



2018 WATER QUALITY SUMMARY



EDWARDS AQUIFER
AUTHORITY

Background

The Edwards Aquifer Authority (EAA) monitors the quality of the water in the Edwards Aquifer by sampling streams, wells, and springs across the region for a variety of parameters. Stream sample locations are near the Recharge Zone and are used to monitor the quality of water entering the Aquifer. Wells located throughout the Recharge and Artesian Zones are sampled to monitor water quality within the Aquifer. Spring samples monitor the quality of water flowing out of the Aquifer. EAA's sampling program provides a representative "snapshot" of water quality conditions across the entire Aquifer system.

The Edwards Aquifer is a karst groundwater system formed by the dissolution of limestone rock. Dissolution occurs when slightly acidic rainwater or groundwater dissolves the limestone to create caves, sinkholes, and other features. Dissolution processes significantly enhance the permeability of the Edwards Aquifer. The Aquifer is characterized by rapid recharge and fast groundwater velocities in the Recharge Zone, highly productive wells in the Artesian Zone, and large springs such as Comal and San Marcos springs.

Water quality in the Recharge Zone can change quickly and vary significantly due to stream infiltration, rainfall, and rapid groundwater velocities. In contrast, water quality in the deep Artesian Zone is generally more stable because of slower groundwater velocities and larger volumes of water for dilution.

Sampling in 2018

EAA staff collected water quality samples from 11 streams, 43 wells (27 Edwards Aquifer wells and 16 Trinity Aquifer wells; some wells were sampled multiple times), two alluvial wells, and five spring groups (see Map 1 for locations). All the water

samples were grab samples, which are discrete samples that represent the water composition at that specific time and place. The EAA's hydrologic reports for previous years, including water quality information, can be accessed at www.edwardsaquifer.org/science-and-maps/research-and-scientific-reports/hydrologic-data-reports.

The EAA sampled both Edwards and Trinity aquifer wells in 2018. There is significant interconnectivity between the aquifers based on evidence from multiple sources. These sources include upland recharge variability studies, streamflow gain and loss studies, tracer tests, analyses of multi-port monitoring wells, geochemistry data, biologic habitat analysis, geophysics data, and inferences from groundwater modeling. While the evidence clearly illustrates connectivity, there remains significant uncertainty regarding the volume of water that may move from the Trinity Aquifer to the Edwards Aquifer. The EAA has initiated the Edwards-Trinity Interformational Flow Investigation, which is a multi-year project designed to address this uncertainty. The current phase of this study aims to identify specific groundwater sites for further research. For more information, please visit www.edwardsaquifer.org/science-and-maps/research-and-scientific-reports/interformational-flow-study.

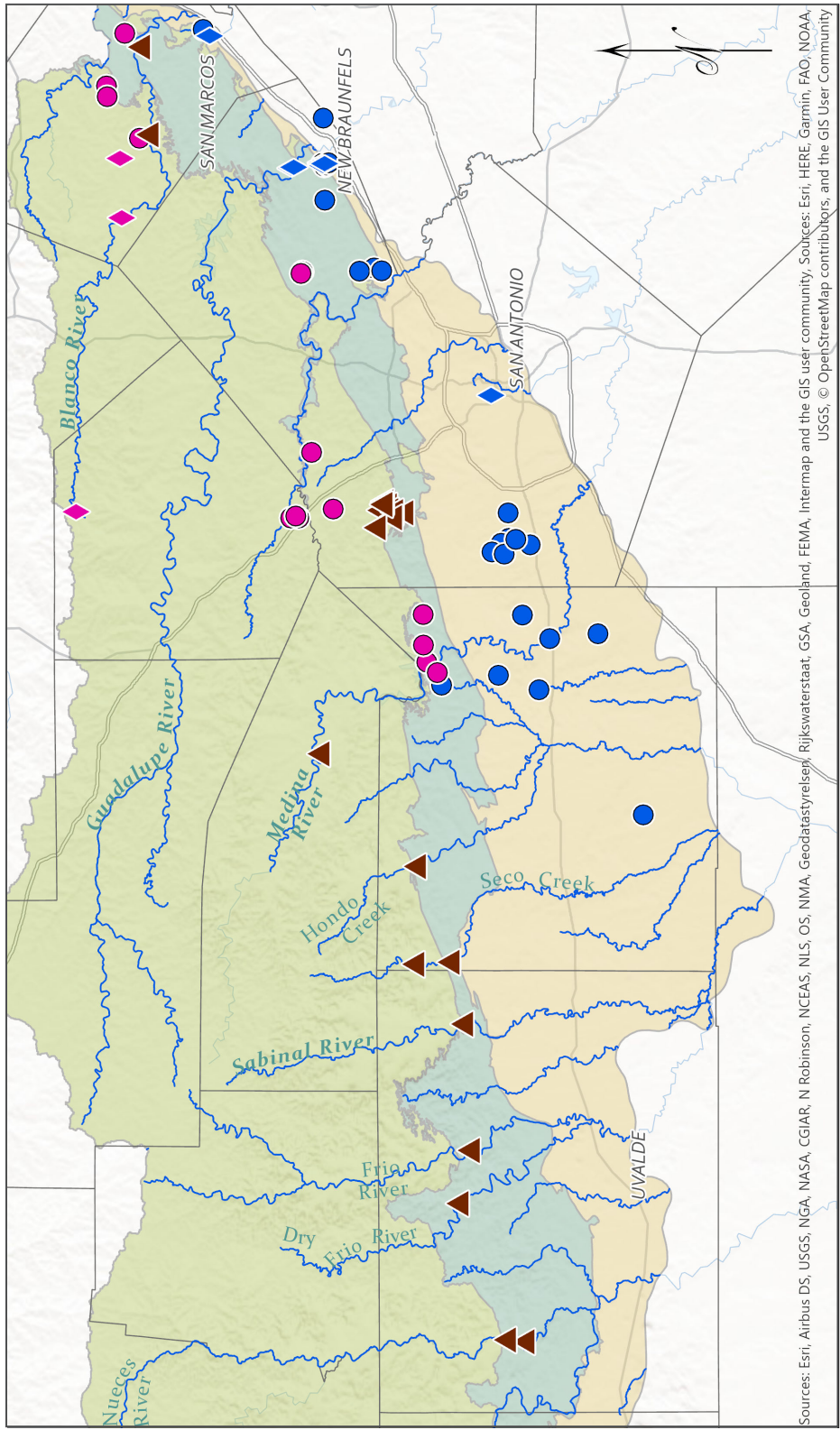
The high quality of water that recharges and is produced by the Edwards Aquifer makes it suitable for a wide range of uses. Although most samples in 2018 contained no detectable contaminants, organic compounds of concern that were detected typically had concentrations less than their maximum contaminant levels (MCLs) established by the Texas Commission on Environmental Quality (TCEQ).

SAMPLE COLLECTION SUMMARY, CALENDAR YEAR 2018

Water Quality Parameter Group	Number of Locations Sampled	Number of Samples Collected	Number of Detections Exceeding MCL
Bacteria	11 Edwards wells	11	0
	4 Edwards spring groups	21	0*
	11 stream sites	27	4*
Metals	27 Edwards wells	34	0
	16 Trinity wells	16	0
	4 Edwards spring groups	21	0
	1 Trinity spring group	2	0
	11 stream sites	27	0
Nitrate-Nitrite	27 Edwards wells	34	0
	16 Trinity wells	16	0
	4 Edwards spring groups	21	0
	1 Trinity spring group	2	0
	11 stream sites	27	0
Volatile Organic Compounds (VOCs)	10 Edwards wells	10	0
	4 Edwards spring groups	17	0
Semivolatile Organic Compounds (SVOCs)	10 Edwards wells	10	0
	4 Edwards spring groups	17	0
	8 stream sites	15	0
Pesticide and/or Herbicide Compounds	10 Edwards wells	10	0
	4 Edwards spring groups	17	0
	8 stream sites	15	2
Polychlorinated Biphenyls (PCBs)	4 Edwards spring groups	17	0

MCL= Maximum Contaminant Level. For water quality samples, analytical results are compared with the primary standards based on concentrations published in Title 30 of the Texas Administrative Code, Chapter 290, Subchapter F <http://www.sos.state.tx.us/tac/index.shtml>.

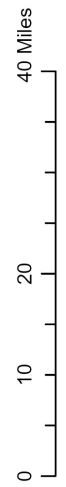
*Spring and stream bacteria samples are compared with contact recreation standards as published in Texas Surface Water Quality Standards (Title 30, Chapter 307 of the Texas Administrative Code).



- Explanation**
- ▲ Surface Water Sample Location
 - Trinity Well
 - ◆ Trinity Spring
 - ◆ Edwards Spring
 - Edwards Well
 - Artesian Zone
 - Contributing Zone
 - Recharge Zone

2018 Water Quality Sampling Locations

Scale: 1:900,000



Map 1. The map shows the locations for water quality samples collected by EAA staff in 2018. The samples represent 11 streams, 43 wells, 5 spring groups, and 2 alluvial wells. Samples were obtained from the Contributing, Recharge, and Artesian Zones of the Edwards Aquifer.

Wells

In the Edwards Aquifer wells sampled, no dissolved metals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), herbicides, or pesticides were detected in concentrations exceeding their respective MCLs.

Springs

Samples collected at springs represent water composited by the vast underground drainage network that makes up the Aquifer. No dissolved metals, VOCs, SVOCs, pesticides, herbicides, or PCBs were detected above their respective MCLs in the springs samples.

Streams

Streams that contribute significant recharge to the Edwards Aquifer were sampled biannually. Samples were generally collected at USGS gauging stations located near the Recharge Zone. No dissolved metals, PCBs, VOCs, SVOCs, herbicides, or pesticide compounds were detected above their respective MCLs in stream water analyses. While two samples had detections for the pesticide merphos, these results were caused by laboratory cross-contamination. Four samples were found to exceed contact recreation standards for bacteria. Elevated bacterial levels in surface water can be caused by a variety of events, such as high rainfall and runoff.

Summary

The water quality "snapshot" obtained through the EAA's sampling program reveals that high quality water is present throughout the Edwards Aquifer system. Most water sampled from streams in the Contributing and Recharge Zone, wells in the Re-

charge and Artesian zones, and springs in the Artesian Zone did not have detectable levels of contaminants. Pesticide detections were determined to be the result of laboratory contamination. In streams, the bacterial detections above contact recreation standards could have been caused by events like rainfall and runoff.

Overall, the Edwards Aquifer produces high quality water suitable for almost any use. 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.