# 2024 Colorado River Basin Highlights Report

## An update on Clean Rivers Program Activities in the Colorado River Basin

PREPARED IN COOPERATION WITH THE
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

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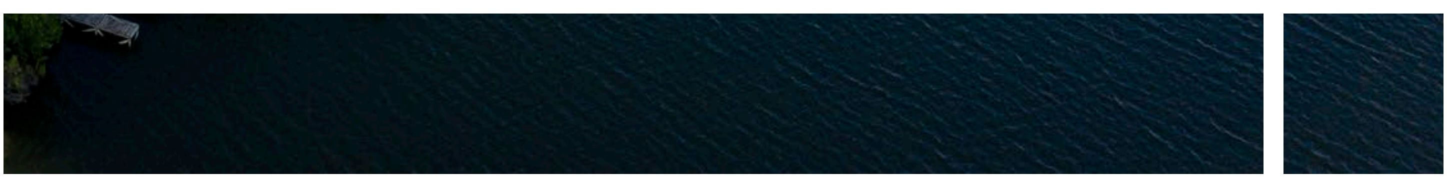


# Introduction

This report is a programmatic update on Clean Rivers Program (CRP) activities in the Colorado River basin during 2023. For detailed water quality information, see the 2023 Colorado River Basin Summary Report available at https://www.lcra.org/water/quality/texas-clean-rivers-program/resources-and-publications/.

CRP is a statewide water quality program that emphasizes monitoring, assessment and public outreach to protect Texas' surface water. The Texas Commission on Environmental Quality (TCEQ) administers the program along with 15 regional partners in their respective river basins. In the Colorado River basin, two organizations implement the program: the Lower Colorado River Authority (LCRA) and the Upper Colorado River Authority (UCRA). The City of Austin also contributes water quality data that helps assess water quality in the Austin area.


***Figure 1.*** *Clean Rivers Program partner regions*

# Program Update

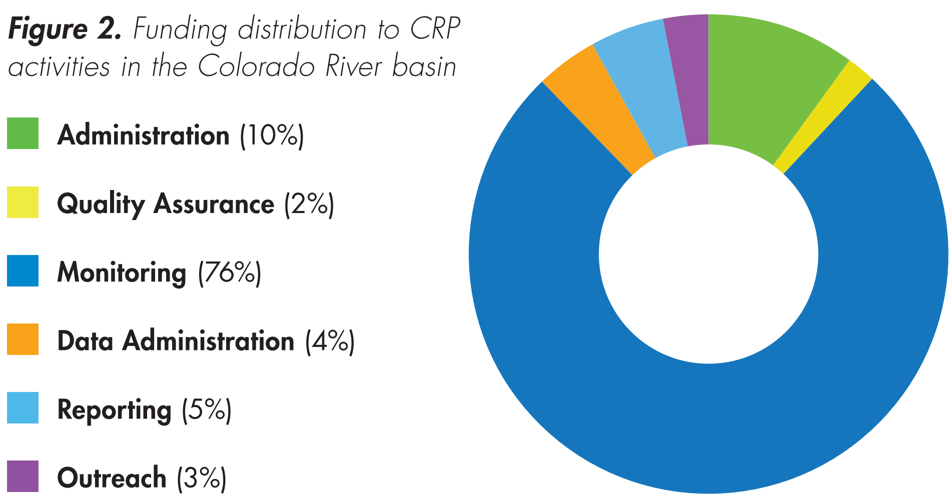
In 1991, Texas lawmakers passed legislation to establish the Texas Clean Rivers Program. With the passage of Senate Bill 818 came funding from fees paid by municipal and industrial dischargers and water rights holders, such as LCRA. Today, money from those annual fees is used by CRP partners across the state to collect and assess water quality data and achieve other program objectives. The data is used to establish and assess attainment of water quality standards, set wastewater discharge permit limits, and evaluate physical, chemical and biological characteristics of aquatic systems.

**CRP Long-term objectives:**

- Provide quality-assured data to the TCEQ for use in water quality decision-making.
- Identify and evaluate water quality issues.
- Promote cooperative watershed planning.
- Inform and engage stakeholders (any individual or group who has in interest in the water quality of the basin).
- Maintain efficient use of public funds.
- Adapt program to emerging water quality issues.

In the 2022-2023 contract, TCEQ allocated $763,594.00 to the Colorado River basin for CRP. UCRA received $236,845 (31%) of the funds in the contract to carry out CRP activities in the upper basin. For the current 2024-2025 contract, the Colorado River basin has been allocated $909,212.00 total. The program continues to be cost-effective, with the majority of the funds used for water quality monitoring, assessment and reporting (Figure 2).

***Figure 2.*** *Funding distribution to CRP activities in the Colorado River basin*

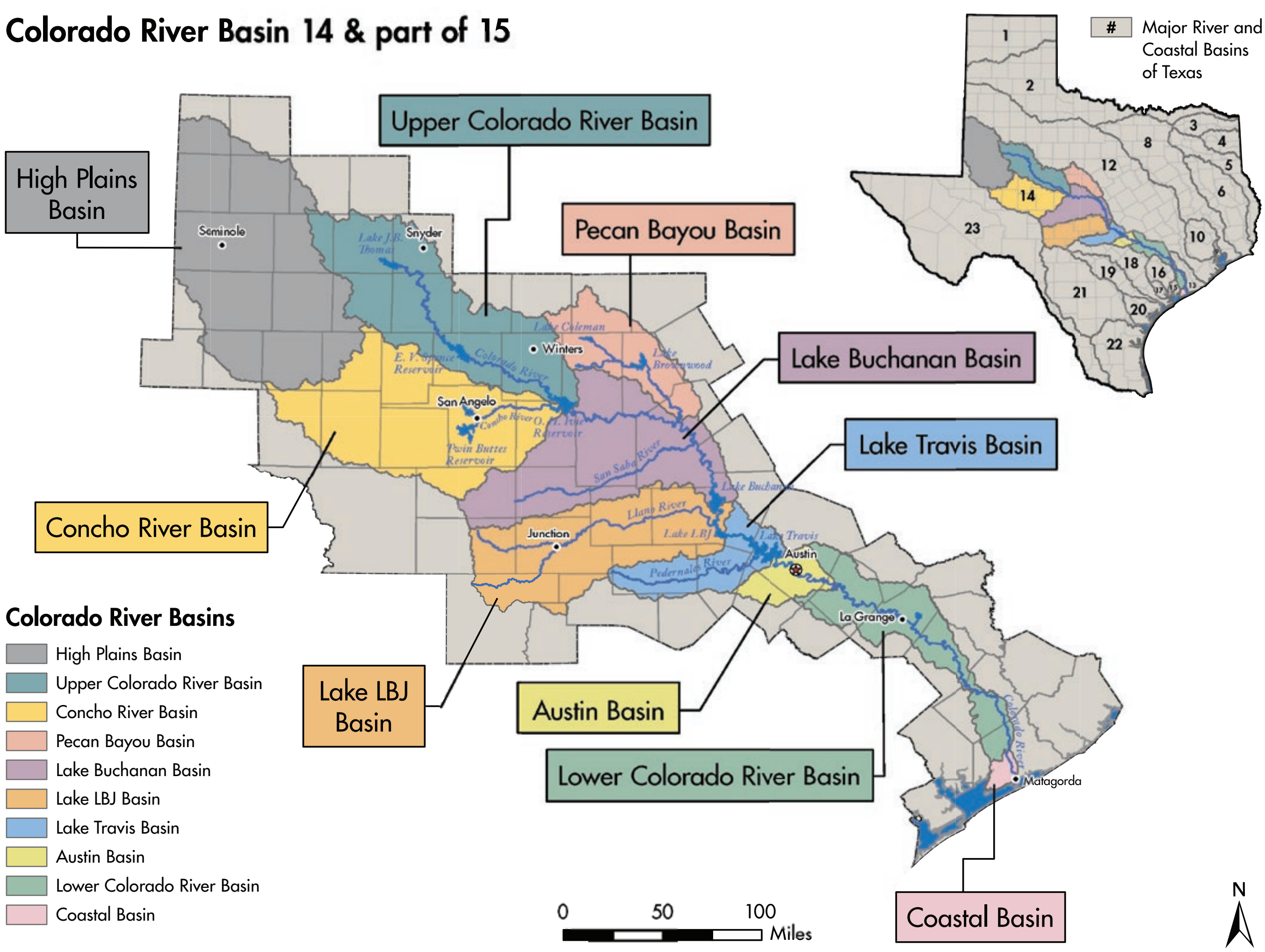


# Water Quality Overview

The upper Colorado River basin extends far into West Texas, a region that typically gets less than 20 inches of rain per year. Flows are intermittent in this region, with contributions from groundwater seeps. The seeps often contain high levels of dissolved solids, which come from dissolution of minerals in geologic formations. Oilfield activities are also a source of dissolved solids in the upper basin.

In the Concho River basin, dissolved solids are not as problematic because higher annual rainfall and major freshwater springs on the South Concho River help increase flows and dilute sources of dissolved solids. Downstream of San Angelo, nitrate levels in some streams are elevated. Sources of nitrates include the Lipan Aquifer, a natural source, and agricultural runoff from fertilizer and animal feeding operations.

The middle portion of the basin includes the Texas Hill Country. Steep terrain with limestone and granite bedrock in the Edwards Plateau give rise to clear, spring-fed perennial streams. The largest tributaries of the Colorado River – the San Saba, Llano and Pedernales rivers – dilute dissolved solids and suspended sediment. This region includes the Highland Lakes: Buchanan, Inks, Lyndon B. Johnson (LBJ), Marble Falls, Travis and Austin, as well as Lady Bird Lake in Austin.



Several streams that flow into the Colorado River around Austin contain excessive amounts of *E. coli*, the bacteria used to determine waters' suitability for contact recreation. These bacteria levels have been attributed to faulty wastewater infrastructure, stormwater runoff and pet waste from urbanized areas.

In the lower basin, a radical transition in topography, soils and geology occurs. The Colorado River flows out of the steep canyons and shallow soils of the Hill Country, crosses the Balcones fault line in Austin, and then enters a region with deep clay soils and relatively flat land known as the Blackland Prairie. From there it traverses through the Post Oak Woodlands and Savannas and then makes its way to the Gulf Coast Plains. In this lower region downstream of Austin, the water is less clear because of suspended solids from the clay and sandy loam soils. Flows are variable in this stretch of river. During March through October, water is released from the Highland Lakes (except during extreme drought conditions) to provide water for downstream crops and fulfill requirements of the LCRA Water Management Plan. These releases help dilute nutrient loads from City of Austin wastewater treatment facilities and provide water for wildlife.

In 2023, there were 150 sites in the Colorado River basin monitored for water quality. Sixty-one of these sites were monitored by LCRA, 48 by UCRA, 27 by TCEQ, 15 by the City of Austin, and one by the United States Geological Survey (USGS) (note that two sites on Lake Austin are monitored by more than one agency at different times of the year). For a complete monitoring schedule, visit https://cms.lcra.org/.

*Colorado River in Bastrop*

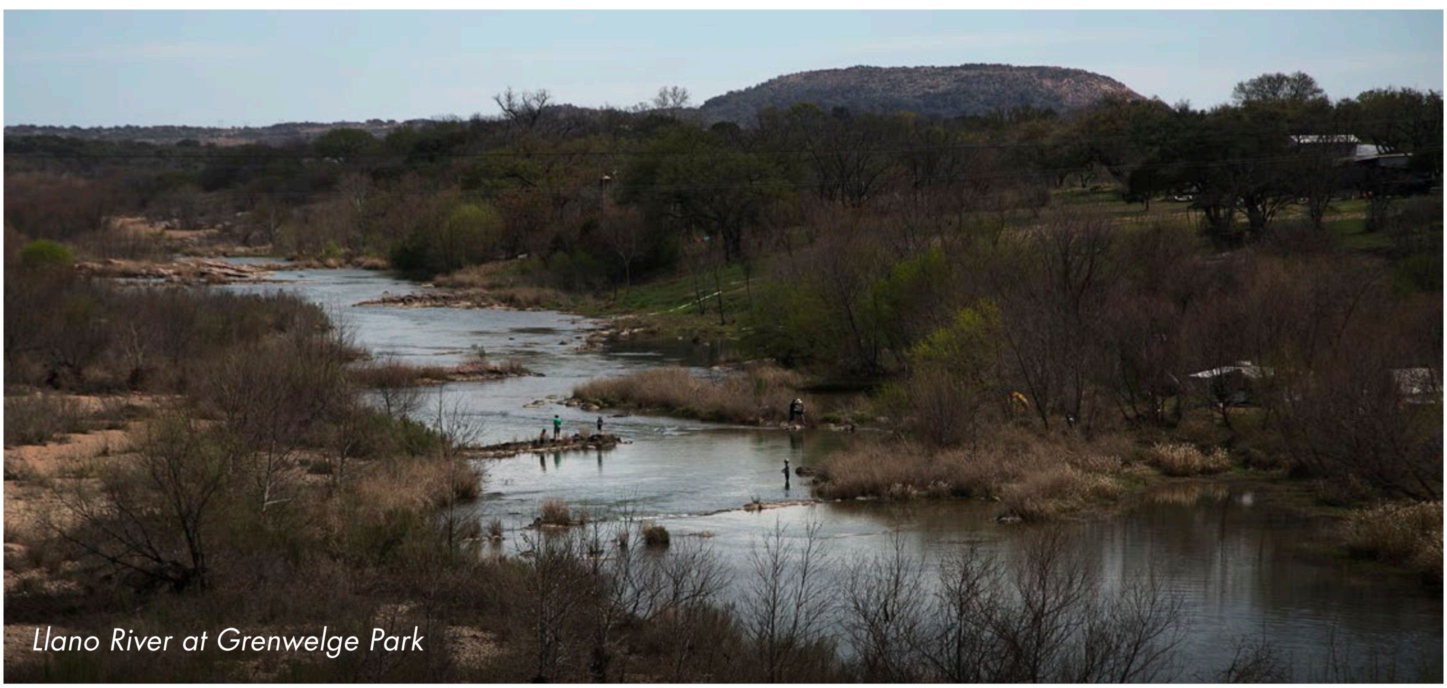
# Ongoing Water Quality Projects

## Upper Llano River Watershed Protection Plan

The Upper Llano River Watershed, composed of the North and South Llano rivers, and the springs that feed them, support several unique plant and animal communities and provide critical flows to the Llano and Colorado rivers, as well as the Highland Lakes. However, aquifer withdrawals, invasive species encroachment, land fragmentation, drought, and loss of riparian habitat threaten the health of the watershed. In an effort to protect and maintain the ecological integrity of the Llano River, the stakeholders of this region worked to create and implement the Llano River Watershed Protection Plan (WPP), which was completed in May 2016. This WPP is funded through a federal Clean Water Act 319(h) grant from the Texas State Soil and Water Conservation Board and the U.S. Environmental Protection Agency. It is led by the Llano River Watershed Alliance.

The Llano River WPP aims to address the complexity of the watershed through an integrated assessment of the landscape condition, biotic condition, chemical/physical parameters, and critical watershed functional attributes. In addition, the WPP identifies land use and cover; future needs; water yields from implementation of best management practices (BMPs); invasive species management and impacts; watershed education components (including programs for K-12 and adult education); wildlife concerns and compatibility to the project; economics of BMPs; landowner interest/cooperation; types of treatment measures needed/recommended; and implementation schedule.

For more information on the Llano River WPP, visit https://www.llanoriver.org/.



*Llano River at Grenwelge Park*

## Colorado River Environmental Models

The Highland Lakes provide water storage capacity, recreational opportunities and a livelihood for many Central Texans. Recognizing their importance to the region, TCEQ adopted the Watershed Protection Rules (described in Chapter 311 of the Texas Administrative Code, subchapters A, B, E and F) in 1986 to protect water quality. The rules, known as the discharge ban, prohibit new wastewater discharges into each of the Highland Lakes.

In an effort to assess and predict changes to water quality in the lakes, LCRA began developing the Colorado River Environmental Models project (CREMS) in 2006. CREMS uses the best available science to evaluate water quality issues, discern trends, and predict the impacts of various decisions, actions and future scenarios on the Highland Lakes. While the first iteration of CREMS was completed in 2012, updates and improvements to the models continue to be developed and implemented. Current models incorporate an extended period of record, additional monitoring and calibration, and advances in computing and modeling program capabilities.

The CREMS model has been used to demonstrate the impact of different discharge scenarios and help establish wastewater permit limits in the Highland Lakes watersheds. LCRA will continue to use the CREMS models as lake conditions change and work with communities in the Highland Lakes watershed to develop reasonable treatment options that are protective of water quality.

For more information on CREMS models, visit https://www.lcra.org/water/quality/water-quality-permit-review-program/water-quality-models/.


*Lake Travis*

## Austin Streams Implementation Plan

High concentrations of *E. coli*, an indicator bacteria, are often found in four streams in the Austin metropolitan area — Waller and Walnut creeks, Spicewood Tributary to Shoal Creek and Taylor Slough South. High concentrations of *E. coli* may indicate a health risk to people who swim or wade in the creeks — activities called "contact recreation" in the state's standards for water quality. The goal of the Austin Streams Implementation Plan is to reduce bacteria levels to protect people who swim or wade in the creeks.

The first step toward restoration is to determine the source(s) of pollution. One way to determine the source is to develop a scientific model called a total maximum daily load (TMDL). A TMDL involves a historical water quality data review, targeted monitoring, detailed water quality analysis, and the amount or "load" of a pollutant that a water body can receive and still support its designated uses. Once the load is determined among all potential sources of pollution, an implementation plan (I-Plan) outlines strategies to reduce pollutant loads.

In 2015, TCEQ initiated a bacteria TMDL for the four impaired streams in the lower Colorado River watershed. In addition to advising TCEQ on developing the TMDLs, the Improving Austin Streams (IAS) stakeholder group developed an I-Plan for bacteria in the four impaired Austin streams. Sources of *E. coli* in Austin streams include stormwater runoff from municipal separate storm sewer systems, malfunctioning on-site sewage facilities, urban development, and pet and wildlife waste.

In June 2021, six years after implementing their original I-Plan, the IAS stakeholders formed a committee to create an updated I-Plan based on currently available data and science and what they learned about the effectiveness of their chosen best management practices (BMPs). The Updated I-Plan will target sources of bacteria in Austin-area streams for a five-year period through 2027. For more information, visit https://www.tceq.texas.gov/waterquality/tmdl/nav/101-austinwatershedsbacteria/austin-area-watersheds-i-plan-stakeholder-group.

In 2023, the City of Austin further investigated the sources of *E. coli* contamination in Taylor Slough South and discovered leaking infrastructure in an ephemeral headwater tributary that was previously unknown to contribute baseflow to Taylor Slough. City of Austin biologists found a 200-foot section of this tributary flowing due to inputs from a stormwater culvert. The surface water was discovered to have persistently high concentrations of *E. coli*; however, this tributary was previously unknown as a contributing baseflow to Taylor Slough due to subsurface interaction. The City of Austin is working with Austin Water to investigate public and private wastewater infrastructure to repair leaks in this area of the watershed.

## Gilleland Creek Implementation Plan

Gilleland Creek is located in eastern Travis County, covering about 76 square miles. Land use in the watershed has been transitioning from agricultural to urban as the cities of Pflugerville, Round Rock, Manor and Austin develop. During dry weather, the creek is primarily composed of wastewater effluent from the seven permitted municipal wastewater treatment facilities in the watershed. Gilleland Creek was first listed as impaired for bacteria in 2004. In 2007, the TCEQ adopted a Total Maximum Daily Load (TMDL) for bacteria in Gilleland Creek, and the EPA approved the TMDL in 2009. This established the maximum amount of bacteria the creek could accept and still met the state's standards for bacteria.

The second part of the TMDL process involved creating an Implementation Plan (I-Plan) that describes the strategy and activities the TCEQ and watershed stakeholders will implement to improve water quality in the affected watershed. The original Gilleland Creek I-Plan was approved by TCEQ in 2011.

In fall 2016, after five years of implementation, the stakeholders determined that they would go through the process of updating the I-Plan in accordance with the adaptive management process. A planning team was formed and participants agreed to work toward the goal of assuring the I-Plan revision (1) allows Gilleland Creek to meet contact recreation standards and (2) manages the entire Gilleland Creek watershed through cooperation among jurisdictions and citizens, and by tailoring solutions to each entity's unique needs.

The I-Plan update was completed by stakeholders and submitted to TCEQ in 2017. Stakeholders continue to meet annually to evaluate their progress. Management measures for the updated I-Plan include riparian zone restoration and protection, wastewater infrastructure maintenance, addressing domestic pet waste, and stormwater treatment. For more information, visit https://www.tceq.texas.gov/waterquality/tmdl/nav/69-gillelandcreekbacteria.

*Gilleland Creek*

## Brady Creek Watershed Protection Plans

The Brady Creek watershed, in McCulloch, Concho and San Saba counties, is approximately 784 square miles in area. It is primarily rural, but includes the towns of Brady, Melvin and Eden. Water quality monitoring performed by UCRA in the early 2000s indicated persistently low levels of dissolved oxygen and resulted in the streams' placement on the 303(d) list, TCEQ's list of impaired water bodies.

In 2004, funded by an EPA 319(h) grant administered by TCEQ, UCRA created the Brady Creek Master Plan. The plan was an urban runoff abatement project and identified stormwater runoff and low flows as causes of the impairment and implemented stormwater controls to lessen the impact of runoff into the creek. UCRA was awarded a contract for the development of a Brady Creek Watershed Protection Plan (WPP) in 2010. Unlike the Brady Creek Master Plan, which included only the area inside Brady's city limits, the WPP encompasses the entire watershed. In 2010 stakeholders were identified and a monitoring plan was developed. A completed plan was submitted to TCEQ in 2014 and approved in August 2016. The plan was the 10th to be approved in Texas and ranked as the second-largest watershed in terms of area to have a WPP in place at that time within the state. The primary goal of the Brady Creek WPP is to restore water quality within impaired segments of Brady Creek and maintain the integrity of the remaining watershed.

For more information on the Brady Creek WPP and to stay up to date on activities, visit https://www.ucratx.org/brady-creek.

*Station ID 14232 upstream from routine monitoring site*

## Upper Colorado River Authority Environmental Internship Program

In 2023, the TCEQ Clean Rivers Program began funding the UCRA Summer Environmental Internship Program (EIP), which is a competitive professional opportunity for university students to gain invaluable experience in both the field and in an office setting. Activities include assisting with water quality monitoring, boater safety certification, research design, familiarization with West Texas habitats, water resource management, education and outreach, community engagement, and governmental agency operation.

The internship is a total of 120 hours over three months (June to August). The position is open to university students enrolled in environmental sciences, or related field.

For more information, visit https://www.ucratx.org/internships.

*Vivian, a UCRA Environmental Intern, inspecting a creek in the upper Colorado River basin*

## Native Freshwater Mussels

There are approximately 22 species of freshwater mussels that are native to the waters of the Colorado River basin. These native mussels burrow into the sediment of rivers and lakes where they fill an important niche in the aquatic ecosystem by filtering water and contributing to both aquatic and terrestrial food chains. They also have a unique life history, whereby the larvae of freshwater mussels are parasites on certain fish species during their development. Mussels rely on adequate quality and quantity of water in order to survive and thrive.

In 2011, the U.S. Fish and Wildlife Service (FWS) listed several mussel species known to occur in the Colorado River basin as candidates under the Endangered Species Act (ESA). Four of these species – Texas fawnsfoot, Texas fatmucket, Texas pimpleback and Balcones spike – have been proposed for listing under the ESA. To address the conservation needs of these mussel species and ensure LCRA and LCRA Transmission Services Corporation are able to continue operations and maintenance activities after a listing decision is made, LCRA worked with FWS to develop a Candidate Conservation Agreement with Assurances (CCAA). This agreement outlines a conservation strategy to protect and enhance mussel habitat and science related to these species in the Colorado River basin. It also includes adaptive management and long-term monitoring of mussel species and their host fish at key locations throughout the basin. The term for the CCAA is 2023-2043.

To view the CCAA, visit https://www.fws.gov/media/20231026usfws-final-lcra-ccaard-signedlcra-signedpdf. For more information on freshwater mussels in Texas, visit https://www.fws.gov/library/collections/texas-freshwater-mussels.


*Freshwater mussels*

## Zebra Mussels

In 2017, invasive zebra mussels (*Dreissena polymorpha*) were first discovered in the Colorado River basin. The first mussel was found in the lower portion of Lake Travis in June 2017 by LCRA and Texas Parks and Wildlife Department (TPWD) biologists. LCRA and TPWD quickly expanded monitoring and outreach efforts and increased signage to alert boaters to the infestation. In August 2017, adult zebra mussels were also found in Lake Austin. Then in early 2018, zebra mussels were discovered in Lady Bird Lake, which lies below Lake Austin and is the last major impoundment on the Colorado River mainstem, and downstream of Longhorn Dam in the Colorado River below Austin. In 2019, lakes LBJ and Marble Falls were classified as infested with zebra mussels by TPWD after all life stages of the invasive organism were discovered in each reservoir during LCRA monitoring events. Lake Buchanan was then designated as infested in late 2020 followed by Inks Lake in mid-2021, again after all life stages were discovered during LCRA monitoring events.

Established populations of zebra mussels now inhabit all of the Highland Lakes. As of the writing of this report, no evidence of zebra mussels has been detected in lakes Bastrop and Fayette, which are reservoirs located on tributaries to the lower Colorado River below Austin that are managed by LCRA. Visit https://tpwd.texas.gov/huntwild/wild/species/exotic/zebramusselmap.phtml to see all of the locations in Texas where zebra mussels can currently be found.

Zebra mussels have drastically changed ecosystems and caused significant economic damage to utilities in many parts of the United States. Once established in a water body, they have the potential to impact natural ecosystems by excessively filtering water, transferring nutrients from the water column to the lake bottom. They also impact the recreation and utility industries because they attach to hard surfaces such as docks, buoys, pumps and pipes.

Zebra mussels spread to lakes via incidental transport via boats. Once attached to a boat hull or trailer, the mussels can be transported to other water bodies by unsuspecting water recreationalists. Adult zebra mussels can live out of water for several days. Zebra mussel larvae are microscopic and "free-float" with currents. As such, they can pass through dams, pipelines, pumps and other infrastructure intact to migrate across river basins. Transport via boat live wells is also well documented.

State regulations now require draining of water from all boats and onboard receptacles when leaving or approaching public fresh waters to prevent the spread of zebra mussels. A "Clean Drain Dry" protocol for watercraft is the most effective means of preventing their spread. More information on this protocol is available at https://tpwd.texas.gov/fishboat/boat/protect_water/.

TPWD has also developed an outreach campaign to educate the public and reduce incidental transport. Beginning in 2012 and continuing to present, LCRA partnered with TPWD to develop and distribute outreach materials specific to the Highland Lakes. LCRA staff have contacted marina owners and other lakeside businesses to educate them about the dangers of zebra mussels. Brochures, posters and vinyl banners have been placed in parks and businesses throughout the Highland Lakes and Colorado River basin to spread awareness.

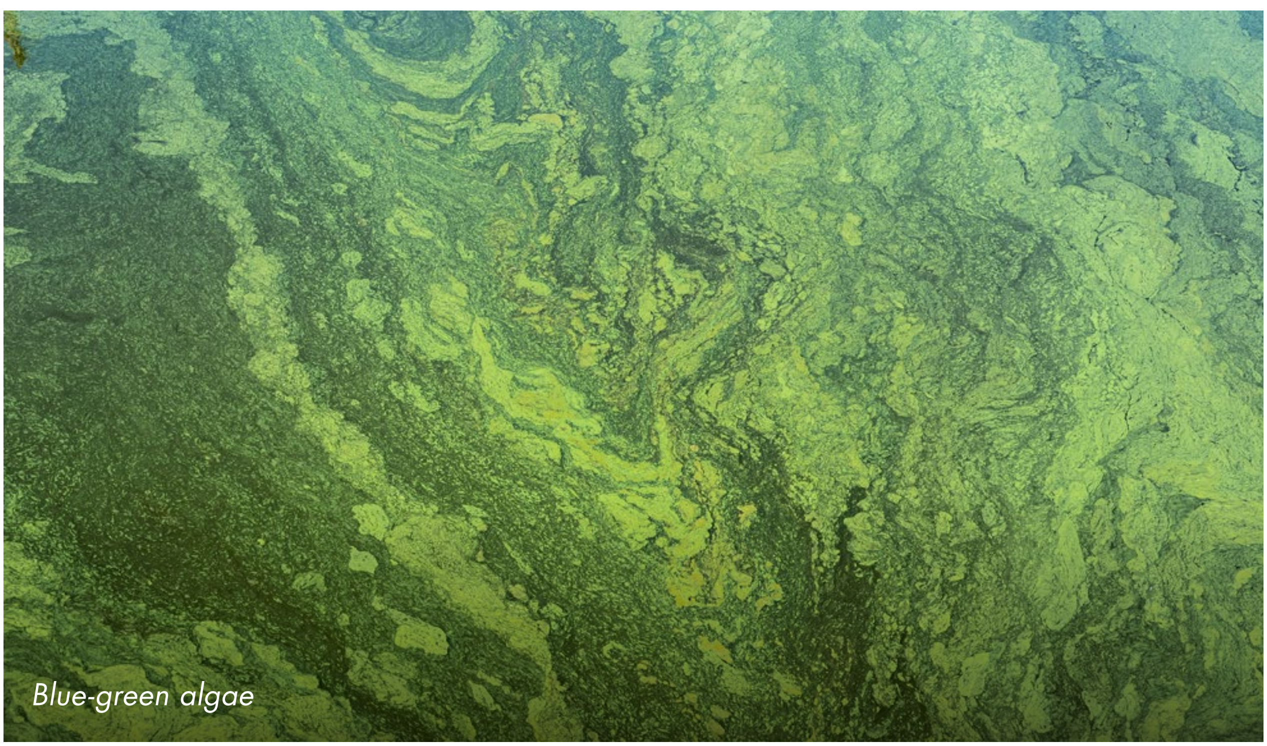
For more information about zebra mussel identification, ecology, and nationwide distribution, visit https://nas.er.usgs.gov/queries/FactSheet.aspx?speciesID=5.

## Cyanotoxins

Cyanotoxin is a general term used for any toxin that is produced by cyanobacteria, also known as blue-green algae. Cyanobacteria can become very abundant in waterways if conditions are conducive (i.e. there are enough available nutrients, water clarity, etc.), and form what is called a cyanobacteria bloom. These blooms can occur in the water column (planktonic) or as mats of algae that grow on the bottom of a lake or river (benthic).

In February 2021, a dog (referred to as C1) swam in Lake Travis and died from suspected neurotoxicosis caused by consumption of algal mat material containing cyanotoxins. LCRA responded quickly to collect water and algae samples from the site and test them for cyanotoxins. In addition, LCRA and the pet owner cooperated to order a necropsy of the dog because symptoms were consistent with ingestion of cyanotoxins (trembling, inability to stand, panting, vomiting, stumbling). Results of the necropsy showed a mixture of cyanotoxins present in the stomach of the dog at the time of death.

Planktonic algal blooms typically occur during the summer months when temperatures are warm and nutrient levels are high. However, the cyanotoxin event responsible for the death of C1 occurred during a winter storm in central Texas, which began Feb. 11, 2021, with temperatures ranging from 37 to 0 F° for eight days prior to the death of C1. Benthic harmful algal blooms are not restricted to occurring in the summer months and can in fact happen year-round. The specific cyanotoxin responsible for C1's death is called dihydroanatoxin-a (dhATX), which is a sub-type of a more common cyanotoxin called anatoxin-a (ATX). Results from the water and algae samples collected at the site the day after C1's death also showed high levels of dhATX and ATX were present, allowing LCRA to confirm the cause of death. The main toxin responsible for C1's death, dhATX, is known to occur in mat proliferations of algae and is rarely seen in pure whole water samples.



*Blue-green algae*

Following the necropsy and composite sample results, LCRA chose to do a onetime survey of several sites on Lake Travis to determine whether dhATX was present throughout the lake. During this survey, nine sites were sampled along Lake Travis and the toxin dhATX was detected in every mat proliferation sample collected from Lake Travis. Based on the results of the Lake Travis survey, LCRA decided to expand the survey and collect whole water and composite algae samples from multiples sites in Lake Buchanan, Lake Lyndon B. Johnson, Inks Lake and Lake Marble Falls. dhATX was present in algal samples taken from Inks Lake and Lake Marble Falls.

The cyanobacteria species known as *Phormidium/Microcoleus* that can produce ATX and dhATX was found to occur in each one of the Highland Lakes. This indicates that the species was present but not always producing cyanotoxins at the time of sampling. Following this information, LCRA decided to implement a long-term plan for monitoring cyanotoxins in the Highland Lakes. For a more in-depth version of this event, see the published paper at https://www.mdpi.com/2416198.

Following the events described above, LCRA began a routine cyanotoxin monitoring program in June of 2021. This program utilizes a two-pronged approach to monitoring for cyanotoxins throughout the Highland Lakes. The first portion of this program uses already established CRP sites (12319, 12324, 12327, 12344, 12347, 17020, 17017, 12336, 12302, 12313) and adds an additional whole water sample to the CRP sampling protocol. Whole water samples are analyzed for three toxins typically produced by planktonic cyanobacteria, anatoxin-a, cylindrospermopsin and total microcystin. Since the inception of this program, cylindrospermopsin has been detected in every site (except 17017, Fayette Reservoir), over multiple months.

The presence of cylindrospermopsin year-round at several sites (Lake Bastrop and Lake Buchanan) suggests background levels of these toxins are always present. The second approach to monitoring cyanotoxins uses small devices filled with resin called Solid Phase Adsorption Toxin Tracking (SPATT) bags that track biologically available toxins in the water column. The resin inside the SPATT bag absorbs toxins over time and is left in the water for two weeks to one month at a time. SPATT bag monitoring occurs at shoreline sites located on lakes Travis, LBJ, Inks, Marble Falls and Buchanan. SPATT bags are placed close to the benthos, to capture any toxins that may be released by benthic algal proliferation.

In addition to the routine cyanotoxin monitoring program, LCRA began a joint study with the City of Austin in May of 2023 to investigate the connection between mat proliferations producing toxins and nutrient availability in lakes Inks, LBJ, Lady Bird and Austin. The aim of this study is to understand nutrient dynamics in the system, and how they potentially relate to algal mat proliferation growth. Understanding whether algal proliferations obtain their nutrients from the water column, from the sediment, or from recycling within their own material will better inform management decisions in the future. This study concluded in May 2024 and a final report will be available in the following months.

## Colorado River Watch Network

The Colorado River Watch Network (CRWN) is a volunteer water quality monitoring program supported by LCRA since 1988. The programs supported 97 active certified volunteers in 2023. In addition to individual volunteers, several groups participate in the program to provide educational outreach and experiential learning to youth and community members who engage in hands-on assistance to monitor multiple sites throughout the Colorado River basin.

Training to become a certified monitor is a multi-phased process, and after training requirements are met, sampling sites are assigned to certified monitors. LCRA provides water quality test kits, supplies, and ongoing support to these trained citizen scientists, who in turn collect and submit valuable water quality data on a monthly basis to inform of water quality trends in the Colorado River and its tributaries. In 2023, two training events were held in the Hill Country and in Bastrop County, with more trainings and workshops planned in 2024 and 2025.

## Aquatic Vegetation in the Highland Lakes

During drought years, aquatic vegetation can become abundant in the Highland Lakes. Low inflows into the reservoirs cause the water to become more stagnant, which can promote growth of vegetation. In addition, increases in the clarity of a waterbody once zebra mussels become established can also lead to increased aquatic plant growth. Clearer water allows sunlight to penetrate deeper as well as increase water temperature at greater depths. These environmental changes allow aquatic vegetation to grow deeper and in more areas of waterbodies.

LCRA and TPWD routinely survey vegetation in reservoirs managed by LCRA. These surveys inform aquatic vegetation management decisions made by both agencies. For more information on the aquatic vegetation in the Highland Lakes, visit [https://www.lcra.org/waterweeds](https://www.lcra.org/waterweeds).

*CRWN volunteer monitoring zebra mussels at Lake Travis*

# TCEQ Integrated Report

## Assessment of Water Quality Data

Every two years, TCEQ evaluates water quality data collected from across the state that meets minimum quality assurance and quality control requirements. This data is compared with the Texas Surface Water Quality Standards (or to screening levels when no standards have been established) and the results are published in the Texas Integrated Report of Surface Water Quality for the Clean Water Act Sections 305(b) and 303(d). The Integrated Report defines the status of each water body as one of the following:

1. Meets or Supports – At least 10 data points were available to assess, and the water body meets Texas Surface Water Quality Standards or supports the water body's designated use(s).

2. Concern – a) Sufficient data to perform a full assessment were not collected, but the limited data indicate standards are not met, b) sufficient data were collected but the assessment shows that there is at least one parameter that is near non-attainment of the standards, or c) standards have not yet been established, as is the case with nutrients. If standards have not been established, the data are compared to screening levels.

3. Impaired – Sufficient amount of data are available, and the water body does not meet state standards. TCEQ publishes impaired water bodies in the 303(d) List, part of the Integrated Report. The 303(d) List also includes water bodies that are impaired from previous assessments. In addition, there are water bodies that are labeled as "impaired" but are not on the 303(d) List because they do not require the development of a Total Maximum Daily Load to address the impairment.

Water bodies either support their designated uses based on a comparison of monitoring data to the standards or they do not. In the simplest terms, if monitoring data indicate that a water body fully supports its uses, then the water body meets the state standards and water quality is considered good. If water quality data indicate a concern status based on the above definition, resources are allocated to collect more data and verify the concern. If monitoring data indicate that the water body does not support one or more of its designated uses, then it is said to be impaired and may have poor water quality. Impaired water bodies are placed on the TCEQ 303(d) List, which refers to the section of the Clean Water Act that requires states to identify impaired water bodies. See Table 3 for a list of impaired waterways in the Colorado River basin.

The 2022 Integrated Report Draft was adopted by TCEQ on June 1, 2022. The EPA approved the 2022 Texas Integrated Report on July 7, 2022. A Draft 2024 Integrated Report is pending completion.

***Table 3.*** *Impaired Water Bodies in the Colorado River Basin according to the 2022 Texas Integrated Report*

| Segment ID | Waterbody | County | Assessment Unit | Impairment | Year First Listed | Category |
|---|---|---|---|---|---|---|
| 1402C | Buckners Creek | Fayette | 1402C_01 | Dissolved Oxygen | 2010 | 5c |
| 1402H | Skull Creek | Colorado | 1402H_01 | Dissolved Oxygen | 2008 | 5b |
| 1403A | Bull Creek | Travis | 1403A_04 | Dissolved Oxygen | 2010 | 5c |
| 1405 | Lake Marble Falls | Burnet | 1405_01 | Excessive algal growth in water | 2022 | 5c |
| | | | 1405_02 | Excessive algal growth in water | 2022 | 5c |
| 1406 | Lake LBJ | Burnet, Llano | 1406_01 | Excessive algal growth in water | 2022 | 5c |
| | | | 1406_02 | Excessive algal growth in water | 2022 | 5c |
| | | | 1406_03 | Excessive algal growth in water | 2022 | 5c |
| | | | 1406_04 | Excessive algal growth in water | 2022 | 5c |
| | | | 1406_05 | Excessive algal growth in water | 2022 | 5c |
| | | | 1406_06 | Excessive algal growth in water | 2022 | 5c |
| 1407A | Clear Creek | Burnet | 1407A_01 | Aluminum in water | 2010 | 5c |
| | | | | Copper in water | 2018 | 5c |
| | | | | Nickel in water | 2014 | 5c |
| | | | | Sulfate in water | 2010 | 5c |
| | | | | Total dissolved solids in water | 2010 | 5c |
| | | | | Zinc in water | 2014 | 5c |
| | | | | pH | 2010 | 5c |
| 1411 | E.V. Spence Reservoir | Coke | 1411_01 | Chloride in water | 2014 | 5c |
| | | | 1411_02 | Bacteria in water | 2022 | 5c |
| | | | | Chloride in water | 2014 | 5c |
| 1412 | Colorado River Below Lake J.B. Thomas | Coke, Scurry | 1412_02 | Bacteria | 2008 | 5b |
| 1412B | Beals Creek | Mitchell, Howard | 1412B_03 | Bacteria | 2010 | 5b |
| 1416 | San Saba River | San Saba, Schleicher | 1416_01 | Bacteria | 2008 | 5c |
| 1416A | Brady Creek | San Saba, McCulloch | 1416A_03 | Dissolved Oxygen | 2004 | 5c |
| 1419 | Lake Coleman | Coleman | 1419_01 | Excessive algal growth in water | 2022 | 5c |
| 1421 | Concho River | Concho, Tom Green | 1421_08 | Dissolved Oxygen | 2008 | 5c |
| 1429 | Lady Bird Lake | Travis | 1429_01 | Excessive algal growth in water | 2022 | 5c |
| | | | 1429_02 | Excessive algal growth in water | 2022 | 5c |
| 1429C | Waller Creek | Travis | 1429C_01 | Bacteria in water | 2004 | 5c |
| | | | | Impaired macrobenthic community | 2002 | 5c |
| 1501 | Tres Palacios Creek Tidal | Matagorda | 1501_01 | Dissolved Oxygen | 1999 | 5b |

# Stakeholder Participation – Water Quality Advisory Committee

Clean Rivers Program activities are driven by local input from Water Quality Advisory Committee (WQAC) members throughout the basin. The WQAC is an advisory committee that identifies and prioritizes local water quality concerns. It is made up of a diverse group of stakeholders, including land owners, farmers, the general public, non-governmental organizations and state and federal agencies. Two WQAC meetings took place in 2023. One was hosted by LCRA and held in Austin with both in-person and virtual attendees from throughout the basin. The second meeting was held in San Angelo at the UCRA offices for stakeholders in the upper portion of the watershed.

WQAC meetings are open to the public. For more information and to get involved in the committee, visit https://www.lcra.org/water/quality/texas-clean-rivers-program/public-outreach/.

*Water Quality Advisory Committee members meet in Austin in 2023*