# WATER QUALITY SUMMARY 2023

EDWARDS AQUIFER AUTHORITY

## Background

The Edwards Aquifer Authority (EAA) monitors the quality of water in the Edwards Aquifer (Aquifer) by sampling streams, wells, and springs across the region.

The Aquifer is a karst groundwater system formed by the dissolution of limestone bedrock. Dissolution occurs as rainwater or groundwater chemically reacts with limestone. The process significantly enhances the permeability of the Edwards Aquifer by creating caves, sinkholes, and other features through which water moves. The Aquifer can be divided into three main hydrologic zones, each with distinct characteristics: perennial and intermittent streams in the Contributing Zone, rapid recharge and fast groundwater velocities in the Recharge Zone, and highly productive wells and large spring systems in the Artesian Zone.

Water quality in the Contributing Zone is affected by both rainfall and evaporation and may change rapidly in response to storm events. Similarly, water quality in the Recharge Zone can change quickly and vary significantly because of stream infiltration from the Contributing Zone, direct rainfall, and rapid groundwater velocities. However, water quality in the deep Artesian Zone is generally more stable because of slower groundwater velocities and larger volumes of water available for dilution.

## How We Monitor

The Aquifer is a unique and vulnerable asset. Therefore, the EAA established a comprehensive monitoring program to assess the quality of water throughout the Aquifer system. Water quality sampling consists of grab samples taken from streams, wells, and springs at specific times throughout the year. Grab samples are small discrete volumes of water that represent the composition of water present at a particular site and time.

Streams are generally sampled over the Contributing and Recharge zones. The resulting data is used to monitor the quality of water entering the Aquifer. Wells located throughout the Recharge and Artesian zones are sampled to assess the quality of groundwater within the Aquifer. Samples collected at springs provide composite data on water quality across the entire Aquifer system, reflecting contributions from recharge, groundwater, and surface water.

## Sampling in 2023

EAA staff collected grab samples from five streams, 26 wells, and four springs in two spring groups between January and September 2023. Water quality information for previous years can be accessed online at https://www.edwardsaquifer.org/science-maps/research-scientific-reports/hydrologic-data-reports/.

The results of laboratory analysis show that high-quality water enters and is produced by the Aquifer, making it suitable for a wide range of uses, such as municipal, agricultural, and livestock. Although most samples in 2023 contained no detectable contaminants, compounds of concerns that were detected typically had concentrations less than their maximum contaminant levels (MCLs) established by the US Environmental Protection Agency (US EPA).

## Understanding Results

Water quality samples were analyzed for bacterial (E. coli), nutrient, dissolved metal, volatile organic compound (VOC), semivolatile organic compound (SVOC), pesticide, herbicide, and polychlorinated biphenyl compound (PCB) content.

Concentrations of individual chemical compounds (analytes) are reported in micrograms per liter of sampled water (µg/L). This unit is equivalent to parts per billion (ppb). Bacterial content is reported in units of most probable number per 100 milliliters of water (MPN/100 mL), a statistically informed value produced by laboratory analysis. This unit estimates the E. coli population per 100 mL of sampled water.

## Summary

The EAA's sampling program provides data about the quality of water entering the Aquifer from surface streams, groundwater moving through the Aquifer, and the composite water that emerges at springs. The results of laboratory analyses for concentrations of bacteria, nutrient, dissolved metal, VOC, SVOC, pesticide, herbicide, and PCB compounds reveal that high quality water is present throughout the Edwards Aquifer system. Most water sampled from streams, wells, and springs did not have detectable levels of contaminants. Concentrations of dissolved metals were generally low and attributed to natural sources. In streams and springs, bacterial detections were likely caused by contamination from stormwater runoff and non-point sources.

Overall, the Edwards Aquifer produces some of the highest quality groundwater in the State of Texas. The EAA will continue to monitor water quality of the Contributing, Recharge, and Artesian zones in its mission to manage, enhance, and protect the Edwards Aquifer.

## Resources

Edwards Aquifer Habitat Conservation Plan

Edwards Aquifer Hydrologic Reports

Edwards Aquifer Open Records Request

EPA Drinking Water Standards

National Water-Quality Assessment (USGS)

TCEQ Contact Recreation Standards

Texas Administrative Code

## STREAM WATER QUALITY SUMMARY, CALENDAR YEAR 2023

| Water Quality Parameter Group | Number of Samples Collected | Number of Detections Exceeding CRS |
|---|---|---|
| Bacteria (E. coli) | 2 | 1 |
| Metals | 5 | 0 |
| Nutrients | 5 | 0 |
| Volatile Organic Compounds (VOCs) | 0 | 0 |
| Semivolatile Organic Compounds (SVOCs) | 5 | 0 |
| Pesticide and Herbicide Compounds | 5 | 0 |
| Polychlorinated Biphenyl Compounds (PCBs) | 0 | 0 |

*Figure 1. Summary of stream water sampling and concentrations of analytes in seven water quality parameter groups. Bacterial samples are compared with contact recreation standards as published in Texas Surface Water Quality Standards (Title 30, Chapter 307 of the Texas Administrative Code), available online at https://www.tceq.texas.gov/waterquality/standards/2014standards.html. The complete set of water quality data used in the 2023 Water Quality Summary is available via an open records request through the EAA's Contact Us webpage at http://www.edwardsaquifer.org/eaa/contact-us/.*

## WELL WATER QUALITY SUMMARY, CALENDAR YEAR 2023

| Water Quality Parameter Group | Number of Samples Collected | Number of Detections Exceeding MCL |
|---|---|---|
| Bacteria (E. coli) | 26 | 0 |
| Metals | 26 | 0 |
| Nutrients | 18 | 0 |
| Volatile Organic Compounds (VOCs) | 8 | 0 |
| Semivolatile Organic Compounds (SVOCs) | 8 | 0 |
| Pesticide and Herbicide Compounds | 8 | 0 |
| Polychlorinated Biphenyl Compounds (PCBs) | 0 | 0 |

*Figure 2. Summary of well water sampling and concentrations of analytes in seven water quality parameter groups. Results are compared to primary and secondary drinking water standards established by the US EPA and adopted by the State of Texas in Title 30 of the Texas Administrative Code, Chapter 290, Subchapter F, available online at https://www.sos.state.tx.us/tac/index.shtml. The complete set of water quality data used in the 2023 Water Quality Summary is available via an open records request through the EAA's Contact Us webpage at http://www.edwardsaquifer.org/eaa/contact-us/.*

## SPRING WATER QUALITY SUMMARY, CALENDAR YEAR 2023

| Water Quality Parameter Group | Number of Samples Collected | Number of Detections Exceeding CRS |
|---|---|---|
| Bacteria (E. coli) | 4 | 0 |
| Metals | 4 | 0 |
| Nutrients | 4 | 0 |
| Volatile Organic Compounds (VOCs) | 4 | 0 |
| Semivolatile Organic Compounds (SVOCs) | 4 | 0 |
| Pesticide and Herbicide Compounds | 4 | 0 |
| Polychlorinated Biphenyl Compounds (PCBs) | 4 | 0 |

*Figure 3. Summary of spring water sampling and concentrations of analytes in seven water quality parameter groups. Bacterial samples are compared with contact recreation standards as published in Texas Surface Water Quality Standards (Title 30, Chapter 307 of the Texas Administrative Code), available online at https://www.tceq.texas.gov/waterquality/standards/2014standards.html. The complete set of water quality data used in the 2023 Water Quality Summary is available via an open records request through the EAA's Contact Us webpage at http://www.edwardsaquifer.org/eaa/contact-us/.*

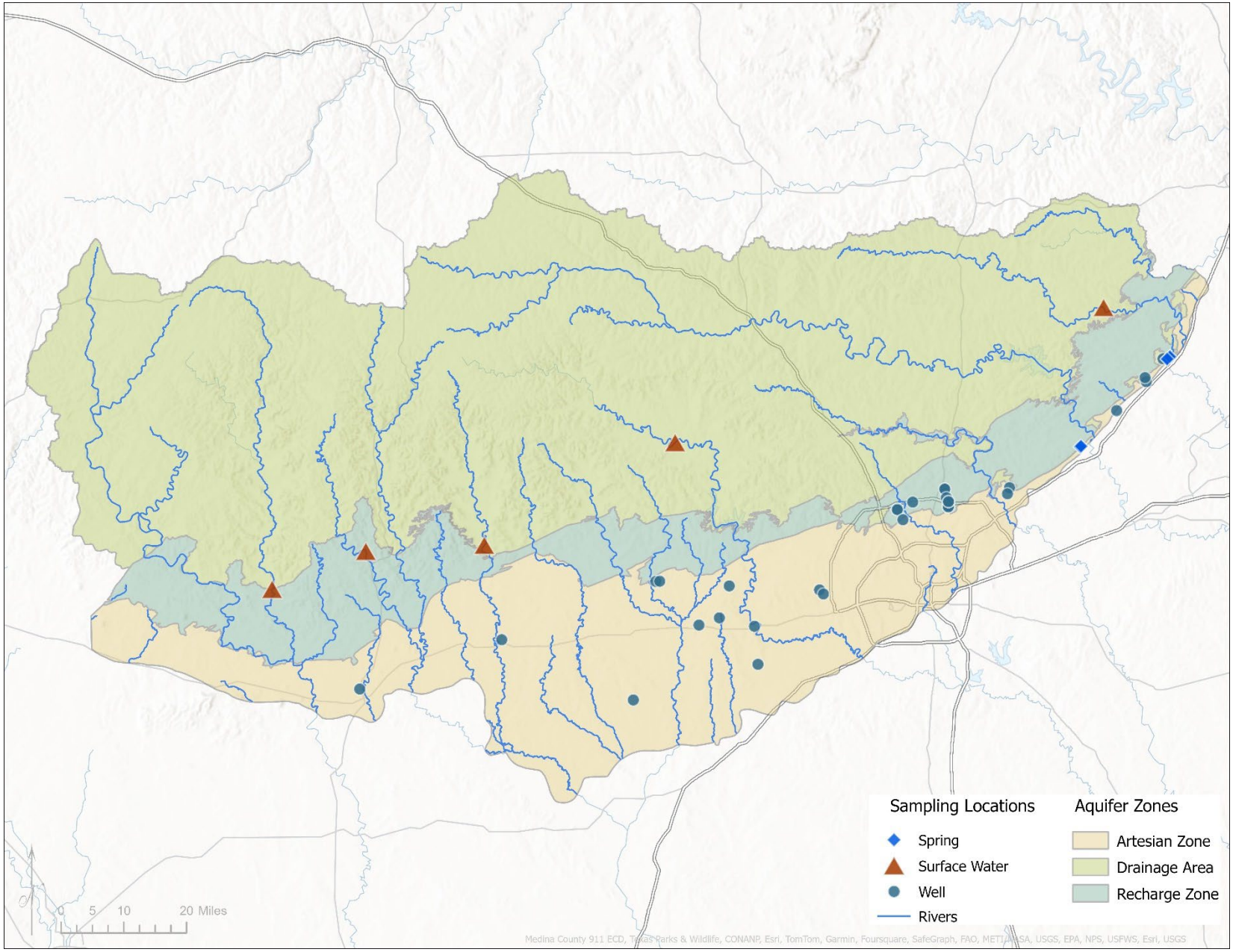


Figure 4. The map shows the locations for water quality samples collected by EAA staff in 2023. Samples were obtained from the Contributing, Recharge, and Artesian zones of the Edwards Aquifer.

Disclaimer: This map was created for demonstrative use by the Edwards Aquifer Authority (EAA) and not intended for other purposes. This map is to be used as an informational tool only.