

# LAVACA BASIN 2024 WATERSHED SUMMARY



*Prepared by the  
Lavaca-Navidad River Authority (LNRA)  
PO Box 429, Edna, TX 77957*

*Prepared in cooperation with the Texas Commission on Environmental Quality  
The preparation of this report was financed in part through funding from the  
Texas Commission on Environmental Quality (TCEQ)*

## TABLE OF CONTENTS

	Page
Acronyms	3
Executive Summary	4
Segment 1602 – Lavaca River Above Tidal	8
Unclassified Segment 1602B - Rocky Creek	11
Unclassified Segment 1602C - Lavaca River Above Campbell Branch	12
<u>Figures:</u>	
Figure 1 – A dry Rocky Creek	5
Figure 2 – Lavaca River in Hallettsville	6
Figure 3 – Lavaca River at State Highway 111	7
Figure 4 – Segment 1602 Impairments	10
Figure 5 – Trash in Rocky Creek	11
Figure 6 – Cow in Rocky Creek	12
Figure 7 – Unclassified Segment 1602C Dissolved Oxygen Impairment	14

## LIST OF ACRONYMS

AU	Assessment Unit (a hydrologically distinct reach of a segment)
BST	Bacteriological Source Tracking
FM	Farm-to-Market Road
FY	Fiscal Year
IR	Integrated Report
LNRA	Lavaca-Navidad River Authority
MGD	Million Gallons per Day
mg/L	Milligrams per Liter
MPN	Most Probable Number
OSSF	Onsite Sewage Facility
RUAA	Recreational Use Attainability Analysis
SH	State Highway
WPP	Watershed Protection Plan
WWTF	Wastewater Treatment Facility

## Executive Summary

The Lavaca River watershed is located along the Texas Gulf Coast primarily in the counties of Lavaca, Jackson, and DeWitt. It spans approximately 910 square miles, with its headwaters starting north of the City of Moulton, in Lavaca County before discharging into the mouth of Lavaca Bay near the City of Point Comfort in Calhoun County. The watershed is largely rural with a land use dominated by agriculture including rangeland, pasture and hayfields, and row crop production. Urban development is limited to the small towns of Moulton, Hallettsville, Shiner, Yoakum, and Edna. The combination of a flat coastal plain and low soil permeability predisposes the watershed to frequent flooding during rainfall events, contingent upon antecedent conditions. The Lavaca River is a typical Texas river in that its annual hydrograph can be characterized by extended low flow periods punctuated by flooding events. The Lavaca Basin falls within the West Gulf Coast Section of the Coastal Plain Physiographic Province. Within this Basin, various land resource areas are present, including the Blackland Prairie, Claypan, and Coastal Prairie. Each of these land resource areas has distinct soil types, vegetation, and characteristics that influence land use, agriculture, and ecological dynamics within the Basin. The watershed is comprised of several smaller contributing watersheds including Rocky Creek, Big Brushy Creek, and Dry Creek.

The Lavaca River originates above Moulton in Gonzales County and flows southeast approximately 116 river miles before discharging into Lavaca Bay. It is comprised of three segments — the most upstream segment-Unclassified Segment 1602C (Lavaca River above Campbell Branch), segment 1602 (Lavaca River Above Tidal), and the most downstream-segment 1601 (Lavaca River Tidal). It is classified as intermittent from the headwaters downstream to the confluence with Campbell Branch. Intermittent streams are small, ephemeral streambed communities in the uppermost segments of stream systems where water flows only during the spring or after a heavy rain, and often remains longer, ponded in isolated pools. It is classified as a perennial stream from the confluence with Campbells Branch downstream to its discharge point into Lavaca Bay.

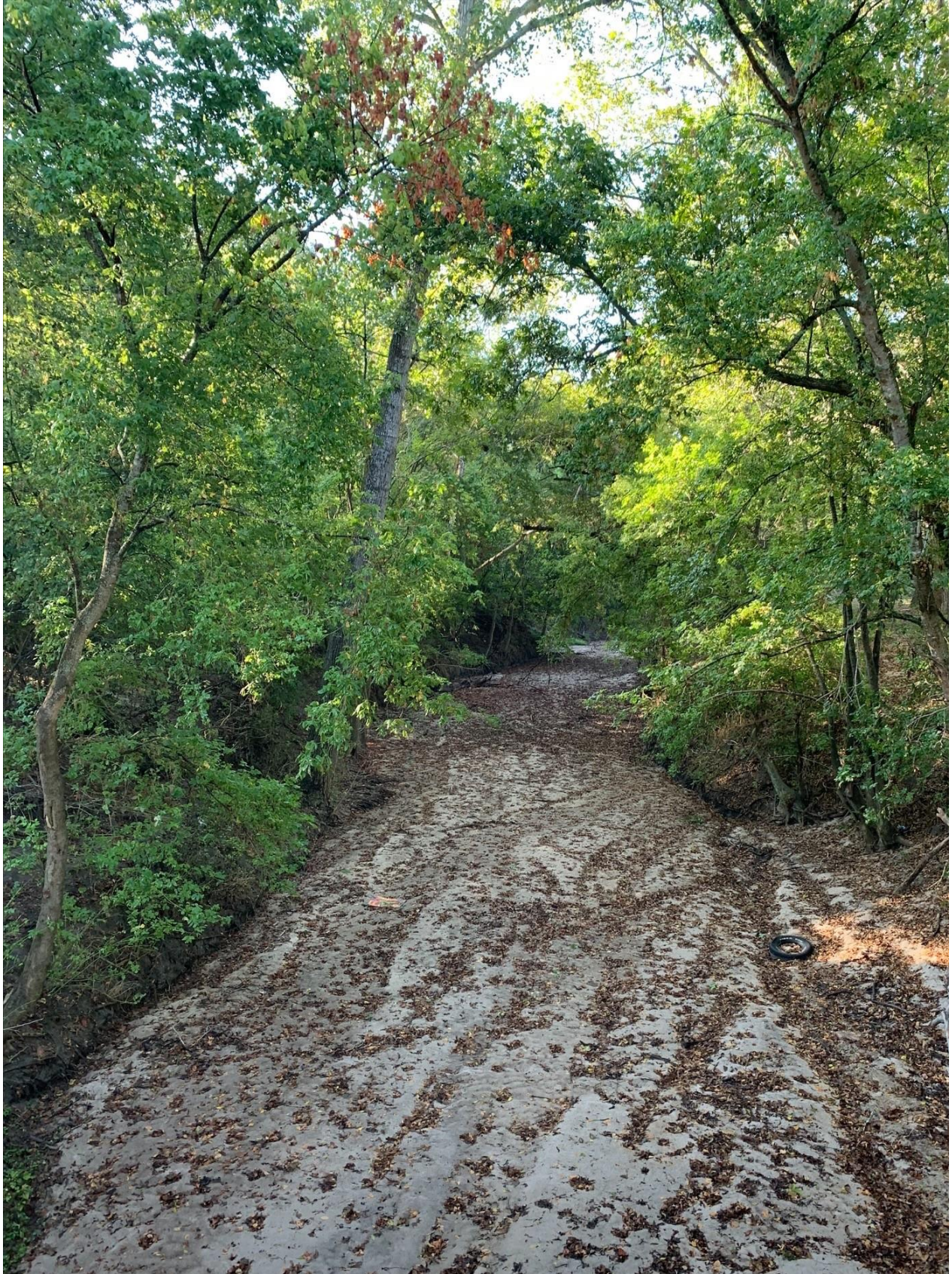


Figure 1: A dry Rocky Creek

The Lavaca River is one of the few remaining unrestricted rivers in Texas. The Lavaca River provides critical freshwater inflow into Lavaca Bay, a secondary embayment of the Matagorda Bay system. These marshes, bays, and estuaries provide critical habitat for the reproduction of aquatic species including fish, shrimp, and other invertebrates, such as blue crab. These organisms not only support recreational and commercial fisheries along the Texas Gulf Coast, they also provide critical habitat and food supplies for local and migratory waterfowl including the endangered whooping crane.



Figure 2: Lavaca River in Hallettsville

Four wastewater treatment facilities (WWTFs) are located within Segment 1602 of the Lavaca watershed. These facilities exclusively treat domestic wastewater. Two (Moulton and Hallettsville) discharge into the Lavaca River, one (Shiner) discharges into Rocky Creek, and the other (Yoakum) discharges into Big Brushy Creek, thence into Clarks Creek before entering the Lavaca River northeast of the State Highway 111 river bridge. Up to date permitting for these facilities indicate Moulton can discharge up to .242 million gallons per day (MGD) and the city of Hallettsville .8 MGD into the Lavaca River. The city of Shiner, who discharges into Rocky Creek, is permitted for .85 MGD and the city of Yoakum is permitted to discharge .95 MGD into Big Brushy Creek.

Bacteria continues to remain the number one cause of water quality impairments in the state of Texas. Numerous approaches have been applied to evaluate bacteria sources in streams and

rivers to develop effective watershed management practices. In 2016 a Watershed Protection Plan (WPP) was developed to address water quality issues throughout the entire length of the Lavaca River and its tributary streams. The stakeholders of the Lavaca River Basin developed a strategy to restore water quality in the river. Stakeholders dedicated considerable time and effort in discussing the watershed, influences on water quality and potential methods to address water quality concerns and selecting appropriate strategies to improve water quality.

The WPP determined that no single source of bacteria was the primary cause of the impairment. A variety of bacteria sources were identified by stakeholders including livestock, wildlife, domestic pets, improperly functioning on-site septic systems, sanitary sewer overflows, illicit dumping, and urban stormwater. Stakeholders identified management measures to reduce and feasibly manage instream bacteria levels. Stakeholders are responsible for the implementation of these voluntary management strategies and the Watershed Coordinator will continue to lead the efforts to implement the plan.

A Recreational Use Attainability Analysis was performed in 2017 to evaluate the use for primary contact recreation through data collection, observation, and interviews with landowners and the general public. The results of the study showed that primary contact recreation in the river was rare and that most contact with the waterbody was incidental through fishing and hunting activities.

Bacteria source tracking (BST) has been identified as a valuable tool for identifying the different sources of fecal pollution. In 2022, the LNRA partnered with state and academic agencies on a nonpoint source grant to further evaluate, update, and refine the Texas *E. coli* BST library. Water samples were collected over twelve months to provide an overview of different fecal sources impacting the Lavaca watershed. In consultation with stakeholders, ten potential sources of fecal contamination in the watershed were identified. From each of these sources, ten unique samples were collected (up to one hundred total known-source samples) and sequenced to generate a known-source microbiome sequence library. No specific geographic locations were specified for collection, sample collection took place throughout the Basin. The list of known sources included: feral hog, cow, horse, white tailed deer, racoon, dog, cat, chicken, on-site sewage facility (OSSF), and WWTF.

## Segment 1602 - Lavaca River above Tidal

The Lavaca River is divided into two segments, 1601 and 1602. Segment 1602 is the section of the river that is not tidally influenced while the lower portion (Segment 1601) is tidally influenced. Segment 1602 is a 67.3-mile-long portion of the Lavaca River running from the confluence of Campbell Branch, west of Hallettsville in Lavaca County, to a point 5.3 miles downstream of US 59 in Jackson County. This portion of the river is classified as perennial. Wastewater effluents from the cities of Yoakum, Shiner, Moulton, and Hallettsville enter either directly into the Lavaca River or through its tributaries.

This portion of the Lavaca River is divided into two assessment units (AU):

- AU 1602\_02 upper 44.4-miles from the confluence with Campbell Branch in Hallettsville downstream to the confluence with Beard Branch. Sampling is conducted at stations 12525 at SH 111 and 12527 at US Alt 90/US 77.
- AU 1602\_03 lower 22.9-miles from the confluence with Beard Branch downstream to a point 5.3 miles downstream of US 59 in Jackson County. Monitoring is performed at station 12524 at US 59. Quarterly sampling is conducted by the Lavaca Navidad River Authority (LNRA) at all three stations for field parameters, flow, laboratory conventionals, and *E. coli*. The LNRA also monitors field parameters and flow at stations 12524 and 12525 on a monthly basis.

The freshwater bacterial geometric mean standard for Primary Contact Recreation streams is 126 colonies most probable number (mpn) per 100 milliliters (mL) of water. Two assessment units of Segment 1602 are impaired for bacteria; their geometric means are in excess of 126 MPN/100 mL. This segment is subject to long periods of low flow followed by brief periods of high flow which can contribute to elevated bacteria levels. Riparian corridors along streams and rivers are often teeming with wildlife due to the availability of water and vegetation. These habitats can contribute to bacterial loading in water bodies. Wildlife may deposit waste directly into the stream channel or onto adjacent land surfaces. Rainfall runoff can then transport these bacteria-laden wastes into nearby streams, further increasing bacterial loading. The wooded riparian corridor suggests that wildlife could be contributing to the bacteria levels, while the presence of cattle trails leading to the stream and the observation of livestock in the waterway indicate that livestock may also be a significant source of contamination.





Figure 3: Lavaca River at State Highway 111



## Unclassified Segment 1602B - Rocky Creek

There are three unclassified tributaries to segment 1602:

- Segment 1602A      Big Brushy Creek
- Segment 1602B      Rocky Creek
- Segment 1602C      Lavaca River above Campbell Branch

Unclassified Segment 1602B is the 35.7-mile-long perennial portion of Rocky Creek running from 1.8 miles upstream of County Road 364 northwest of the City of Shiner downstream to the confluence with the Lavaca River. Monitoring is being conducted quarterly at station 18190 by the LNRA for field parameters, flow, conventional laboratory, and *E. coli*.



Figure 5: Trash in Rocky Creek

The 2022 Integrated report (IR) lists Rocky Creek as impaired for elevated levels of *E. coli* and shows a concern for elevated Total Phosphorus. The 2022 IR reported a geometric mean of 339.83 MPN/100 mL. Livestock are regularly observed in the stream during monitoring visits. Landowner education and livestock best management practices may help reduce bacteria concentrations in the stream.



Figure 6: Cow in Rocky Creek

## Unclassified Segment 1602C - Lavaca River Above Campbell Branch

Unclassified Segment 1602C -- Lavaca River Above Campbell Branch -- is the upper 26.1-mile portion of the Lavaca River from approximately 4 miles upstream of SH 95 in Lavaca County downstream to the confluence with Campbell Branch in Hallettsville. This portion of the river is classified as intermittent with perennial pools.

This reach had been identified as AU 1602\_01, but is now assessed as two assessment units:

- AU 1602C\_02 upper 8.6-mile portion from the headwaters approximately 4 miles upstream of TX Highway 95 in the City of Moulton downstream to the confluence of the West Prong Lavaca River.
- AU 1602C\_01 lower 17.6-miles from the confluence of the West Prong Lavaca River downstream to the confluence with Campbell Branch in Hallettsville.

Both assessment units were included on the 303(d) list for 24-Hour Dissolved Oxygen Average. The impairment was carried forward from previous assessments. In FY 2021, the LNRA began performing diels six times per year to address the impairment and to provide data for the assessment. Periodic drought conditions have prolonged data gathering which will continue through fiscal year 2025.

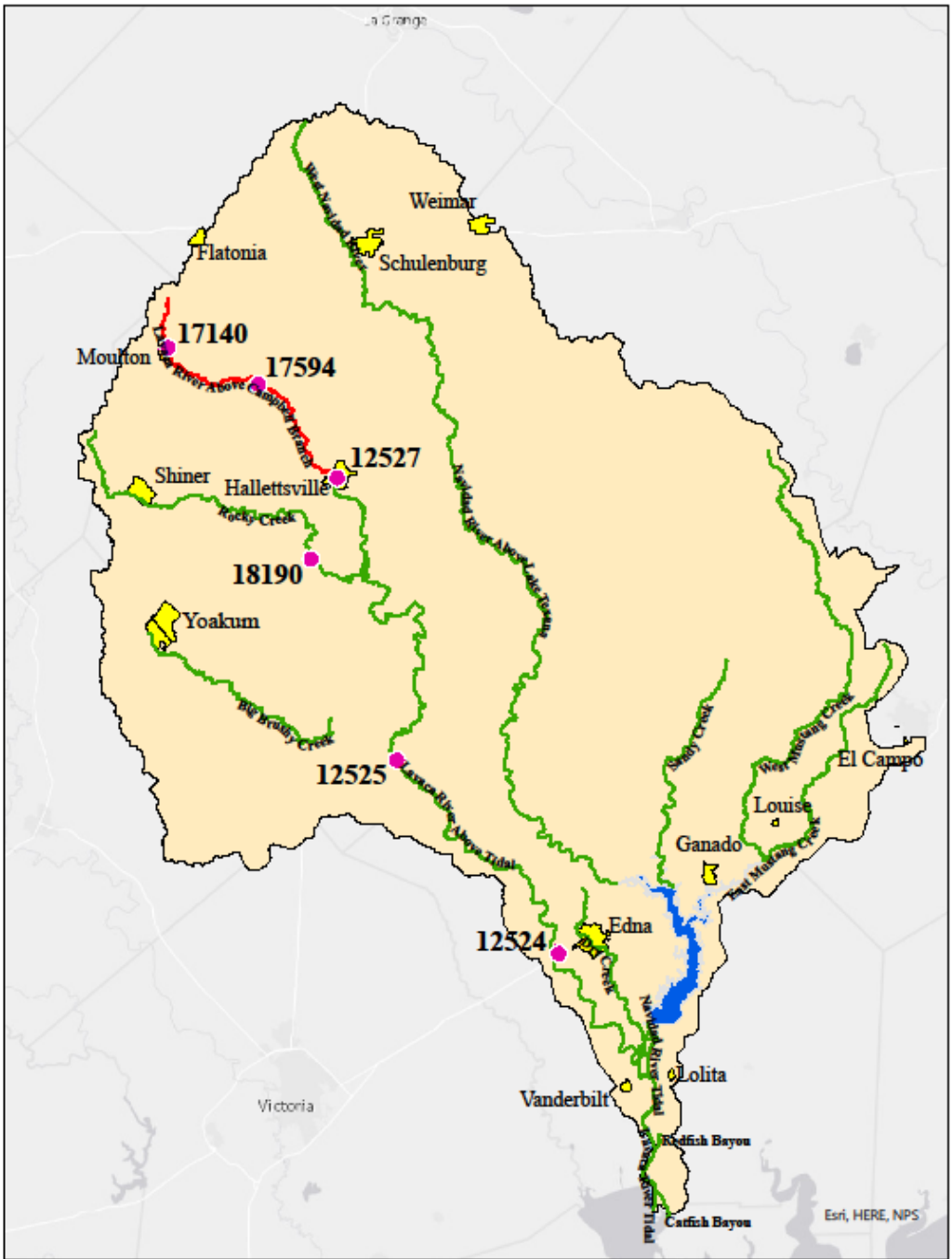


Figure 7: Unclassified Segment 1602C dissolved oxygen impairment

