



Sabine River Basin Lake Fork Reservoir Watershed Characterization Report 2017

*Prepared in Cooperation with the Texas Commission on Environmental
Quality.*

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Introduction

The Lake Fork Reservoir Watershed Characterization Report describes water quality in the Lake Fork Reservoir (LFR) watershed in the Sabine River Basin. This report includes, but is not limited to, the examination of water quality monitoring data, hydrological characteristics, land use, permitted dischargers and major watershed events.

Segment 0512 – Lake Fork Reservoir

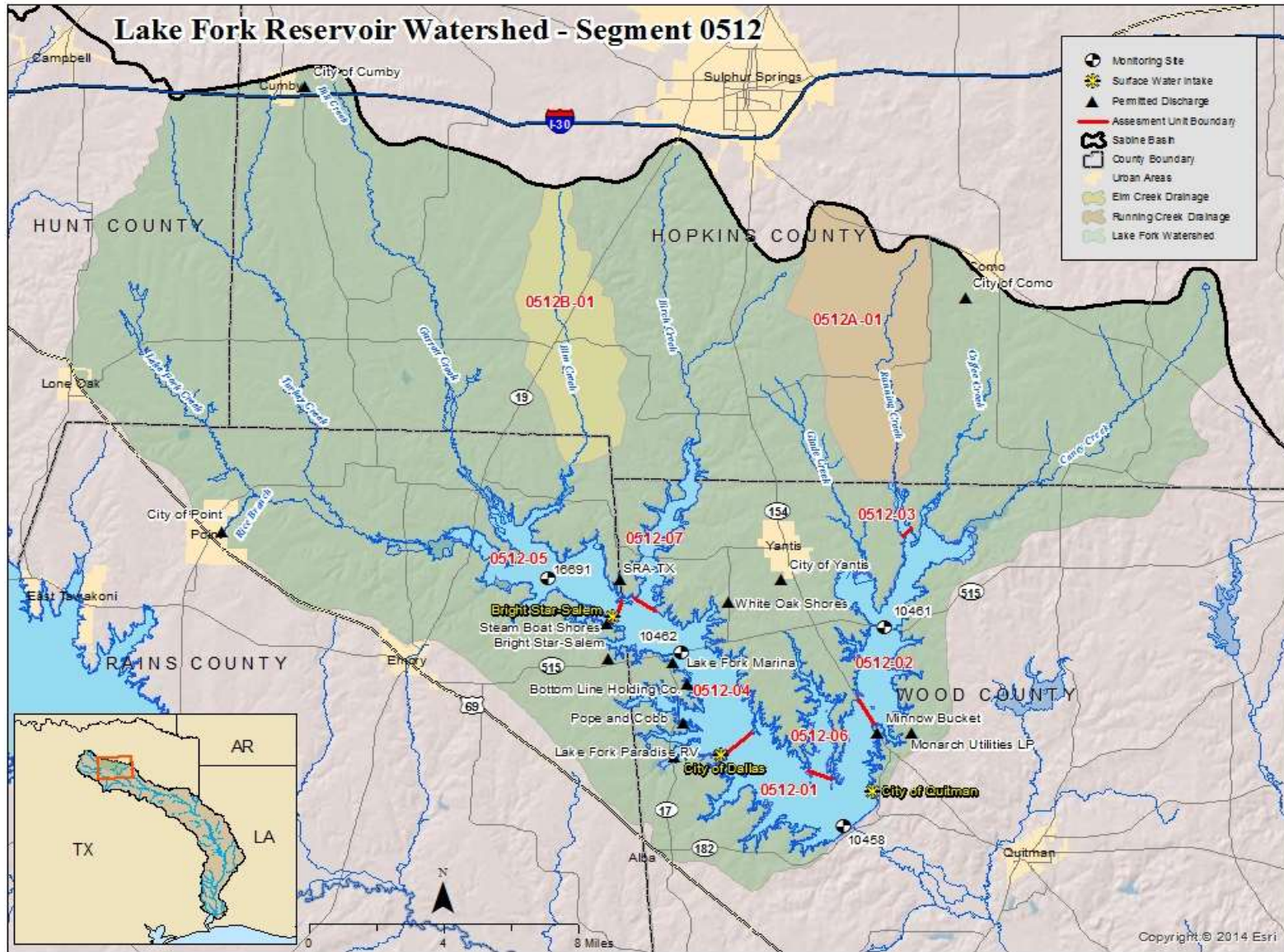
Segment Description

Segment 0512, LFR, begins at the Lake Fork Dam in Wood County up to a normal pool elevation of 403 mean sea level (msl). LFR is located thirty miles north of Tyler, Texas. It impounds Lake Fork Creek, a major tributary of the Sabine River, and inundates land in Wood, Rains, and Hopkins Counties (Figure 1). The LFR watershed is comprised of seven Texas Commission on Environmental Quality (TCEQ) assessment units (AUs). Running Creek (Segment 0512A) and Elm Creek (Segment 0512B) are unclassified water bodies in the LFR watershed and are included in this report. Each TCEQ AU ID and description of boundaries are listed in Table 1.

Table 1. LFR Watershed AUs

AU ID	AU Description
0512_01	Lake Fork from the dam up to Wood County Electric Cooperative transmission lines on the Lake Fork Creek arm and up to the SH154 crossing on the Caney Creek arm
0512_02	Lake Fork from SH154 crossing on the Caney arm up to normal pool elevation of 403 feet
0512_03	Lake Fork Running Creek arm east of Yantis
0512_04	Lower Lake Fork Creek arm from Wood County Electric Cooperative transmission lines on the Lake Fork Creek arm and up to the FM2946 crossing
0512_05	Upper Lake Fork Creek arm from the FM2946 crossing up to normal pool elevation of 403 feet
0512_06	Lake Fork Little Caney Creek arm south of Yantis
0512_07	Lake Fork Birch Creek arm west of Yantis
0512A_01	Running Creek from the confluence of Lake Fork at the Hopkins/Wood County line upstream to the headwater 400 m south of SH11 southeast of Sulphur Springs
0512B_01	Elm Creek from the confluence of Lake Fork 375 m downstream of FM514 to the headwater at Hopkins CR1110 southwest of Sulphur Springs

Figure 1. Lake Fork Reservoir Watershed Segment 0512



The Sabine River Authority of Texas (SRA-TX) currently monitors three stations and TCEQ Region 5 monitors one station within the LFR watershed. The TCEQ station IDs used for the 2014 Texas Integrated Report of Surface Water Quality¹ (IR) assessment along with their descriptions, assigned AU IDs, and monitoring entities are listed in Table 2.

Table 2. Segment 0512 Monitoring Stations

TCEQ Station ID (SRA-TX ID)	Description	AU ID	Monitoring Entity
10458 (LF2)	Lake Fork Reservoir near dam in creek channel	0512_01	SRA-TX
10462 (LF4)	Lake Fork Reservoir mid-cove Lake Fork Creek arm at FM515	0512_04	SRA-TX
10461 (LF3)	Lake Fork Reservoir mid-arm in Caney Creek arm at FM515	0512_02	SRA-TX
16691 (LF7)	Lake Fork Reservoir 3.75 km upstream of FM2946 at Buoy #63 near old Lake Fork Creek channel 32° 54' 51.7" N, 95° 41' 48.3" W	0512_05	TCEQ

Hydrological Characteristics



Lake Fork Reservoir has 315 miles of shoreline and a surface area of 27,690 acres at a conservation pool elevation of 403 feet above mean sea level (AMSL). Lake Fork, Garrett, Elm, Birch, Running, Coffee, Glade, Little Caney, and Caney Creeks are the major tributaries that contribute to the 438 square miles of the LFR drainage area (Figure 1). Running Creek, located in Hopkins County, is a perennial unclassified waterbody 12 miles in length. Elm

Creek, also located in Hopkins County, is an intermittent unclassified waterbody with pools and is 10 miles in length. Running Creek has a drainage area of 25.5 square miles and Elm Creek has 18 square miles of drainage area.

The average rainfall for the LFR watershed is 48 inches per year. The SRA-TX Lake Fork Division recorded 50.48 inches of rainfall at the Lake Fork Dam from September 2016 through August of 2017

¹ <https://www.tceq.texas.gov/waterquality/assessment/14twqi/14txir>, accessed 2/5/2018.

(FY2017). Typically, August is the driest month and April and May are the wettest months. In FY2017, the highest recorded monthly rainfall was in August, 10.47 inches, and the lowest rainfall was in March, 1.9 inches. The highest recorded reservoir elevation in FY2017 was 403.74 feet AMSL on April 30, 2017 and August 14, 2017. The lowest recorded elevation in FY2017 was 399.77 feet AMSL on December 21, 2016.

Entities that maintain water intakes and pump stations on the reservoir for public water supplies are Bright Star-Salem Special Utility District (SUD), the City of Quitman, and the City of Dallas (Figure 1). The cities of Dallas and Quitman drinking water intakes are located in AU0512_01; Bright Star-Salem SUD's drinking water intake is in AU0512_05.

LFR is one of the nation's top trophy bass lakes², drawing local, national, and international anglers. Large populations of channel and blue catfish, along with naturally occurring populations of yellow and black bass, black and white crappie, and bluegill and redear sunfish, continue to make LFR an angler favorite.

Land Use

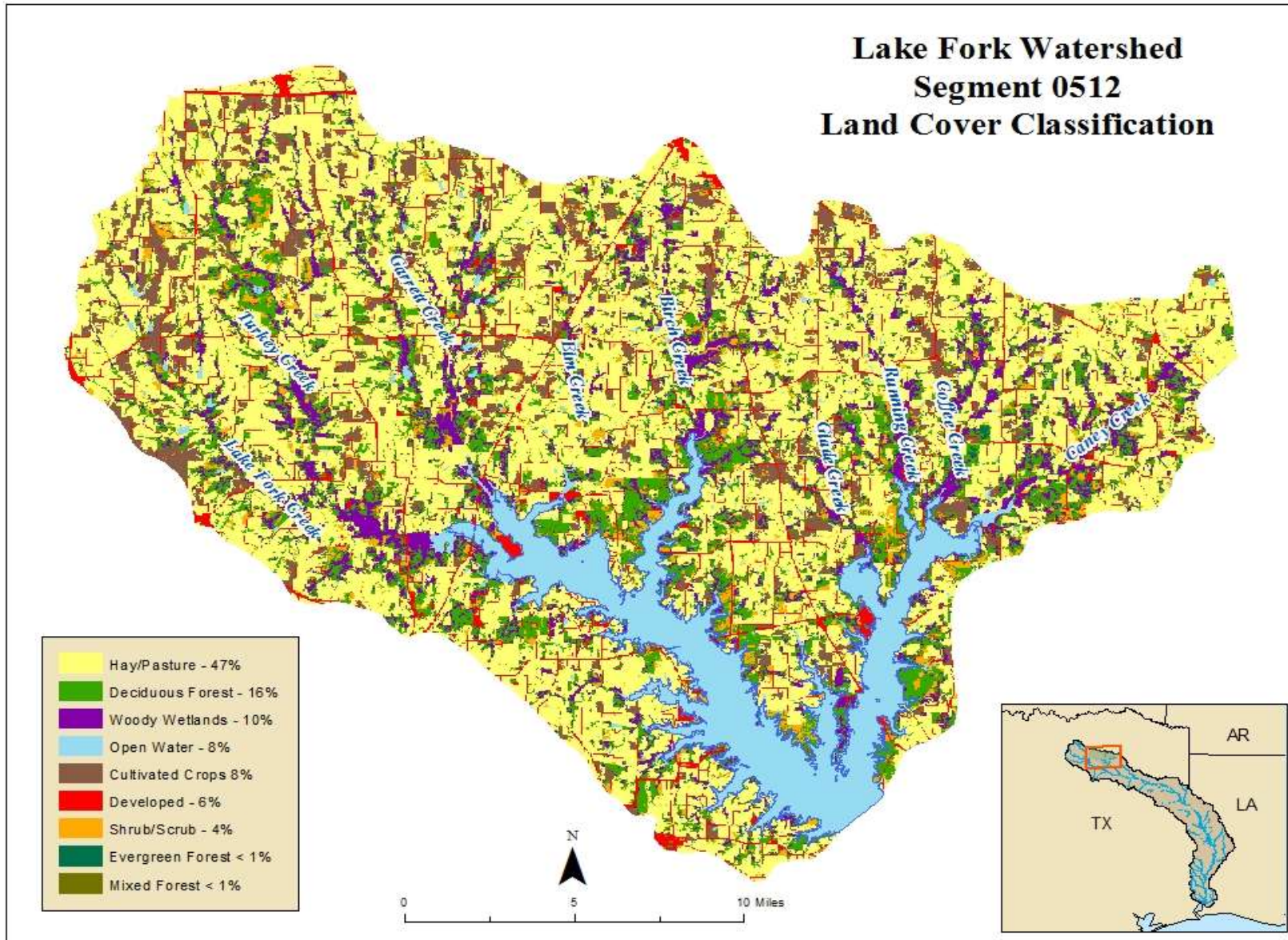
The LFR watershed is located in the East and South Central Plains Ecoregion, and the topography is characterized by rolling upland hills. Area soils exhibit sandy surface layers with clay subsoils. The City of Yantis, population 389³ is located between the Lake Fork Creek arm and Caney Creek arm on SH154. Partially located within the LFR watershed, are the cities of Como, population 696, Cumby, population 778, and Point, population 821. The watershed population is 18,484, which correlates to a density of 42 people per square mile.

Spatial analysis of the LFR watershed indicates that hay pastures, deciduous forests, woody wetlands, and open water account for 82% of land use (Figure 2). Hay pastures and deciduous forests are the dominant land cover in this watershed. Cultivated crop farming, dairy and poultry production, livestock, and oil and gas production also occur within this rural watershed. Housing developments, recreational vehicle parks, marinas, and restaurants are located on lands adjacent to the reservoir. There are no active solid waste landfills or superfund sites within the LFR watershed.

² <https://tpwd.texas.gov/fishboat/fish/recreational/lakes/fork/>, accessed 2/6/2018

³ US Census Bureau, 2010.

Figure 2. Lake Fork Reservoir Watershed 0512 Land Cover Classification



TCEQ permitted dischargers, daily discharge quantity, discharge route, and AU ID locations are listed in Table 3. See Figure 1 for all permitted dischargers, AU designated boundaries, and sample site locations.

Table 3. TCEQ Permitted Dischargers in LFR Watershed

TCEQ Permitted Discharge	Daily Discharge (MGD)	Discharge Route	AU ID
Minnow Bucket Wastewater Treatment Facility	0.012	Directly into LFR	0512_01
Monarch Utilities LP	0.025	Searcy Branch to LFR	0512_02
City of Como	0.10	Carroll Creek to LFR	0512_02
Lake Fork Paradise RV Resorts LLC	0.0245	Directly into LFR	0512_04
Pope and Cobb Corporation	0.0105	Directly into LFR	0512_04
Lake Fork Marina Inc.	0.025	Directly into LFR	0512_04
Bottom Line Holding Inc.	0.025	Directly into LFR	0512_04
White Oak Shores Sewer Corporation	0.011	Unnamed Tributary to LFR	0512_04
Bright Star-Salem SUD	0.035	Unnamed Tributary to LFR	0512_04
Steamboat Shores Owners Association	0.0135	Directly into LFR	0512_05
City of Point	0.04	Rice Branch to Lake Fork Creek to LFR	0512_05
City of Cumby	0.12	Big Creek to Garrett Creek to LFR	0512_05
SRA-TX	0.0295	Six Acre Pond to LFR	0512_05
City of Yantis	0.042	Ditch to Little Caney Creek to LFR	0512_06

Potential Stakeholders

Potential stakeholders and entities with possible interest in this watershed are as follows:

- AgriLife Extension
- Bright Star-Salem SUD
- City of Dallas
- City of Como
- City of Cumby
- City of Emory
- City of Gladewater
- City of Henderson
- City of Kilgore
- City of Longview
- City of Point
- City of White Oak
- City of Yantis
- Commercial Marina / RV Park Operators
- Eastman Chemical Company
- Fishing Clubs / Anglers
- Hopkins County Officials
- Landowners / Citizens
- Permitted Dischargers
- Railroad Commission of Texas
- Rains County Officials
- SRA-TX
- TCEQ
- Texas Department of Agriculture
- Texas Department of Transportation
- Texas Forest Service
- Texas Parks and Wildlife Department
- Texas Soil and Water Conservation Board
- Texas Water Development Board
- USDA Natural Resource Conservation Service
- United States Environmental Protection Agency
- United States Geological Survey
- Wood County Industrial Commission
- Wood County Officials
- Wood - Rains and Hopkins Soil and Water Conservation District

Impairment / Area of Interest

The 2014 IR assessment, which included water quality data collected from 12/1/2005 through 11/30/2012, indicated no impairments in Lake Fork Reservoir. Screening level concerns for chlorophyll-a (Chl-a) were indicated in the Caney Creek Arm (AU0512_02). The assessment included 77 Chl-a values with a mean of 36.7 µg/L.

The upper portion of the Lake Fork Creek arm, (AU0512_05), had a Concern for Near Non-Attainment for pH, based on the Texas Surface Water Quality Standards (TSWQS) numeric criteria,

and a Concern for Chl-a, based on nutrient screening levels. The pH assessment included 28 values with a mean of 9.35, which exceeds the TSWQS of 9.00 pH units. There were four single grab exceedances for pH. The Chl-a assessment included 23 values with a mean of 39.36 $\mu\text{g/L}$.

Running Creek, first listed in 2002, is on the 2014 IR 303(d) List for bacteria. The Non-Supporting assessment for bacteria was carried forward from the 2012 IR. A “carryforward” designation signifies that previously listed impairments did not have adequate data to reassess and are carried forward from a previous assessment. The 2014 IR assessment results for bacteria indicated a geometric mean of 244 most probable number (MPN)/100 mL, which exceeds the TSWQS of 126 MPN/100 mL. This impairment is currently classified as Category 5b, which implies that a review or possible revision of the standards will be conducted prior to a management strategy being chosen. Running Creek also had a Concern for Screening Level for nitrate, ammonia and depressed dissolved oxygen (DO).



Elm Creek, first listed in 2002, is on the 2014 IR 303(d) List for bacteria. The Non-Supporting assessment for bacteria was carried forward from the 2012 IR and is also classified as Category 5b. Elm Creek also had a Concern for Near Non-Attainment for depressed DO grab minimum, and a Concern for Screening Level for ammonia and depressed DO grab.

Recreational Use Attainability Analyses (RUAA) were completed on Running and Elm Creeks during the summers of 2010 and 2011. A RUAA is conducted to assess recreation use and determine if the appropriate standard has been applied to the water body.



The RUAA findings support the TSWQS aquatic recreation designated use revision of Running and Elm Creeks from primary contact recreation (PCR) to secondary contact recreation 1 (SCR1). A PCR designated use involves recreation activities that involve a significant risk of water ingestion. A SCR1 designation use involves recreation activities that do not involve a significant risk of water ingestion. The initial 30-day public comment period has closed for these waterbodies, but the public will have an additional opportunity to comment on TCEQ's recommendations before any changes are made to the aquatic recreational

use designations in the TSWQS. TCEQ RUAA recommendations concerning these waterbodies can be viewed at: <https://www.tceq.texas.gov/waterquality/standards/ruaas/ruaassabine>.

Possible Causes of Impairment or Interest

Nonpoint source runoff is a probable source of bacteria impairments in Running and Elm Creeks. Nonpoint bacteria sources within this watershed include agriculture, wildlife, and private septic systems. Agricultural sources include livestock grazing and the use of chicken litter and cow manure to fertilize hay pastures. This rural watershed has large populations of wildlife including feral hogs, beaver, otter, and deer.

Point source effluents from permitted dischargers include water treatment backwash and wastewater from domestic and municipal sources. Due to a low number of upstream dischargers, nonpoint source runoff is a probable contributor to the Concern for Screening Level assessment for Chl-a in the Caney Creek arm (AU0512_02), as well as for pH and Chl-a concerns in the upper portion of the Lake Fork Creek arm (AU0512_05).

Major Watershed Events

The SRA-TX continues to partner with the Texas Parks and Wildlife Department (TPWD) in control efforts and education campaigns surrounding LFR to reduce the spread of giant salvinia, water hyacinth, and zebra mussels. On November 18, 2015, giant salvinia was first discovered on LFR in the Chaney Branch arm. SRA-TX and TPWD took immediate action to confine the plant by closing the nearest boat ramp and placing a floating boom across the Chaney Branch arm. Mechanical removal efforts began immediately and TPWD has performed multiple herbicide treatments. TPWD also treated over 150 acres of water hyacinth on LFR in 2017.

The United States Geological Survey (USGS) monitors LFR for the presence of zebra mussels. The TPWD has classified LFR as “suspect for the presence of zebra mussels” after one veliger (zebra mussel larval stage) was collected and identified by USGS in November 2015. To date, no adult zebra mussels have been detected. Additional information concerning Texas invasive species can be found at: <http://www.texasinvasives.org/> and <https://tpwd.texas.gov/huntwild/wild/species/exotic/>.

Recommendations

The SRA-TX will continue to monitor LFR monthly at TCEQ stations 10458 (LF2), 10462 (LF4), and 10461 (LF3). TCEQ Station 16691 (LF7) is scheduled to be monitored quarterly by TCEQ Region 5 personnel. Running Creek and Elm Creek are scheduled for monthly bacteria sampling by TCEQ Region 5 personnel. Monitoring and sampling plans for the LFR watershed will be discussed during the 2018 Coordinated Monitoring Meeting.

The Sabine Basin Steering Committee allows stakeholders to have an active role in addressing water quality concerns and monitoring in the Sabine Basin. The Basin Steering Committee and Coordinated Monitoring meetings are held yearly to encourage participation and to receive recommendations from stakeholders in the Basin.

