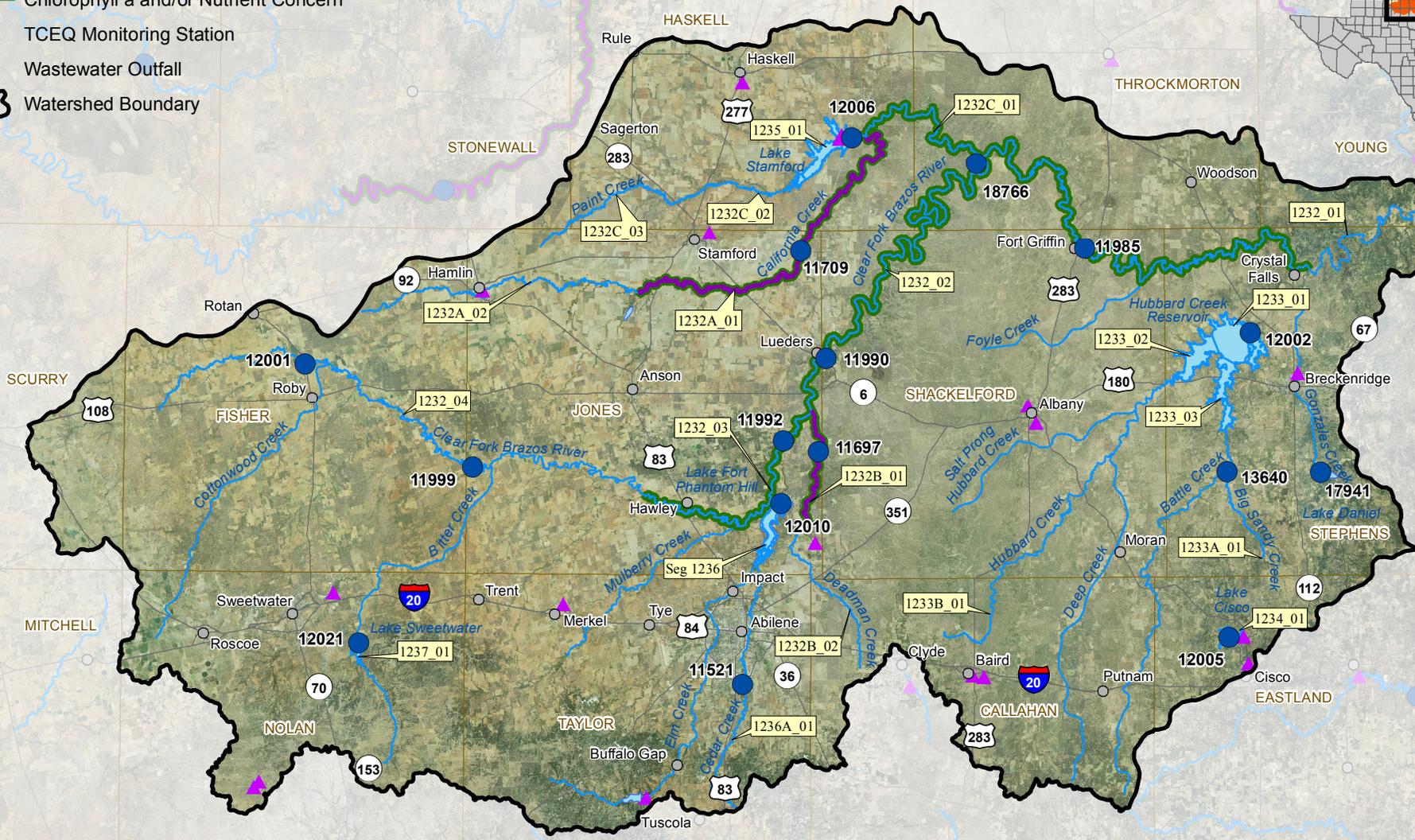
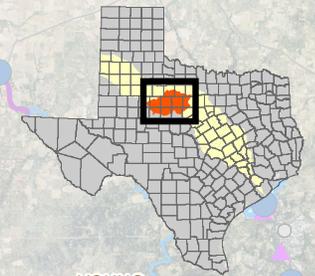
The 2010 assessment found an impairment for mercury in edible fish tissue and this impairment remains for the 2012 assessment. A request has been made for re-sampling by the Texas Department of State Health Services (DSHS).

Buffalo Springs Lake (Segment 1241C)

Buffalo Springs Lake is listed as having a concern for chlorophyll *a* and nitrate.

Watershed of the Clear Fork of the Brazos River FY13 Water Quality Monitoring and 2012 IR Status

- Bacteria Impairment
- Chlorophyll a and/or Nutrient Concern
- TCEQ Monitoring Station
- ▲ Wastewater Outfall
- Watershed Boundary



Watershed of the Clear Fork of the Brazos River

Water Body	Segment	Parameter(s) Impairment and/or Concern
Clear Fork Brazos River	1232_02	Nutrients and/or Chl <i>a</i> – CS
	1232_03	DO – CS Nutrients and/or Chl <i>a</i> – CS
California Creek	1232A_01	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS
Deadman Creek	1232B_01	Bacteria – NS Macrobenthics – CS Nutrients and/or Chl <i>a</i> – CS
	1232B_02	Bacteria – CN
Paint Creek	1232C_01	Nutrients and/or Chl <i>a</i> – CS
Hubbard Creek Reservoir	1233_01	DO – CS

Clear Fork of the Brazos River (Segment 1232)

The Clear Fork is listed as having concerns for chlorophyll *a*, and DO for the portion of the segment from the confluence Bitter Creek to the confluence with Deadman Creek (1232_03). There is a concern for chlorophyll *a*, orthophosphate phosphorus and total phosphorus for the portion of the segment from the confluence with Deadman Creek to the confluence with Hubbard Creek downstream of Hubbard Creek Reservoir (1232_02). Deadman Creek is an effluent dominated stream and municipal discharges are most likely the greatest contributor to the nutrient loading in the Clear Fork.

California Creek (Segment 1232A)

The portion of California Creek from Thompson’s Creek in Jones County to the confluence with Paint Creek in Haskell County is listed as impaired for bacteria and as having concerns for nitrate nitrogen and chlorophyll *a*. Contributors to the nutrient enrichment concerns include municipal discharges, agricultural runoff and on-site sewage facilities.

Deadman Creek (Segment 1232B)

Deadman Creek is listed as not supporting due to bacteria and as having concerns for nitrate nitrogen and phosphorus in the portion of the segment from the City of Abilene WWTP receiving water to the confluence with the Clear Fork of the Brazos River (1232B_01).

Deadman Creek also has a concern for the macrobenthic community. The portion of Deadman Creek upstream of the City of Abilene WWTP (1232B_02) is still in support of the recreational use, but there is concern for elevated bacteria concentrations.

Paint Creek (Segment 1232C)

Paint Creek is listed as having a concern for chlorophyll *a*. Special studies on California Creek, Paint Creek, and Deadman Creek identified agricultural nonpoint pollution and municipal discharges as possible sources of nutrient loadings.

Hubbard Creek Reservoir (Segment 1233)

Hubbard Creek Reservoir is currently listed as having a concern for DO in the Hubbard Creek Arm of the reservoir. Hubbard Creek Reservoir is frequently impacted by drought and low water levels which is most likely the cause of low DO concentrations.

Big Sandy Creek (1233A)

Big Sandy Creek is not listed for any concerns or impairment.

Lake Cisco (Segment 1234)

Lake Cisco is not listed for any concerns or impairment.

Lake Stamford (Segment 1235)

Lake Stamford is not listed for any concerns or impairment.

Fort Phantom Hill Reservoir (Segment 1236)

Fort Phantom Hill Reservoir is not listed for any concerns or impairment.

Lake Sweetwater (Segment 1237)

Lake Sweetwater is not listed for any concerns or impairment.

Upper Watershed of the Brazos River

Water Body	Segment	Parameter(s) Impairment and/or Concern
Brazos River Above Possum Kingdom Lake	1208_01	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS
Brazos River Below Possum Kingdom Lake	1206_01 1206_02	Habitat - CS Macrobenthics – CN
Lake Granbury	1205_02 1205_03 1205_05	Nutrients and/or Chl <i>a</i> – CS Harmful Algal Bloom /Golden Algae – CN
	1205_04	Harmful Algal Bloom /Golden Algae – CN
Possum Kingdom Lake	1207_ALL	Harmful Algal Bloom /Golden Algae – CN
Squaw Creek	1229A_01	Nutrients and/or Chl <i>a</i> – CS
Brazos River Below Granbury	1204_02	Nutrients and/or Chl <i>a</i> – CS Habitat - CS
Camp Creek	1204A_01	Bacteria – NS
Squaw Creek Reservoir	1229A_01	Nutrients and/or Chl <i>a</i> – CS
Nolan River	1227_01	TDS, SO ₄ – NS Cl ⁻ – NS Nutrients and/or Chl <i>a</i> – CS Fish Community – CS
	1227_02	TDS, SO ₄ – NS Cl ⁻ – NS Nutrients and/or Chl <i>a</i> – CS
Buffalo Creek	1227A_01	Nutrients and/or Chl <i>a</i> – CS
Lake Pat Cleburne	1228_01	Nutrients and/or Chl <i>a</i> – CS
Whitney Lake	1203_01	DO – CN Harmful Algal Bloom /Golden Algae – CN
	1203_02	Harmful Algal Bloom /Golden Algae – CN

Water Body	Segment	Parameter(s) Impairment and/or Concern
	1203_03 1203_05 1203_06	Nutrients and/or Chl <i>a</i> – CS Harmful Algal Bloom /Golden Algae – CN
	1203_04	Harmful Algal Bloom /Golden Algae – CN
Brazos River Below Lake Whitney	1257_01	Nutrients and/or Chl <i>a</i> – CS Macrobenthics – CS

Lake Whitney (Segment 1203)

Lake Whitney is listed as having concerns for chlorophyll *a* in the Nolan River arm (1203_05), the Brazos River arm (1203_06), and the Steele Creek arm (1203_03). There is also a concern for DO near the dam (1203_01). Potential non-point sources contributing to high chlorophyll *a* concentrations in the watershed include municipal discharges, on-site sewage facilities and municipal and agricultural runoff. The current cause for low DO is unknown but may be due to internal nutrient recycling. Golden algae is also a concern resulting in fish kills in the main body of the reservoir (1203_02) as well as the portion near the dam. The Texas Parks and Wildlife Department (TPWD) will monitor Lake Whitney monthly for golden algae concentrations monthly in FY 2014.

Brazos River below Lake Granbury (Segment 1204)

The 2012 assessment found concern for chlorophyll *a* in the portion of the segment from DeCordova Bend Dam in Hood County to the confluence with the Paluxy River (1204_02). There is also concern here for impaired habitat due to stream bank modification and destabilization.

Camp Creek (Segment 1204A)

Camp Creek is not supporting for bacteria. The source is unknown.

Lake Granbury (Segment 1205)

Portions of Lake Granbury have concerns for chlorophyll *a*: the portion of the lake adjacent to the City of Oak Trail Shores (1205_02), the portion adjacent to the City of Granbury (1205_03) and the downstream portion of the lake (1205_05). There have also been fish kills due to golden alga blooms on Lake Granbury. TPWD monitors Lake Granbury monthly during months with a high likelihood of golden algae blooms. The [Lake Granbury WPP](#) was approved in May 2011 and is now in implementation.

Brazos River below Possum Kingdom Reservoir (Segment 1206)

The 2012 assessment lists this segment as having concerns for the macrobenthic community and habitat.

Palo Pinto Creek (Segment 1206D)

Palo Pinto Creek supports all of its designated uses with no impairments or concerns.

Possum Kingdom Lake (Segment 1207)

There are no impairments for the Possum Kingdom reservoir however, there is concern due to fish kills resulting from golden algae blooms throughout the reservoir.

Brazos River above Possum Kingdom Reservoir (Segment 1208)

The portion of the Brazos River above Possum Kingdom in the Upper watershed of the Brazos River basin is from downstream of the confluence with Spring Branch in Young County to the Possum Kingdom reservoir (1208_01). This portion of the segment is listed as having a concern for chlorophyll *a* and is impaired for bacteria. The nutrient sources causing algal growth are unknown while elevated levels of bacteria are attributed to general nonpoint source pollution. An [RUAA](#) has been conducted in segment 1208 and results have led to the recommendation that the segment remain classified as a Primary Contact Recreation (PCR) segment.

Nolan River (Segment 1227)

Nolan River is listed as not supporting for sulfate and TDS and as having concerns for chlorophyll *a* and nutrients. The ground water in the watershed contains dissolved solids, this water is used by industry and the local municipal waste water treatment can't remove the dissolved solids and thus discharges them to the Nolan River. TCEQ has reevaluated the sulfate and TDS criteria for this segment and is awaiting EPA approval of the recommended standard change.

Lake Pat Cleburne (Segment 1228)

The 2012 assessment lists a concern for chlorophyll *a* in this reservoir with the nutrient source unknown.

Paluxy River (Segment 1229)

There are no impairments or concerns in the Paluxy River.

Squaw Creek Reservoir (Segment 1229A)

Squaw Creek Reservoir possesses a concern for phosphates. The source of elevated phosphorus in Squaw Creek Reservoir is currently unknown.

Lake Palo Pinto (Segment 1230)

Lake Palo Pinto has no impairments or concerns.

Lake Graham (Segment 1231)

The Lake Graham is not listed for any concerns or impairment.

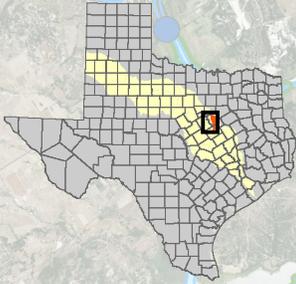
Brazos River below Lake Whitney (Segment 1257)

The 2012 assessment lists concerns for chlorophyll *a* and the macrobenthic community in the downstream portion of the segment from the confluence with Cook Creek to the confluence with Aquilla Creek (1257_01). Contributing sources are unknown.

Aquilla Creek Watershed

FY13

Water Quality Monitoring and 2012 IR Status



JOHNSON

Covington

Itasca

81

35W

171

1254B_01

HILL

1254A_02

Carl's Corner

35E

77

Hillsboro

171

22

1254_02

1254_01

12128

1254_01

Aquilla Reservoir

1254_03

12129

17321

12127

Aquilla

Abbott

35

West

MCLENNAN

Ross

Gholson

11593

Elm Mott

1257_01

1256_01

Brazos River

— Chlorophyll a and/or Nutrient Concern

● BRA Monitoring Station

● TCEQ Monitoring Station

● TIAER Monitoring Station

▲ Wastewater Outfall

⬮ Watershed Boundary



**Brazos
River
Authority**

0 5 10 Miles



Aquilla Creek Watershed

Water Body	Segment	Parameter(s) Impairment and/or Concern
Aquilla Reservoir	1254_01	Nutrients and/or Chl <i>a</i> – CS
	1254_02	
	1254_03	Nutrients and/or Chl <i>a</i> – CS Sediment – CS
Hackberry Creek	1254A_01	DO – CS Nutrients and/or Chl <i>a</i> – CS
Brazos River Below Lake Whitney	1257_01	Nutrients and/or Chl <i>a</i> – CS Macrobenthics – CS

Aquilla Reservoir (Segment 1254)

The 2012 assessment lists Aquilla Reservoir as having a concern for nitrate. Sources of the nitrate in the watershed may include permitted discharges, agricultural runoff and other non-point source runoff. The Hackberry Creek arm on the east portion of the reservoir (1234_03) has a concern for arsenic in sediment. It is suspected that the arsenic came from the arsenic acid cotton defoliant used for decades in the highly agricultural area around Aquilla Reservoir.

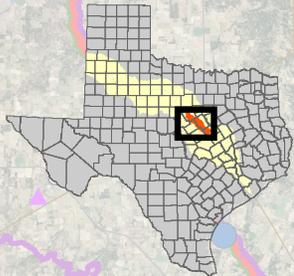
Hackberry Creek (Segment 1254A)

Hackberry Creek is listed as having concerns for DO, ammonia, nitrate, and orthophosphorus in the 2012 assessment.

Brazos River below Lake Whitney (Segment 1257)

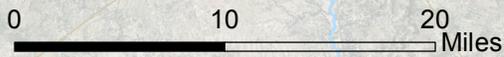
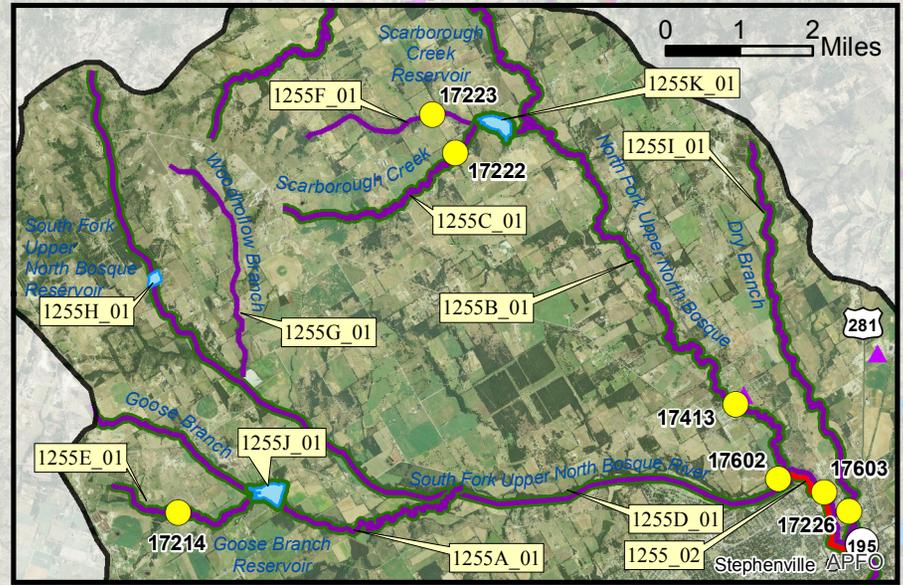
The 2012 assessment lists concerns for chlorophyll *a* and the macrobenthic community in the downstream portion of the segment from the confluence with Cook Creek to the confluence with Aquilla Creek (1257_01). Contributing sources are unknown.

Bosque River Watershed FY13 Water Quality Monitoring and 2012 IR Status



See Inset Map

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



Bosque River Watershed

Water Body	Segment	Parameter(s) Impairment and/or Concern
Upper North Bosque River	1255_01	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS Fish Kill Report – CN
	1255_02	Bacteria – NS DO – NS Nutrients and/or Chl <i>a</i> – CS
Goose Branch	1255A_01	Bacteria – CN Nutrients and/or Chl <i>a</i> – CS
North Fork Upper North Bosque River	1255B_01	Bacteria – NS Nutrient – CS
Scarborough Creek	1255C_01	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS
South Fork North Bosque River	1255D_01	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS
Unnamed Tributary of Goose Branch	1255E_01	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS
Unnamed Tributary of Scarborough Creek	1255F_01	Bacteria – NS
Woodhollow Branch	1255G_01	Bacteria – NS
South Fork Upper North Bosque River Reservoir	1255H_01	DO – CS
Dry Branch	1255I_01	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS
Goose Branch Reservoir	1255J_01	Nutrients and/or Chl <i>a</i> – CS
Scarborough Creek Reservoir	1255K_01	Nutrients and/or Chl <i>a</i> – CS
North Bosque River	1226_02	DO – CN Nutrients and/or Chl <i>a</i> – CS
	1226_03	Nutrients and/or Chl <i>a</i> – CS

Water Body	Segment	Parameter(s) Impairment and/or Concern
	1226_04	Nutrients and/or Chl <i>a</i> – CS
Green Creek	1226B_01	DO – NS Nutrients and/or Chl <i>a</i> – CS
Indian Creek	1226E_01	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS
Sims Creek	1226F_01	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS
Alarm Creek	1226H_01	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS
Little Duffau Creek	1226K_01	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS
Little Green Creek	1226M_01	Bacteria – NS
Indian Creek Reservoir	1226N_01	Nutrients and/or Chl <i>a</i> – CS
Sims Creek Reservoir	1226O_01	DO – CS Nutrients and/or Chl <i>a</i> – CS
Waco Lake	1225_03	Nutrients and/or Chl <i>a</i> – CS
Middle Bosque/South Bosque River	1246_01 1246_02	Nutrients and/or Chl <i>a</i> – CS
Tonk Creek	1246D_01	Nutrients and/or Chl <i>a</i> – CS
Wasp Creek	1246E_01	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS

Waco Lake (Segment 1225)

Waco Lake is listed as having a concern for nitrate in the Middle/South Bosque arm of the Lake (1225_03).

North Bosque River (Segment 1226)

The portion of the North Bosque River from the confluence with Indian Creek in Erath County to the confluence with Neils Creek in Bosque County (1226_04, 1226_03 and 1226_02) is listed as not supporting its general use due to excessive algal growth with a concern for chlorophyll *a*. The portion of the stream from Indian Creek in Erath County to Duffau Creek in Bosque County also has a

concern for orthophosphorus. Wastewater treatment plant effluent, agricultural runoff and the confined animal feeding operations (CAFOs) located in the watershed are potential contributors to the elevated nutrients. However, through implementation of the TMDL plan, reductions in nutrients have been achieved ([Improving Water Quality in the North Bosque River, TCEQ 2012](#)).

Duffau Creek (Segment 1226A), Meridian Creek (Segment 1226C), Neils Creek (Segment 1226D), Spring Creek (Segment 1226G), Gilmore Creek (Segment 1226I), Honey Creek (Segment 1226J), and Spring Creek Reservoir (Segment 1226P) have no impairments or concerns.

Green Creek (Segment 1226B) is not supporting for DO and has concerns for chlorophyll *a*, and bacteria.

Indian Creek (Segment 1226E) is not supporting for bacteria has concerns for chlorophyll *a* and nitrate.

Sims Creek (Segment 1226F) and **Alarm Creek (Segment 1226H)** are not supporting for bacteria have concerns for chlorophyll *a*.

Little Duffau Creek (Segment 1226K) is not supporting for bacteria has concerns for orthophosphate, nitrate, and total phosphorus.

Little Green Creek (Segment 1226M) is not supporting for bacteria.

Indian Creek Reservoir (Segment 1226N) has concerns for ammonia, chlorophyll *a* orthophosphorus and total phosphorus.

Sims Creek Reservoir (Segment 1226O) has concerns for DO and chlorophyll *a*.

The North Bosque River and all of these unclassified streams are small, prairie streams with no flow to low flow for most of the year, so when water is present in these streams, it is a result of storm events. [RUAAs](#) have been completed and are under review or are planned for the six 1226 unclassified segments with bacterial impairments.

Middle Bosque/South Bosque River (Segment 1246)

The Middle Bosque/South Bosque River segment as well as two sub-segments, **Tonk Creek (Segment 1246D)** and **Wasp Creek (Segment 1246E)**, are listed as having concern for nitrate. The area ranges from undeveloped to moderate development with a mix of commercial, industrial, residential, and agricultural uses. Potential sources of nitrates include point source discharges along with both urban and agricultural runoff.

Although **Wasp Creek (Segment 1246E)** was not listed on the 2010 assessment, it was originally listed in 2002 and is again listed in the 2012 assessment as impaired for recreational use due to elevated bacteria concentrations. Potential sources of bacteria include on-site sewage systems and runoff from rangeland and agricultural lands.

Upper North Bosque River (Segment 1255)

The Upper North Bosque River is listed as not supporting its recreational use due to elevated bacteria concentrations. It is also listed as not supporting its general use due to excessive algal growth with a concern for chlorophyll *a*. The portion of the Upper North Bosque River from the confluence with the North and South Forks of the North Bosque River to the confluence with Dry Branch (1255_02) is also listed as not supporting its aquatic life use due to depressed DO. Both wastewater treatment plant effluent and the CAFOs located in the watershed are potential contributors to the elevated bacteria and nutrients. And like Segment 1226, through implementation of the [TMDL](#) plan, pollutant reduction is being addressed.

Goose Branch (Segment 1255A), North Fork Upper North Bosque River (Segment 1255B), Scarborough Creek (Segment 1255C), and South Fork North Bosque River (Segment 1255D) segments are listed as not supporting due to bacteria and as having concerns for nutrients and chlorophyll *a*.

Unnamed Tributary to Goose Creek (Segment 1255E) and Dry Branch (Segment 1255I) are listed as not supporting due to bacteria and have concern for nutrients.

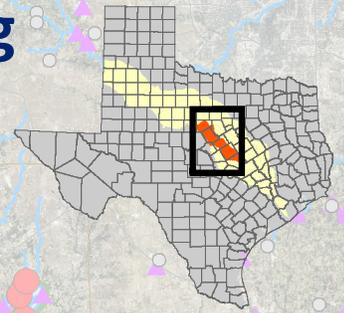
Unnamed Tributary to Scarborough Creek (Segment 1255F) and Woodhollow Branch (Segment 1255G) segments are not supporting due to bacteria.

South Fork Upper North Bosque River Reservoir (Segment 1255H) has a concern for DO.

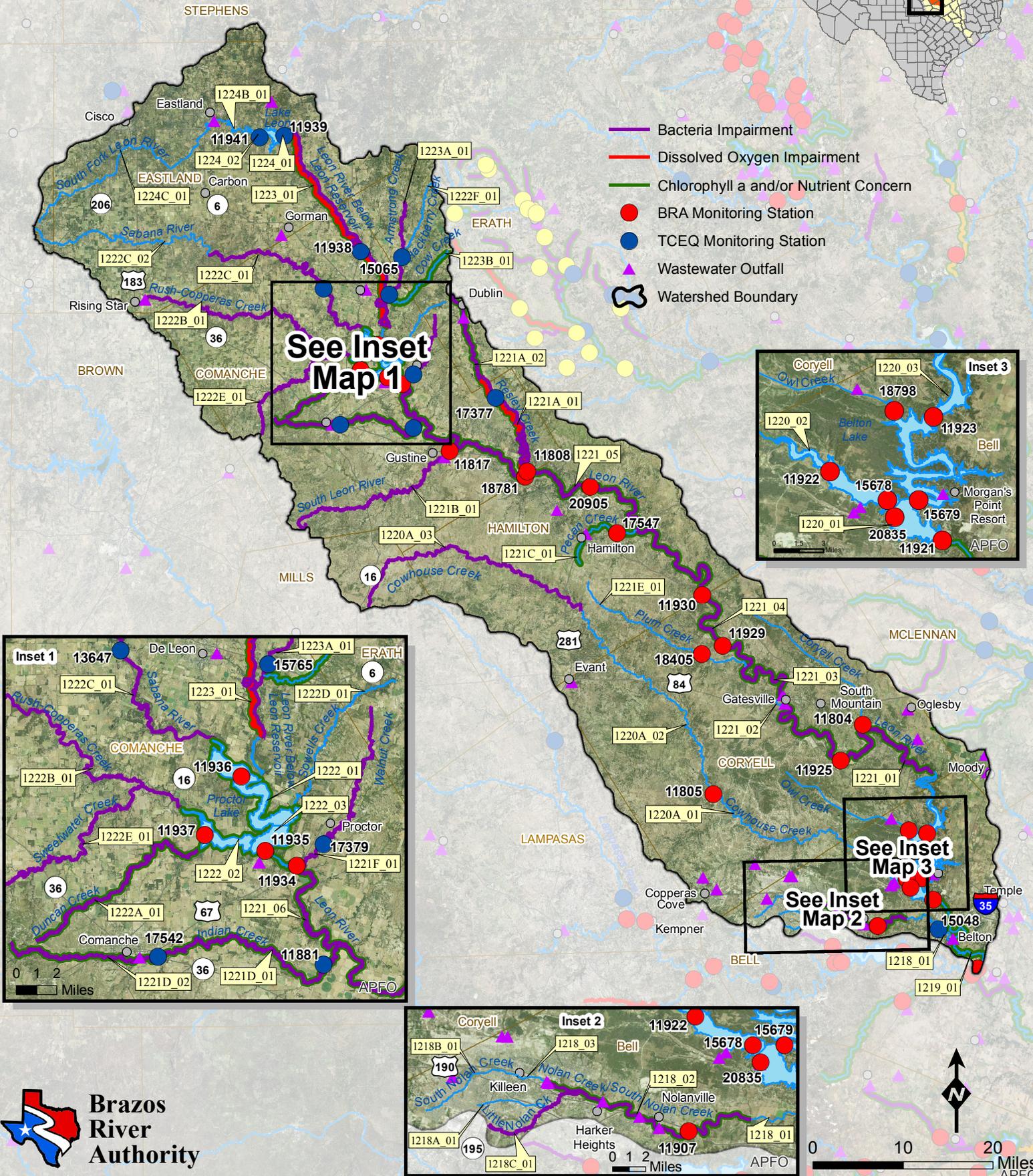
Goose Branch Reservoir (Segment 1255J) and Scarborough Creek Reservoir (Segment 1255K) have concern for nutrients and chlorophyll *a*.

Like the unclassified tributary streams in segment 1226, many of the impaired or concern sub-segments in 1255 are small, rural streams with little to no flow for most of the year whose water is primarily generated by storm events. [RUAAs](#) have been completed and are under review for segment 1255, 1255B, 1255C, 1255E, 1255F, 1255G and 1255I.

Leon River Watershed FY13 Water Quality Monitoring and 2012 IR Status



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



**See Inset
Map 1**

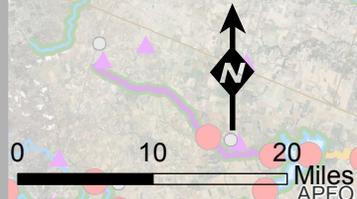
Inset 3

Inset 1

**See Inset
Map 2**

**See Inset
Map 3**

Inset 2



Leon River Watershed

Water Body	Segment	Parameter(s) Impairment and/or Concern
Nolan Creek/South Nolan Creek	1218_02	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS
Little Nolan Creek	1218C_01	Bacteria – NS
Leon River Below Belton Lake	1219_01	Nutrients and/or Chl <i>a</i> – CS
Cowhouse Creek	1220A_03	Bacteria – NS
Leon River Below Proctor Lake	1221_01 1221_03 1221_04 1221_06	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS
	1221_05	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS DO – CS
	1221_07	Bacteria – NS DO – CS Nutrients and/or Chl <i>a</i> – CS
Resley Creek	1221A_01	Bacteria – NS DO – NS Nutrients and/or Chl <i>a</i> – CS
	1221A_02	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS
South Leon River	1221B_01	Bacteria – NS Habitat – CS
Pecan Creek	1221C_01	Nutrients and/or Chl <i>a</i> – CS
Indian Creek	1221D_01	Bacteria – NS
	1221D_02	Nutrients and/or Chl <i>a</i> – CS
Walnut Creek	1221F_01	Bacteria – NS

Water Body	Segment	Parameter(s) Impairment and/or Concern
Proctor Lake	1222_01 1222_02	Nutrients and/or Chl a – CS
	1222_03	DO – CS Nutrients and/or Chl a – CS
Duncan Creek	1222A_01	Bacteria – NS DO – CN Nutrients and/or Chl a – CS
Rush-Copperas Creek	1222B_01	Bacteria – NS
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 – CS
Leon River Below Leon Reservoir	1223_01	Bacteria – NS DO– NS Nutrients and/or Chl a – CS
Armstrong Creek	1223A_01	Bacteria – NS Nutrients and/or Chl a – CS
Cow Creek	1223B_01	Bacteria – CN Nutrients and/or Chl a – CS

Nolan Creek/South Nolan Creek (Segment 1218)

The portion of South Nolan Creek from the confluence with Liberty Ditch in the City of Killeen to the confluence with the North Nolan Creek Fork (1218_02) possesses a bacterial impairment and water quality concerns for nitrate and phosphates. TCEQ, the City of Killeen and TIAER have begun a project to address these issues. Through watershed characterization, the project intends to identify causes and sources of pollution in the Nolan Creek/South Nolan Creek watershed and develop an Information/Education Strategy to provide sufficient information to develop a watershed protection plan or TMDL.

Little Nolan Creek (Segment 1218C)

Little Nolan Creek has a concern for elevated bacteria concentrations.

Leon River Below Belton Lake (Segment 1219)

The portion of the Leon River from the Belton Dam in Bell County to the confluence with the Lampasas River (1219_01) possesses concerns for nitrate and orthophosphorus, but is otherwise fully supporting of all assessed uses. The source of elevated nutrients in this segment is believed to be a result of point source discharges and urban runoff.

Belton Lake Segment (Segment 1220)

Water quality in Belton Lake is fully supporting of all uses assessed.

Cowhouse Creek (Segment 1220A)

The upstream portion of Cowhouse Creek (1220A_03) is impaired for bacteria.

Leon River Below Proctor Lake (Segment 1221)

The portion of the Leon River from the confluence with Walnut Creek in Comanche County to the confluence with Stillhouse Creek in Bell County and the portion from an unnamed tributary near S. 7th St. in Gatesville to the confluence with Lake Belton was first placed on the State's 303(d) List for bacteria levels not supporting contact recreation use in 1998 and is currently listed as impaired for bacterial with concerns for chlorophyll *a*. The bacteria impairment is a result of the contribution of multiple sources, including: confined animal feeding operations, municipal waste water discharge, and stormwater runoff from rural sources. There is also an additional listing of non-support for the portion of the Leon River from the confluence with South Leon Creek to the confluence with Pecan Creek for depressed DO. The Leon River Watershed Protection Plan was submitted to the EPA in 2012 and is currently under review. Please click here for more information on the [Leon River Watershed Protection Plan](#) that addresses issues in this segment. An [RUAA](#) has been conducted in segment 1221 and [results](#) have led to the recommendation is that the segment remain classified as a Primary Contact Recreation (PCR) segment.

Four of the tributaries to this segment are not supporting their recreational use due to bacteria: **Resley Creek (Segment 1221A)**, the **South Leon River (Segment 1221B)**, **Indian Creek (Segment 1221D)**, and **Walnut Creek (Segment 1221F)**. Resley Creek's listing also includes an impairment for depressed DO, and has concerns for nutrients and chlorophyll *a*. The **South Leon River (Segment 1221B)** also has a concern for habitat. **Pecan Creek (Segment 1221C)** has concern for chlorophyll *a* and Indian Creek as concerns for chlorophyll *a*, nitrate and phosphates. A project to address issues in Resley Creek has been completed with results becoming available in August 2013.

Proctor Lake (Segment 1222)

Proctor Lake possesses no impairments, however; there is concern for high chlorophyll *a* values with an additional concern for depressed DO in the portion of the lake near the dam (1222_03). The elevated chlorophyll *a* levels are most likely caused by increased nutrient inputs via tributary streams to the reservoir from runoff from rural lands.

Four tributaries to Lake Proctor possess impairments for bacteria: **Duncan Creek (Segment 1222A)**, **Rush-Copperas Creek (Segment 1222B)**, **Sabana River (Segment 1222C)**, and **Sweetwater Creek (Segment 1222E)**. **Sowells Creek (Segment 1222D)** and **Hackberry Creek (Segment 1222F)** have a concerns for elevated bacteria levels. Duncan and Hackberry Creeks also have additional concerns for low DO. As in the case of the small tributary streams mentioned in the Bosque River Watershed, the tributary streams of Proctor Lake are also dominated by stormwater runoff.

Leon River Below Leon Reservoir (Segment 1223)

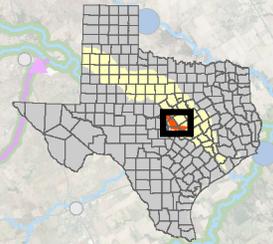
The Leon River below Leon Reservoir is on the 303(d) List as impaired for recreational use due to elevated bacterial levels and depressed DO. There is a concern for increased chlorophyll *a*. This segment frequently experiences low water levels which hinder its ability to buffer against high ambient air temperatures in the summer and fall and are the likely cause for depressed DO levels.

Armstrong Creek (Segment 1223A) and **Cow Creek (Segment 1223B)** are impaired for bacteria. These segments also have concerns for chlorophyll *a* and orthophosphorus respectively. These segments typically have low flow and are dominated by stormwater runoff, which is most likely the source of the bacteria.

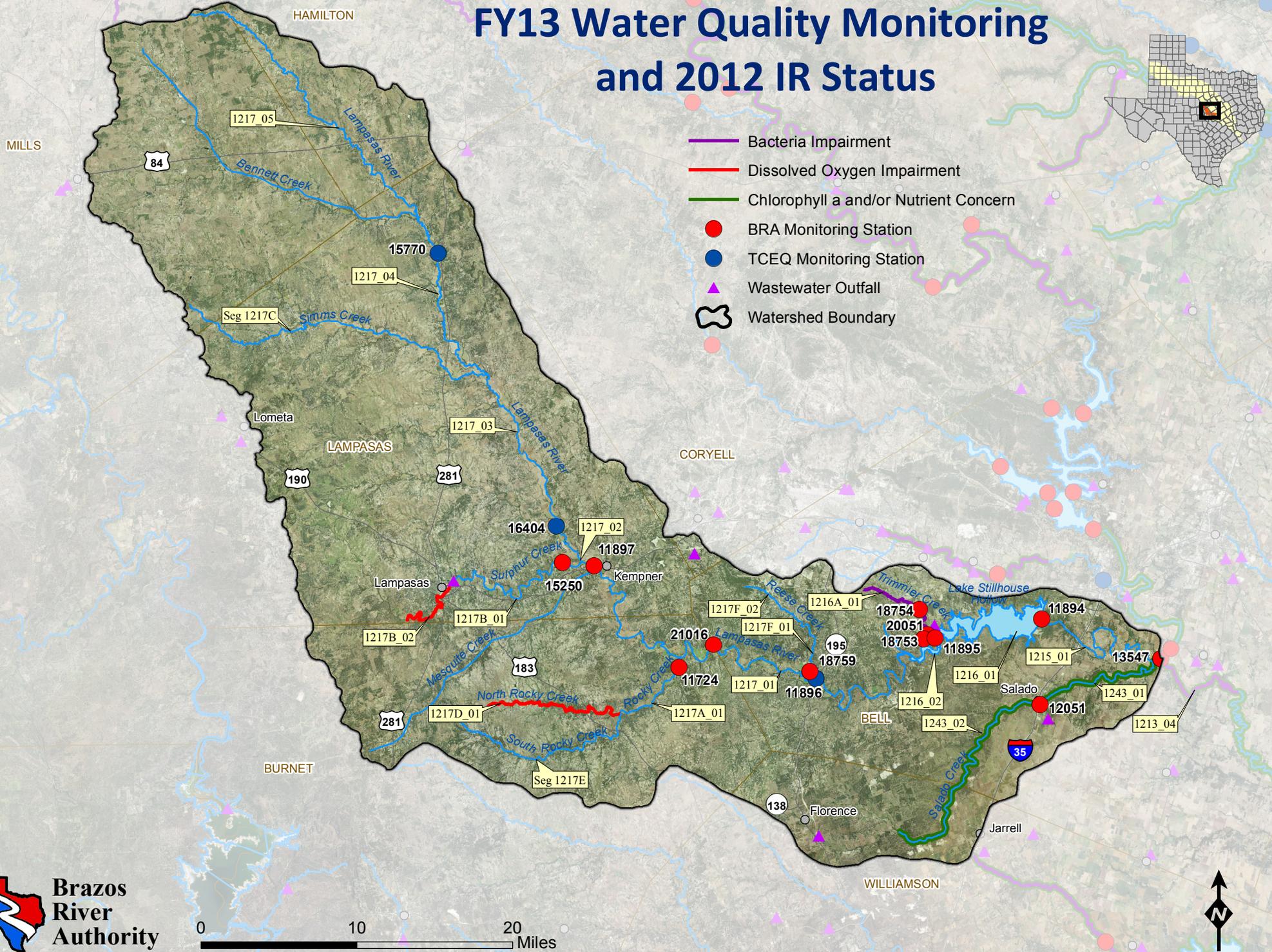
Leon Reservoir (Segment 1224)

The Leon Reservoir is not listed for any concerns or impairment.

Lamparas River Watershed FY13 Water Quality Monitoring and 2012 IR Status



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



Lampasas River Watershed

Water Body	Segment	Parameter(s) Impairment and/or Concern
Lampasas River Below Stillhouse Hollow Lake	1215_01	Bacteria – NS
Trimmier Creek	1216A_01	Bacteria – NS Macrobenthics – CN
Stillhouse Hollow Lake	1216_01	DO – CS
Lampasas River Above Stillhouse Hollow Lake	1217_02	Macrobenthics – CS
Sulphur Creek	1217B_01	Macrobenthics – CS
	1217B_02	DO – NS
North Rocky Creek	1217D_01	DO – NS
Salado Creek	1243_01	Nutrients and/or Chl a – CS
	1243_02	

Lampasas River Below Stillhouse Hollow Lake (Segment 1215)

The Lampasas River below Stillhouse Hollow Lake is not listed for any concerns or impairment.

Stillhouse Hollow Lake (Segment 1216)

Water quality in Lake Stillhouse Hollow currently meets all water quality standard criteria and nutrient screening levels with no impairments. There is however a concern for low DO in the main body of the lake (1216_01).

Trimmier Creek (Segment 1216A) is impaired due to elevated bacterial concentrations and has a concern for the macrobenthic community. The creek flows through an area experiencing rapid development and appears to be carrying a large sediment load caused by urban runoff into Stillhouse Hollow Lake. An RUAA has been planned for Trimmier Creek.

Lampasas River Above Stillhouse Hollow Lake (Segment 1217)

The Lampasas River above Stillhouse Hollow Lake has no impairment; however the portion of the segment from the confluence with Mesquite Creek in Lampasas County to the confluence with Lucy Creek (1217_02) has a concern for macrobenthic community. A draft Watershed Protection has been published for public comment and will be submitted to EPA for approval in Spring 2013. Please click here for more information on the [Lampasas River Watershed Protection Plan](#) that addresses issues in this segment.

Sulphur Creek (Segment 1217B)

Sulphur Creek has a concern for the macrobenthic community in the portion of Sulphur Creek from the confluence with the Lampasas River to the confluence with Burleson Creek in the City of Lampasas (1217B_01). The remaining portion of the creek to the confluence with Donaldson Creek and Espy Branch (1217B_02) is impaired for low dissolved oxygen. Low dissolved oxygen is likely a result of anoxic groundwater influx from the many springs that feed in to the stream.

North Rocky Creek (Segment 1217D)

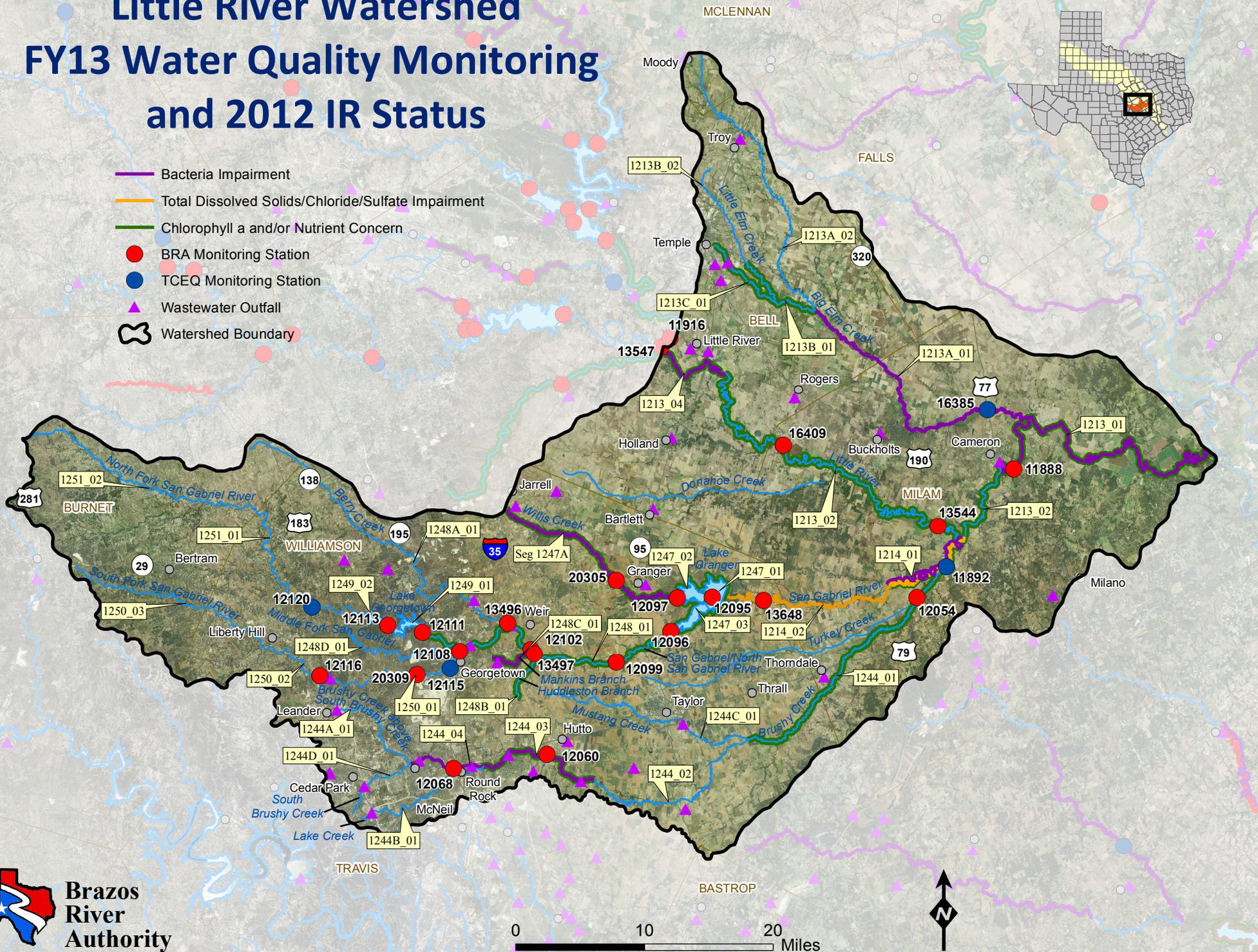
North Rocky Creek is impaired for depressed DO. This DO impairment is caused by frequent low water levels which hinder its ability to buffer against high ambient air temperatures in the summer and fall reducing the water's capacity to maintain DO levels. A [TMDL project](#) was initiated in 2002 to address the impairment. Biological data collected indicated that North Rocky Creek supports a relatively healthy biological community even with depressed DO levels. The TCEQ's Water Quality Standards program reviewed data from North Rocky Creek and determined that site-specific criterion for DO would be appropriate. The 2010 TCEQ Water Quality Standards assigned North Rocky Creek site-specific criteria for 24-hr dissolved oxygen. With additional data collection and assessment against the new criteria, North Rocky Creek may be removed from the impaired list going forward.

Salado Creek (Segment 1243)

Salado Creek possesses a concern for nitrate but no impairments. Likely sources of nitrate include runoff from urban and agricultural areas and on-site sewage facilities.

Little River Watershed FY13 Water Quality Monitoring and 2012 IR Status

-  Bacteria Impairment
-  Total Dissolved Solids/Chloride/Sulfate Impairment
-  Chlorophyll a and/or Nutrient Concern
-  BRA Monitoring Station
-  TCEQ Monitoring Station
-  Wastewater Outfall
-  Watershed Boundary



Little River Watershed

Water Body	Segment	Parameter(s) Impairment and/or Concern
Little River	1213_01	Bacteria – NS
	1213_04	Nutrients and/or Chl <i>a</i> – CS
	1213_02 1213_03	Nutrients and/or Chl <i>a</i> – CS
Big Elm Creek	1213A_01	Bacteria – NS
Little Elm Creek	1213B_01	DO – CN Nutrients and/or Chl <i>a</i> – CS
Unnamed Tributary of Little Elm Creek	1213C_01	Nutrients and/or Chl <i>a</i> – CS Habitat – CS
San Gabriel River	1214_01	Bacteria – NS Cl, SO ₄ – NS Nutrients and/or Chl <i>a</i> – CS
	1214_02	Cl, SO ₄ – NS
Brushy Creek	1244_01	Bacteria – CN Nutrients and/or Chl <i>a</i> – CS
	1244_03	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS
	1244_04	Bacteria – NS
Granger Lake	1247_01 1247_02 1247_03	Nutrients and/or Chl <i>a</i> – CS
Willis Creek	1247A_01	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS Macrobenthics – CS
San Gabriel/North Fork San Gabriel River	1248_01	Nutrients and/or Chl <i>a</i> – CS Cl – NS
Huddleston Branch	1248B_01	Bacteria – CN

Water Body	Segment	Parameter(s) Impairment and/or Concern
Mankins Branch	1248C_01	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS Habitat – CS
South Fork San Gabriel River	1250_01	Macrobenthics – CS
	1250_03	DO – CS

Little River (Segment 1213)

The Little River is on the 2012 303(d) List for a bacterial impairment and possesses a concern for nitrate and chlorophyll *a*. The upper (from the confluence with Boggy Creek to the confluence with the Leon and Lampasas Rivers: 1213_04) and lower (from the confluence with the Brazos River to the confluence with the City of Cameron WWTP receiving water: 1213_01) portions of the Little River are listed as impaired for bacteria and the entire river has a concern for nitrate nitrogen. 1213_01 also has concern for chlorophyll *a*. The immediate watershed to segment 1213 is dominated by agricultural activities. Nitrogen concerns in this segment are most likely from a combination of localized agricultural runoff and inflow from the San Gabriel River and Brushy Creek which both have nutrient concerns. The elevated bacteria count is likely a result of runoff from agricultural lands, wildlife waste, and municipal discharges.

Big Elm Creek (Segment 1213A)

The portion of Big Elm Creek from the confluence with the Little River to the confluence with Little Elm Creek (1213A_01) is impaired for elevated bacteria concentrations.

Little Elm Creek (Segment 1213B)

The portion of Little Elm Creek from the confluence with Big Elm Creek to the confluence with Williamson Branch (1213B_01) has concerns for depressed DO and elevated nitrate concentrations.

Unnamed tributary of Little Elm Creek (Segment 1213C)

The unnamed tributary of Little Elm Creek has concern for habitat and orthophosphorus.

San Gabriel River (Segment 1214)

The San Gabriel River is listed as impaired for bacteria with concerns for nitrate, orthophosphorus and total phosphorus in the portion from the confluence with the Little River to the confluence with Alligator Creek (1214_01). The entire segment is impaired

for chloride and sulfate. Bacteria and nutrient issues are most likely caused by a combination of agricultural runoff, municipal discharges and on-site sewage facilities. The source of the dissolved solids impairment is currently unknown but may be a result of the high use of water softeners by residential properties in the upper portion of the San Gabriel's watershed. Most wastewater treatment systems in the state are not equipped to remove the high levels of dissolved solids generated by water softeners. When high levels of dissolved solids come to the treatment facility from residential properties they are passed through and discharged into lakes and streams.

Brushy Creek (Segment 1244)

The portion of Brushy Creek from the confluence with Cottonwood Branch to the confluence with Brushy Creek above South Brushy Creek (1244A) and South Brushy Creek (1244D) is on the 2012 303(d) List for a bacterial impairment (1244_03 and 1244_04). Concerns for elevated nutrients including nitrate, orthophosphate and total phosphorus exist in Brushy Creek as well. Both elevated bacteria levels and nutrient levels in Brushy Creek are attributed to municipal discharges and urban runoff. An [RUAA](#) has been conducted in segment 1244 and [results](#) have led to the recommendation is that the segment remain classified as a Primary Contact Recreation (PCR) segment.

Granger Lake (Segment 1247)

Lake Granger is in full support of all of its designated uses but a concern for elevated nitrate levels exists.

Willis Creek (Segment 1247A)

Willis Creek is identified on the 2012 303(d) List as possessing bacterial impairments and as having concern for the macrobenthic community and elevated nitrate. The watershed in the immediate vicinity of both Lake Granger and Willis Creek is highly utilized for agriculture, and runoff from these fields is the most likely source of both bacteria and nutrients into the lake. An [RUAA](#) has been completed for 1247A and is under review.

San Gabriel/North Fork San Gabriel River (Segment 1248)

The San Gabriel/North Fork San Gabriel River is in full support of all of its designated uses but has a concern for nitrate. There is a high rate of development and construction activities occurring either in the river channel itself or immediately adjacent to the river.

Huddleston Branch (Segment 1248B)

Huddleston Branch possesses a concern for elevated bacteria.

Mankins Branch (Segment 1248C)

Mankins Branch is identified on the 2012 303(d) List as impaired due to elevated bacteria concentrations. Concerns exist for elevated nitrate, orthophosphorus, total phosphorus and habitat. Issues in these unclassified segments are most likely a combination of municipal discharges and urban runoff. An [RUAA](#) has been completed for 1248C and is under review.

Lake Georgetown (Segment 1249)

Lake Georgetown is not listed for any concerns or impairment.

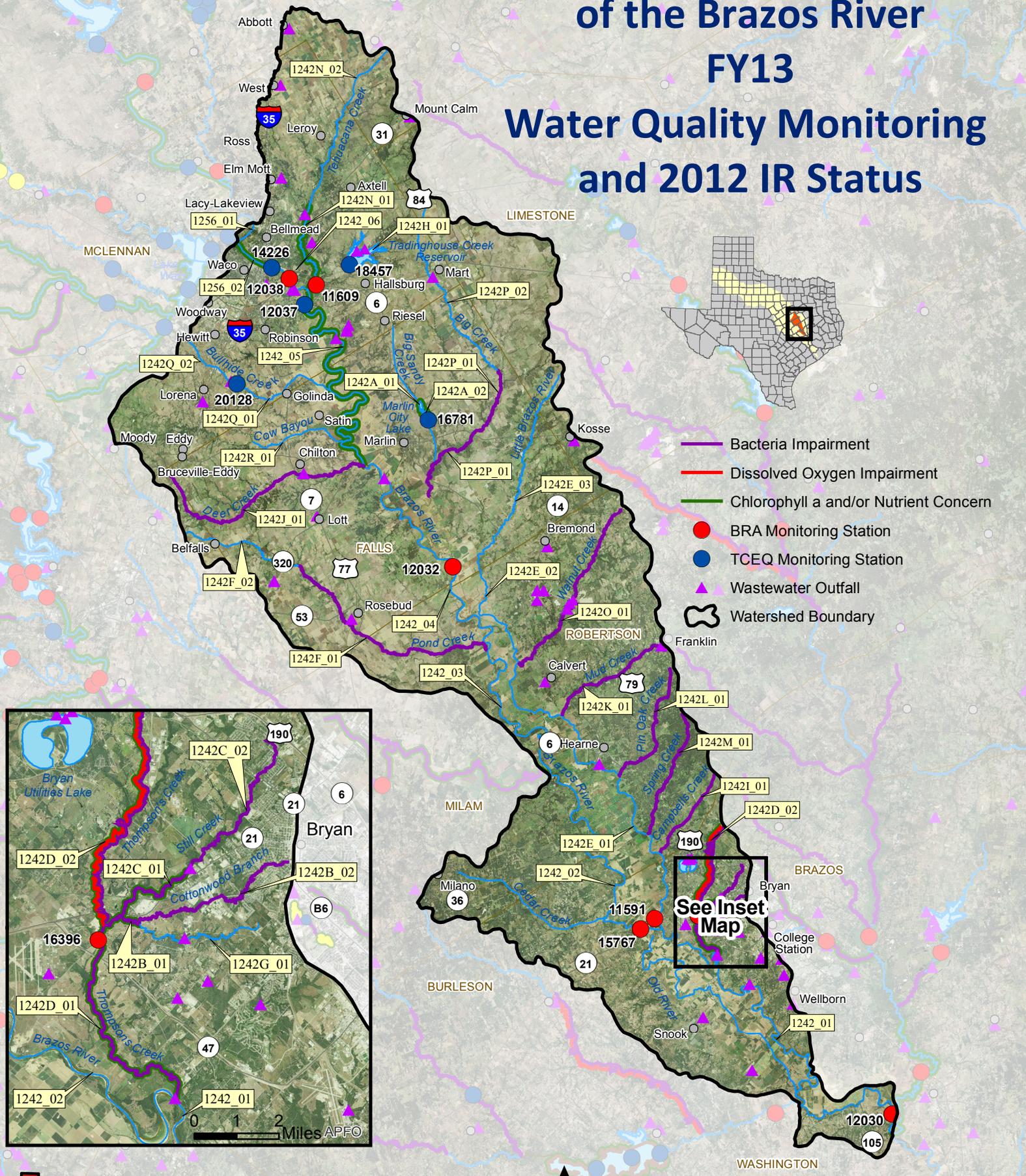
South Fork San Gabriel River (Segment 1250)

The portion of the segment from the Williamson CR 279 crossing to the upper end of the segment has a concern for depressed DO. This DO concern is caused by frequent low water levels which hinder the water's ability to buffer against high ambient air temperatures in the summer and fall reducing the capacity to maintain DO levels. There is also a concern for the macrobenthic community in the portion from the confluence with the San Gabriel River upstream approximately 0.09 miles to an unnamed tributary.

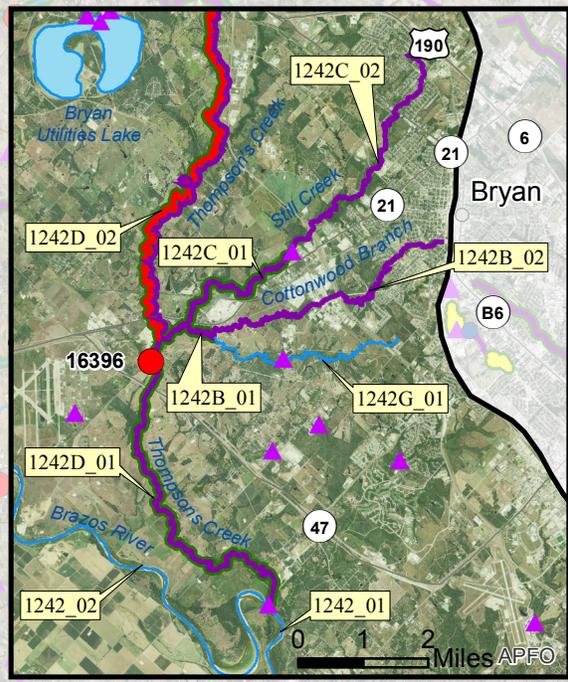
North Fork San Gabriel River (Segment 1251)

The North Fork San Gabriel River is not listed for any concerns or impairment.

Central Watershed of the Brazos River FY13 Water Quality Monitoring and 2012 IR Status



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



See Inset Map

Central Watershed of the Brazos River Basin

Water Body	Segment	Parameter(s) Impairment and/or Concern
Brazos River/Lake Brazos	1256_02	Nutrients and/or Chl <i>a</i> – CS
Brazos River Above Navasota River	1242_05	Nutrients and/or Chl <i>a</i> – CS
Marlin City Lake System	1242A_01 1242A_02	Nutrients and/or Chl <i>a</i> – CS
Cottonwood Branch	1242B_01	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS
	1242B_02	Bacteria – NS
Still Creek	1242C_01	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS
	1242C_02	Bacteria – NS
Thompsons Creek	1242D_01	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS Fish Community – CN
	1242D_02	Bacteria – NS DO – NS Macrobenthics – CN Nutrients and/or Chl <i>a</i> – 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 Macrobenthics – CN
Mud Creek	1242K_01	Bacteria – NS
Pin Oak Creek	1242L_01	Bacteria – NS
Spring Creek	1242M_01	Bacteria – NS

Water Body	Segment	Parameter(s) Impairment and/or Concern
Tehuacana Creek	1242N_01	DO – CS Nutrients and/or Chl <i>a</i> – CS Fish Kill Report – CN Macrobenthics – CN
Walnut Creek	1242O_01	Bacteria – NS Macrobenthics – CN
Big Creek	1242P_01	Bacteria – NS

Brazos River above Navasota (Segment 1242)

In the 2012 assessment this segment has no impairments and only the portion of the segment from the confluence with Deer Creek upstream to the confluence with Tehuacana Creek had a concern for chlorophyll *a*.

Marlin City Lake System (Segment 1242A)

For the Marlin City Lake System, orthophosphate phosphorus and elevated chlorophyll *a* pose concerns. Currently, the source of phosphorus is unknown.

Tradinghouse Reservoir (Segment 1242H) has a concern due to fish kills being reported.

Eleven tributaries to the Brazos above Navasota possess bacterial impairments, including: **Cottonwood Branch (Segment 1242B)**, **Still Creek (Segment 1242C)**, **Thompson Creek (Segment 1242D)** (also with a depressed DO impairment), **Pond Creek (Segment 1242F)**, **Campbell's Creek (Segment 1242I)**, **Deer Creek (Segment 1242J)**, **Mud Creek (Segment 1242K)**, **Pin Oak Creek (Segment 1242L)**, **Spring Creek (Segment 1242M)**, **Walnut Creek (Segment 1242O)** and **Big Creek (Segment 1242P)**. Nutrient enrichment is a concern for Cottonwood Branch, Still Creek and Thompsons Creek. In the 2012 assessment **Tehuacana Creek (Segment 1242N)** has concerns for DO, chlorophyll *a*, macrobenthic and fish kill report.

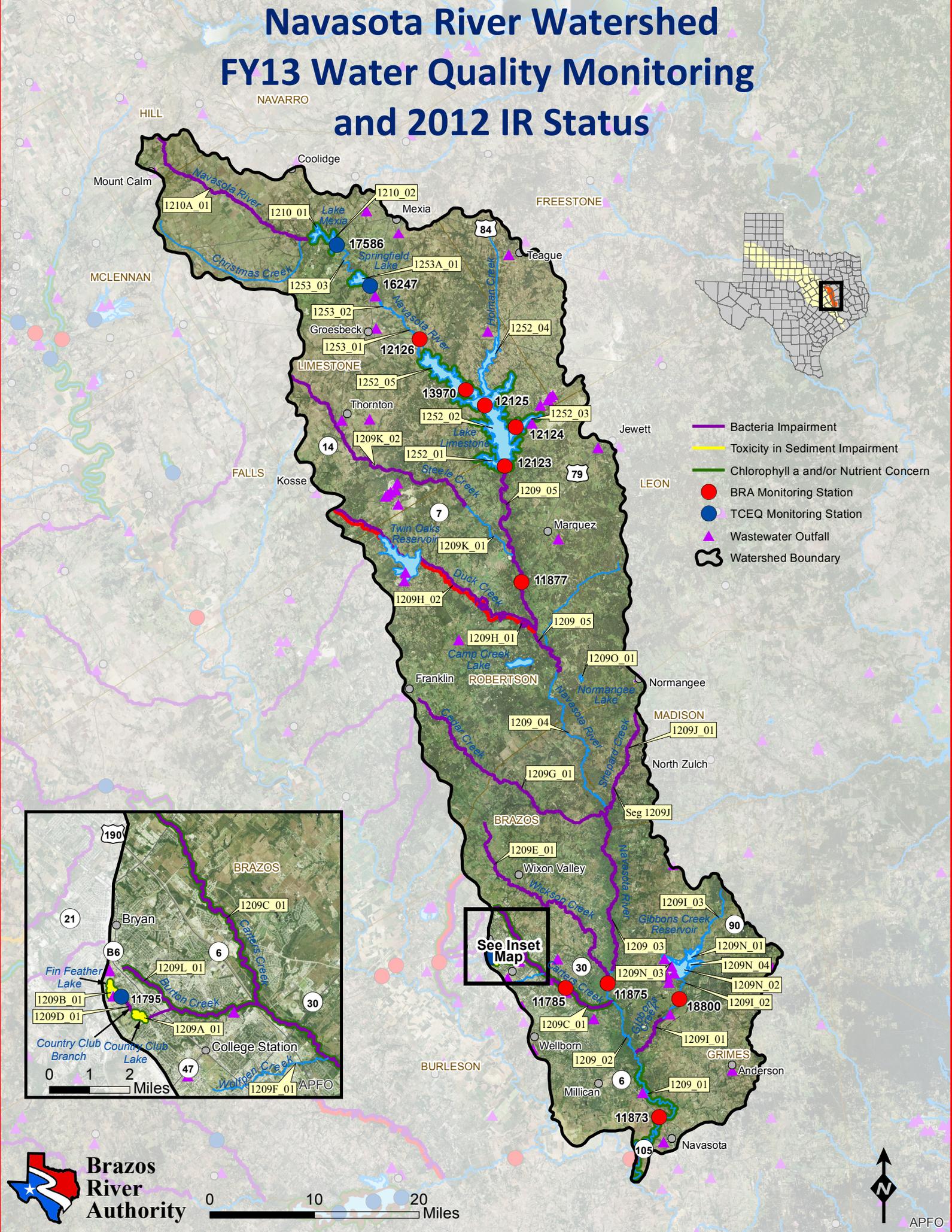
As in the case of the unclassified tributary streams in the Bosque and Leon Watersheds, many of the impaired or concern sub-segments in 1242 are small, rural streams with little to no flow for most of the year whose water is primarily generated by storm events and the associated runoff.

[RUAA's](#) have been completed and are under review for all eleven segments with bacterial impairments. A project intended to address issues in Thompson's, Deer and Tehuacana Creeks has been completed with results becoming available in August 2013.

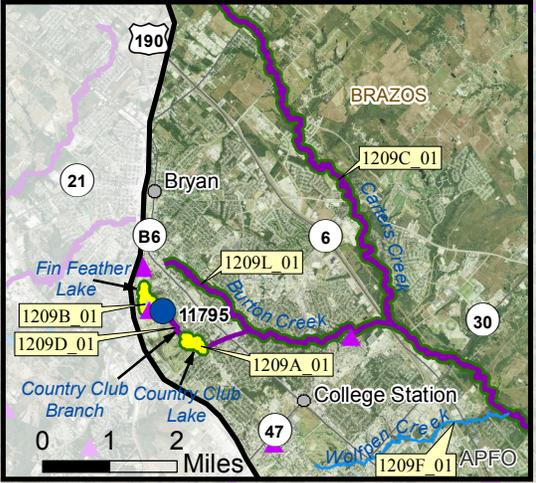
Brazos River/Lake Brazos (Segment 1256)

The Brazos River/Lake Brazos is listed having concerns for chlorophyll *a*, and nitrate nitrogen in the Lake Brazos portion of the segment. Elevated chlorophyll *a* levels are most likely a result of municipal discharges and urban runoff, both which can transport high levels of nutrients to waterbodies.

Navasota River Watershed FY13 Water Quality Monitoring and 2012 IR Status



- Bacteria Impairment
- Toxicity in Sediment Impairment
- Chlorophyll a and/or Nutrient Concern
- BRA Monitoring Station
- TCEQ Monitoring Station
- ▲ Wastewater Outfall
- Watershed Boundary



Navasota River Watershed

Water Body	Segment	Parameter(s) Impairment and/or Concern
Navasota River Below Lake Limestone	1209_01	DO – CS Nutrients and/or Chl <i>a</i> – CS
	1209_02	DO – CS Bacteria – NS
	1209_03 1209_05	Bacteria – NS
Country Club Lake	1209A_01	Toxicity Sediment – NS Nutrients and/or Chl <i>a</i> – CS
Fin Feather Lake	1209B_01	Toxicity Sediment – NS Nutrients and/or Chl <i>a</i> – CS
Carters Creek	1209C_01	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS
Country Club Branch	1209D_01	Bacteria – NS
Wickson Creek	1209E_01	Bacteria – NS
Cedar Creek	1209G_01	Bacteria – NS DO – CS Habitat – CS
Duck Creek	1209H_01 1209H_02	Bacteria – NS DO – NS
Gibbons Creek	1209I_01	Bacteria – NS DO – CS
	1209I_02	Bacteria – CN
Shepherd Creek	1209J_01	Bacteria – NS DO – CN
Steele Creek	1209K_02	Bacteria – NS
Burton Creek	1209L_01	Bacteria – NS Nutrients and/or Chl <i>a</i> – CS

Water Body	Segment	Parameter(s) Impairment and/or Concern
Normangee Lake	1209O_01	Nutrients and/or Chl <i>a</i> – CS
Lake Mexia	1210_01	DO – CS Nutrients and/or Chl <i>a</i> – CS
	1210_02	Nutrients and/or Chl <i>a</i> – CS
Navasota River Above Lake Mexia	1210A_01	Bacteria – NS
Lake Limestone	1252_01	Nutrients and/or Chl <i>a</i> – CS
	1252_02	
	1252_03	
	1252_05	
Navasota River Below Mexia	1253_01	DO – CS
	1253_02	
Springfield Lake	1253A_01	DO – CN Nutrients and/or Chl <i>a</i> – CS

Navasota River Below Lake Limestone (Segment 1209)

The Navasota River below Lake Limestone is listed on the 2012 303(d) List as impaired for contact recreation due to elevated bacteria levels in the portions from the confluence with Sandy Branch to the confluence with Shepherd Branch in Madison County (1209_03) and in the portion from the confluence with Camp Creek upstream to Lake Limestone Dam in Robertson County (1209_05). Sources of bacteria may include stormwater inflow from tributary streams, runoff from agricultural lands, municipal discharges, wildlife runoff and on-site sewage facilities. Concerns also exist for depressed DO, and elevated nitrate and orthophosphorus. An [RUAA](#) has been conducted in segment 1209 and [results](#) have led to the recommendation is that the segment remain classified as a Primary Contact Recreation 1 (PCR) segment.

There are nine tributaries that likely contribute to this segment’s impairments.

Carter’s Creek (Segment 1209C), Country Club Branch (Segment 1209D), Wickson (Segment 1209E), Cedar (Segment 1209G), Duck (Segment 1209H), Gibbons (Segment 1209I), Shepherd (Segment 1209J), Steele (Segment 1209K), and Burton (Segment 1209L) Creeks all have impairments for their recreation use designation due to elevated bacteria levels. Duck Creek also has an impairment for depressed DO. Carter’s Creek and Burton Creek both have concerns for nutrients, while Cedar, Gibbons and Shepherd Creeks have concerns for depressed DO. Carter’s Creek and Burton Creek are both strongly influenced by municipal discharges that are

most likely the source of both elevated bacteria and nutrients. An [implementation plan](#) is currently funded and in process to address issues in Carter's Creek. [RUAAs](#) have been completed and are in review for all of the Segment 1209 unclassified segments with bacterial concerns.

Country Club (Segment 1209A) and Fin Feather Lake (Segment 1209B) both have impairments for their aquatic use designation due to toxic sediments. These impairments are mostly a remnant from historically poor industrial practices. Country Club Lake also possesses concerns for phosphates while Fin Feather Lake possesses an additional concern for chlorophyll α . A [TMDL](#) was completed on these segments in 2003.

Lake Mexia (Segment 1210)

Lake Mexia has no impairment, but is listed as having concerns for low DO, chlorophyll α , orthophosphorus and total phosphate. Nutrient concerns are attributable to runoff from wildlife and agricultural lands. Low DO levels are most likely attributable to elevated chlorophyll α levels and advanced sedimentation which has significantly reduced the reservoirs capacity.

The Navasota River above Lake Mexia (Segment 1210A)

The Navasota River above Lake Mexia is listed as impaired due to bacteria. Potential sources of bacteria include: on-site sewage facilities, wildlife wastes, and runoff from residential areas and agricultural lands. An [RUAA](#) has been conducted in segment 1209 and [results](#) have led to the recommendation is that the segment be reclassified as a Secondary Contact Recreation 1 (SCR1) segment.

Lake Limestone (Segment 1252)

Lake Limestone has no impairment, however all but the Big Creek Arm portion of the lake possess concerns for chlorophyll α .

Navasota River Below Lake Mexia (Segment 1253)

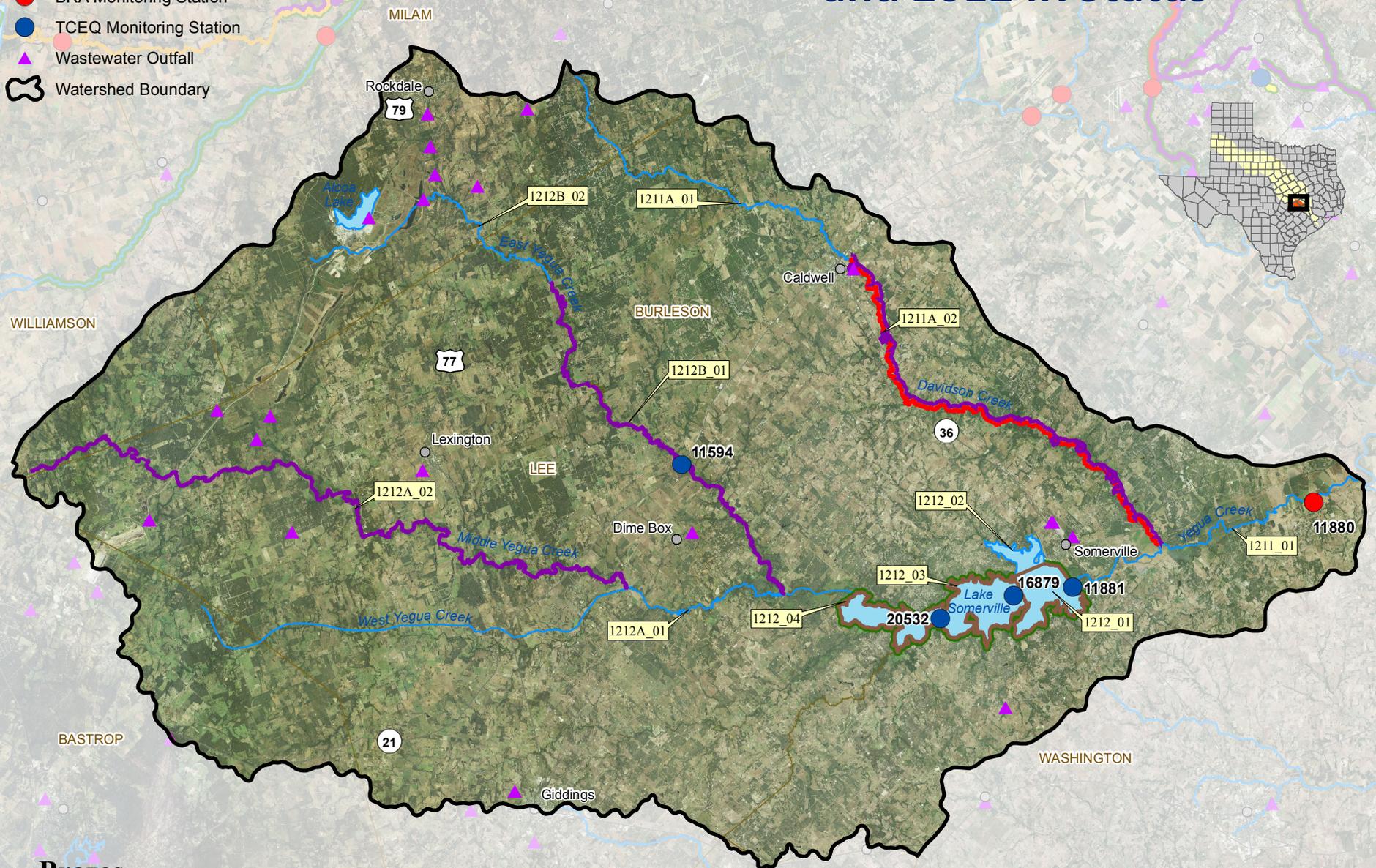
There are concerns for depressed DO on the portion of the river from the headwaters of Lake Limestone upstream to Springfield Lake. This DO impairment is caused by frequent low water levels which hinder its ability to buffer against high ambient air temperatures in the summer and fall reducing the water's capacity to maintain DO levels.

Springfield Lake (Segment 1253A)

Springfield Lake is in full support of all of its uses, but there is a concern for elevated levels of ammonia, nitrate, orthophosphorus, and depressed DO. The cause of depressed DO is likely the elevated chlorophyll α levels due to nutrient rich runoff entering the river and lake.

Yegua Creek Watershed FY13 Water Quality Monitoring and 2012 IR Status

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



Yegua Creek Watershed

Water Body	Segment	Parameter(s) Impairment and/or Concern
Davidson Creek	1211A_02	Bacteria – NS DO – NS
Somerville Lake	1212_01	DO – NS
	1212_03	High pH – NS Nutrients and/or Chl <i>a</i> – CS
	1212_04	
Middle Yegua Creek	1212A_02	Bacteria – NS DO – CS Fish Community – CN Habitat – CS
East Yegua Creek	1212B_01	Bacteria – NS

Yegua Creek (Segment 1211)

Yegua Creek is not listed for any concerns or impairment.

Davidson Creek (Segment 1211A)

Davidson Creek is impaired due to elevated bacteria levels and depressed DO. Reminiscent of the unclassified tributary streams in the Central Brazos and Navasota Watersheds, Davidson Creek is a small, rural stream with little to no flow for most of the year whose water is primarily generated by storm events and the associated runoff. An [RUAA](#) has been completed and is under review.

Somerville Lake (Segment 1212)

Somerville Lake is on the 2012 303(d) List as being impaired for high pH levels and having concern for chlorophyll *a* for all areas (1212_01, 1212_03 and 1212_04) of the reservoir except the northern arm near the town of Somerville (1212_02). The western end of the reservoir (1212_04) also has a concern for orthophosphate. The extremes in pH are most likely a result of algal activity; the observed high concentrations of chlorophyll *a* may be a potential cause for fluctuations in pH. Photosynthesis and respiration are two major factors that influence the amounts of carbon dioxide in the lake, which in turn affects pH levels and DO levels. With a grant from the TCEQ, BRA is collecting additional data through the Two Data Collection Initiatives project, to gain a better

understanding of the possible causes of the elevated pH levels and depressed DO in Lake Somerville. Results of the study will be available in September 2013.

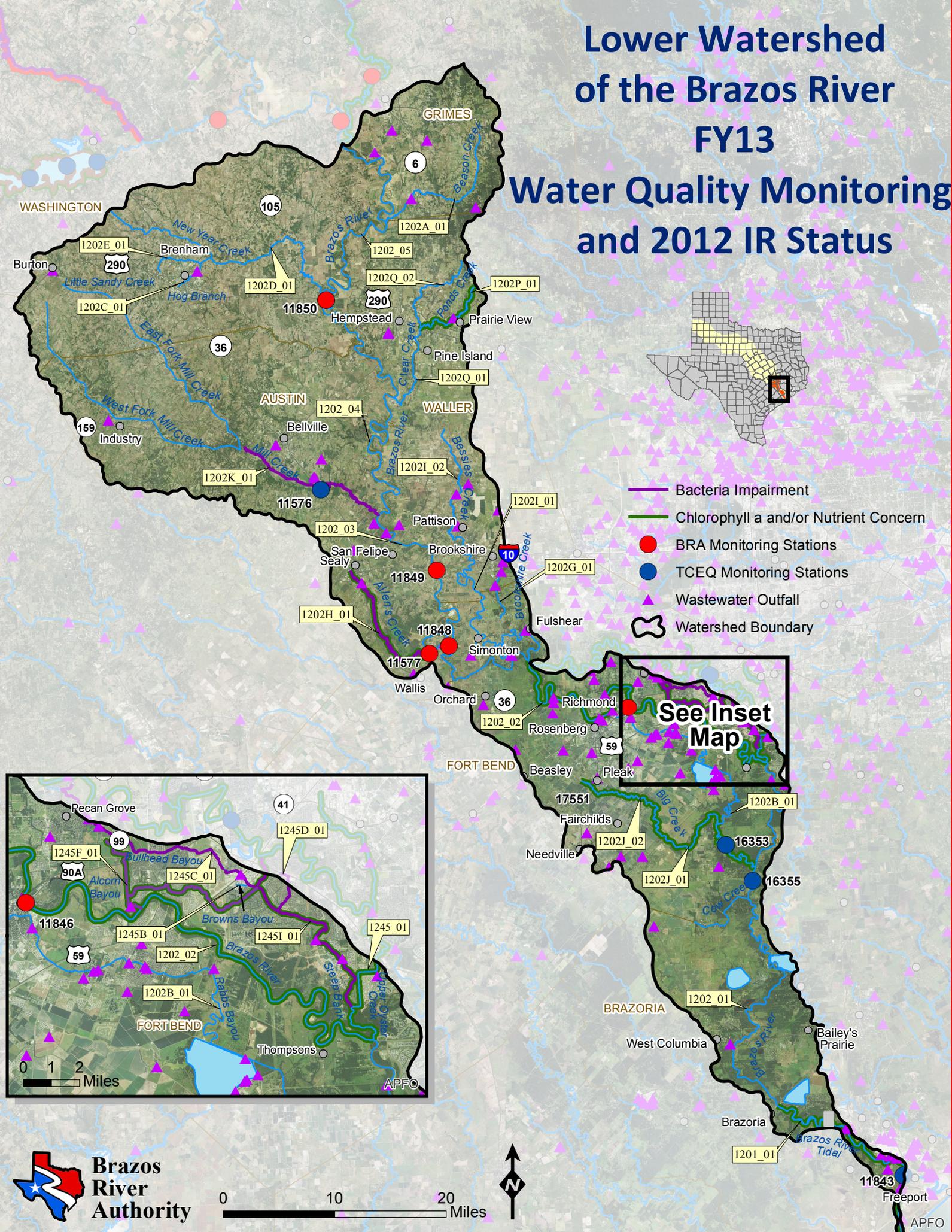
Middle Yegua Creek (Segment 1212A)

The portion of Middle Yegua Creek from the confluence with West Yegua Creek to the headwaters in Williamson County (1212A_02) is on the 2012 303(d) List as impaired for recreational use due to elevated bacteria levels and has concerns for DO, aquatic habitat and the fish community. An [RUAA](#) is planned for this segment.

East Yegua Creek (Segment 1212B)

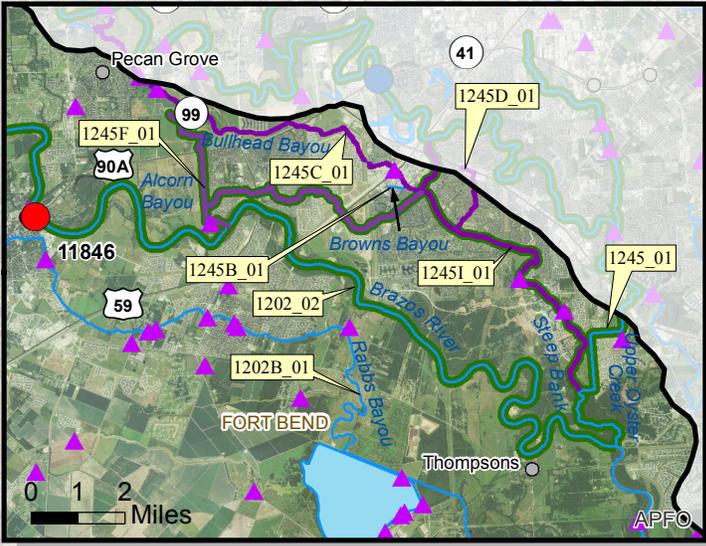
The portion of East Yegua Creek from the confluence with Middle Yegua Creek to the confluence with Allen Creek is (1212B_01) is on the 2012 303(d) List as impaired for recreational use due to elevated bacteria levels. Sources of bacteria for 1212A and 1212B may include municipal discharges and runoff from agricultural lands and wildlife. An [RUAA](#) has been conducted in segment 1212B and [results](#) have led to the recommendation is that the segment be reclassified as a Secondary Contact Recreation 1 (SCR1) segment.

Lower Watershed of the Brazos River FY13 Water Quality Monitoring and 2012 IR Status



- Bacteria Impairment
- Chlorophyll a and/or Nutrient Concern
- BRA Monitoring Stations
- TCEQ Monitoring Stations
- ▲ Wastewater Outfall
- Watershed Boundary

See Inset Map



Lower Watershed of the Brazos River Basin

Water Body	Segment	Parameter(s) Impairment and/or Concern
Brazos River Tidal	1201_01	Nutrients and/or Chl <i>a</i> – CS
Brazos River Below Navasota River	1202_02	Nutrients and/or Chl <i>a</i> – CS
Allen's Creek	1202H_01	Bacteria – NS DO – CS Nutrient – CS
Big Creek	1202J_01	Fish Community – CN Habitat – CS Nutrients and/or Chl <i>a</i> – CS
	1202J_02	Bacteria – CN Nutrients and/or Chl <i>a</i> – CS
Mill Creek	1202K_01	Bacteria – NS
Pond Creek	1202P_01	Nutrients and/or Chl <i>a</i> – 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 <i>a</i> – CS
Steep Bank Creek	1245I_01	Bacteria – NS DO – CS Nutrients and/or Chl <i>a</i> – CS

Brazos River Tidal (Segment 1201)

The Brazos River tidal segment differs from the rest of the Brazos River in that the Gulf of Mexico can have an effect on the water quality of that portion of the river. This segment does not have any water quality impairments, but there is a concern for increased chlorophyll *a*.

Brazos River Below Navasota River (Segment 1202)

The Brazos River below Navasota River is in full support of all of its designated uses but the portion of the river from the confluence with Flat Bank Creek upstream to the confluence with Bessie's Creek has a concern for chlorophyll *a*.

Allen's Creek (Segment 1202H)

Allen's Creek possesses an impairment for not supporting contact recreation use due to bacteria. There are also concerns for depressed DO and orthophosphate, total phosphorus and nitrate. An [RUAA](#) has been conducted and is under review.

Big Creek (Segment 1202J)

The portion of Big Creek from the confluence with Fairchild's Creek to the confluence with Cottonwood and Coon Creeks (1202J_02) has concerns for bacteria, orthophosphate, total phosphorus and nitrate. The portion of Big Creek from the confluence with the Brazos River to the confluence with Fairchild's Creek (1202J_01) has concerns for the fish community, aquatic habitat and chlorophyll *a*. Bacteria issues and nutrient concerns in Big Creek are most likely a result of agricultural and wildlife runoff. Like Allen's Creek, this section of the creek is shallow, with muddy bottoms and low sloping banks. There is little habitat variety in this portion of the creek which leads to low diversity in the fish community.

Mill Creek (Segment 1202K)

The portion of Mill Creek from the confluence with the Brazos River to the confluence with the East/West Forks of Mill Creek in Austin County (1202K_01) has an impairment for not supporting contact recreation use due to bacteria.

Pond Creek (Segment 1202P)

Pond Creek has a concern for orthophosphate.

Bullhead Bayou (Segment 1245C) and the Unnamed Tributary to Bullhead Bayou (Segment 1245D)

Both of these segments are not supporting for contact recreation use due to bacteria. An [RUAA](#) has been conducted in segments 1245C and 1245D. [Results](#) have led to the recommendation is that the segments be reclassified as Secondary Contact Recreation 1 (SCR1) segments.

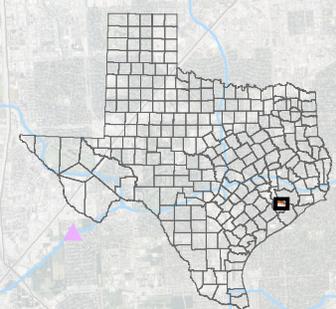
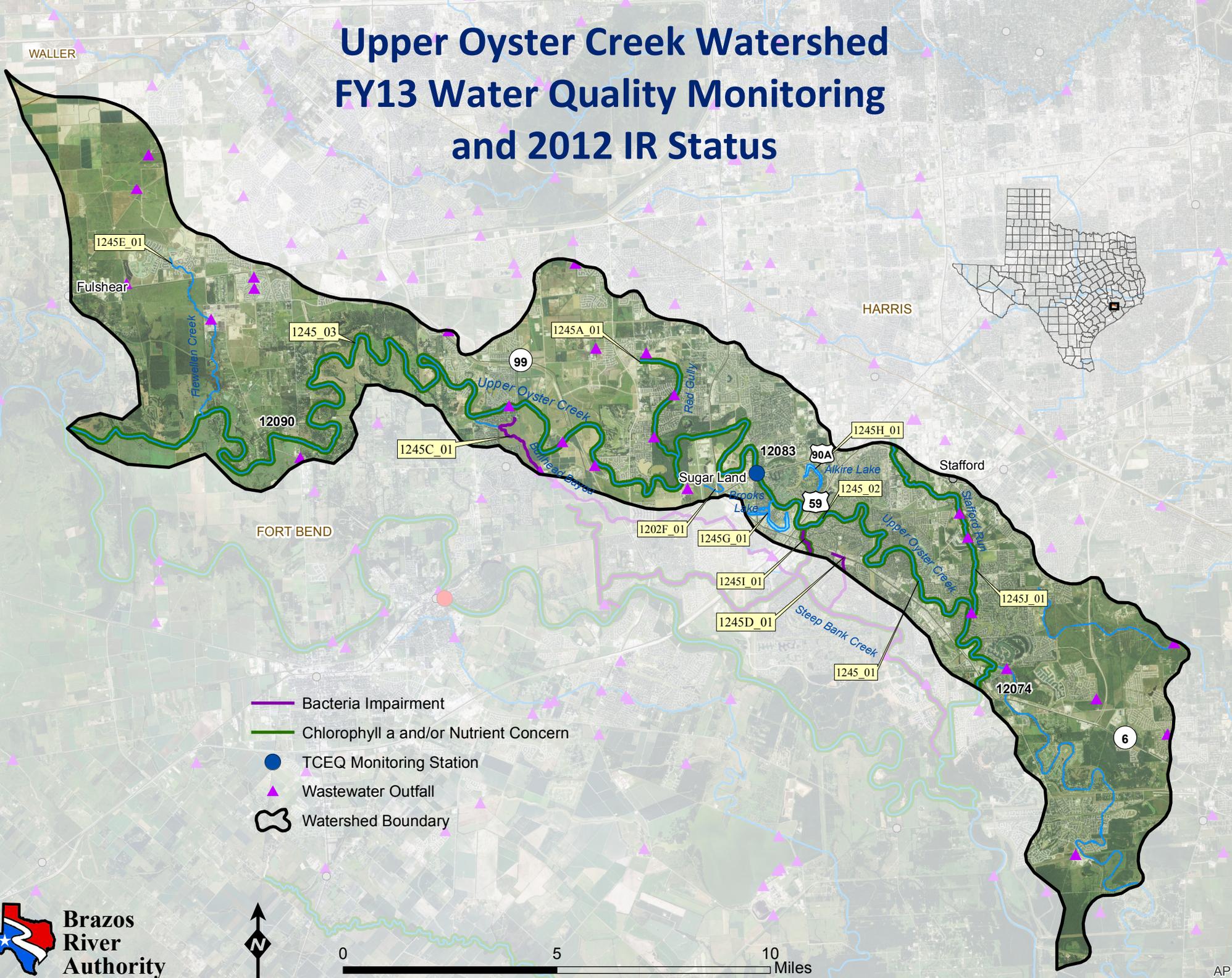
Alcorn Bayou (Segment 1245F)

Alcorn Bayou has an impairment for not supporting contact recreation use due to bacteria as well as concerns for nitrate and orthophosphorus.

Steep Bank Creek (Segment 1245I)

Steep Bank Creek has an impairment for not supporting contact recreation use due to bacteria as well as concerns for depressed DO and elevated nitrate and orthophosphorus.

Upper Oyster Creek Watershed FY13 Water Quality Monitoring and 2012 IR Status



- Bacteria Impairment
- Chlorophyll a and/or Nutrient Concern
- TCEQ Monitoring Station
- Wastewater Outfall
- Watershed Boundary



Upper Oyster Creek Watershed

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

Upper Oyster Creek (Segment 1245)

Upper Oyster Creek possesses a concerns for chlorophyll *a* concentrations, DO, nitrate and orthophosphorus. A previous bacteria impairment led to a [TMDL](#) being initiated. A [TMDL](#) for DO was approved by the EPA in September 2010.

Red Gully (Segment 1245A)

Red Gully has concerns for elevated bacteria, nitrate and orthophosphorus.

Flewellen Creek (Segment 1245E)

Flewellen Creek has a concern for elevated bacteria concentrations.

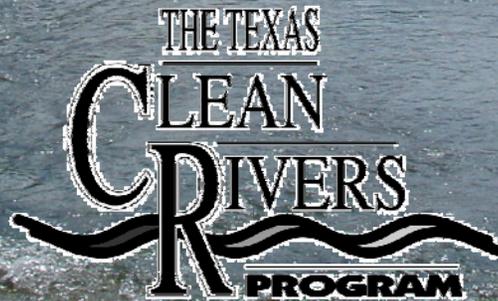
Stafford Run (Segment 1245J)

Stafford Run has a concern for elevated bacteria concentrations.

Brazos River Basin Basin Highlights Report 2013



Brazos River
Authority



Brazos River Authority
4600 Cobbs Drive
Waco, TX 76710
Phone (254) 761-3100 www.brazos.org