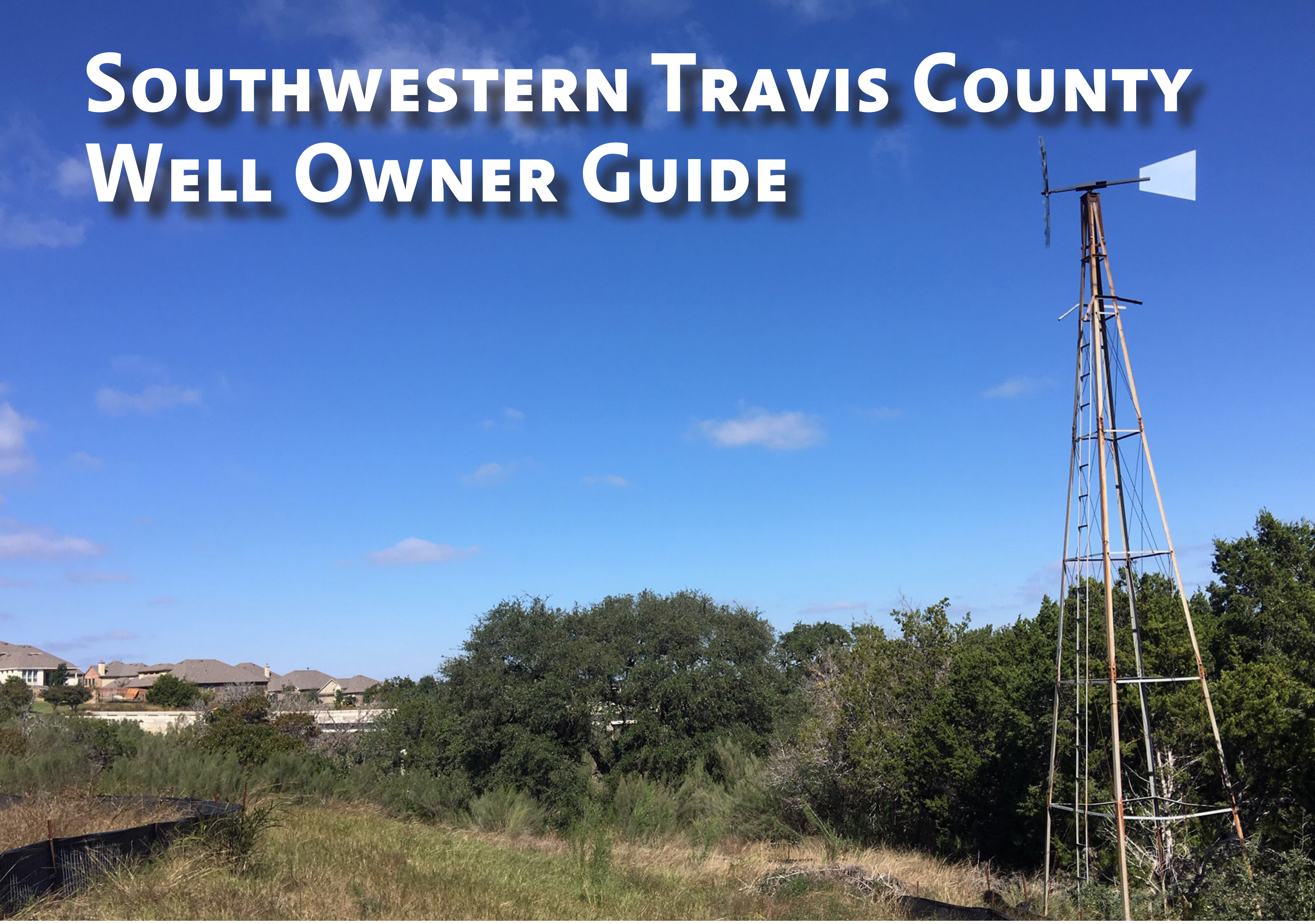
Southwestern Travis County Well Owner Guide



SOUTHWESTERN TRAVIS COUNTY GROUNDWATER CONSERVATION DISTRICT
www.SWTCGCD.org

COUNTY OF TRAVIS
STATE OF TEXAS
1839

Barton Springs Edwards Aquifer
CONSERVATION DISTRICT

Southwestern Travis County Groundwater Conservation District

Quick Facts

Created: **2017 by Texas Legislature (HB 4345)**
Confirmed: **November 2019 by voters**
Size: **212 square miles**
Aquifers: **Upper, Middle, Lower Trinity**
Groundwater Users: **11,500+ people**
Regional Planning: **SWTCGCD is included in GMA 9 and the Region K Water Planning Group.**
Endangered Species: **Golden-Cheeked Warbler, Black-Capped Vireo (now delisted), various cave-dwelling invertebrates**

Area History

In 1990, the Hill Country Priority Groundwater Management Area (PGMA) was designated in response to existing and projected groundwater availability and quality issues (Cross and Bluntzer, 1990). Southwestern Travis County lies within the Hill Country PGMA's northeastern boundary (*Figure 1*).

Mission

The mission of the SWTCGCD is to preserve and protect groundwater through conservation, education, and waste prevention.

Groundwater Resources

The area covers the unconfined (recharge) zone and the confined zone of the Trinity aquifers and underlying Paleozoic aquifers.

Territory

The SWTCGCD territory includes the Travis County portion of the Hill Country PGMA and is bound by the Colorado River to the north, by Blanco and Burnet counties to the west, by Hays County to the south, and by the Barton Springs/Edwards Aquifer Conservation District to the east (*Figure 2*).

Board Meetings

Regular Board meetings are typically held on the second Wednesday of each month at 9:30 AM. Visit www.swtcgcd.org for details.

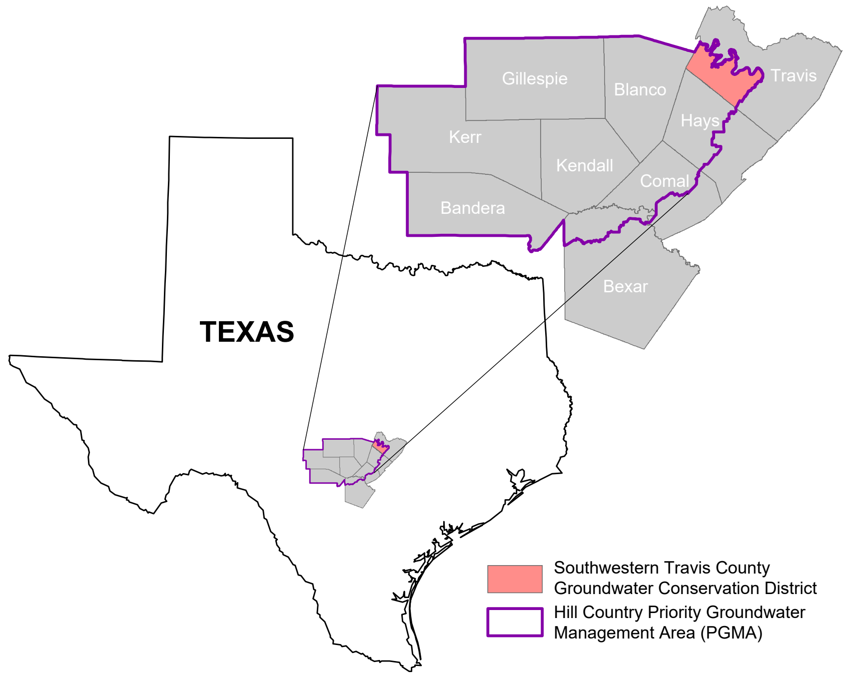


Figure 1*. The Hill Country Priority Groundwater Management Area (PGMA) was designated in 1990 by the Texas Water Commission in response to existing and projected groundwater availability and quality issues. Southwestern Travis County was included in the Hill Country PGMA.*

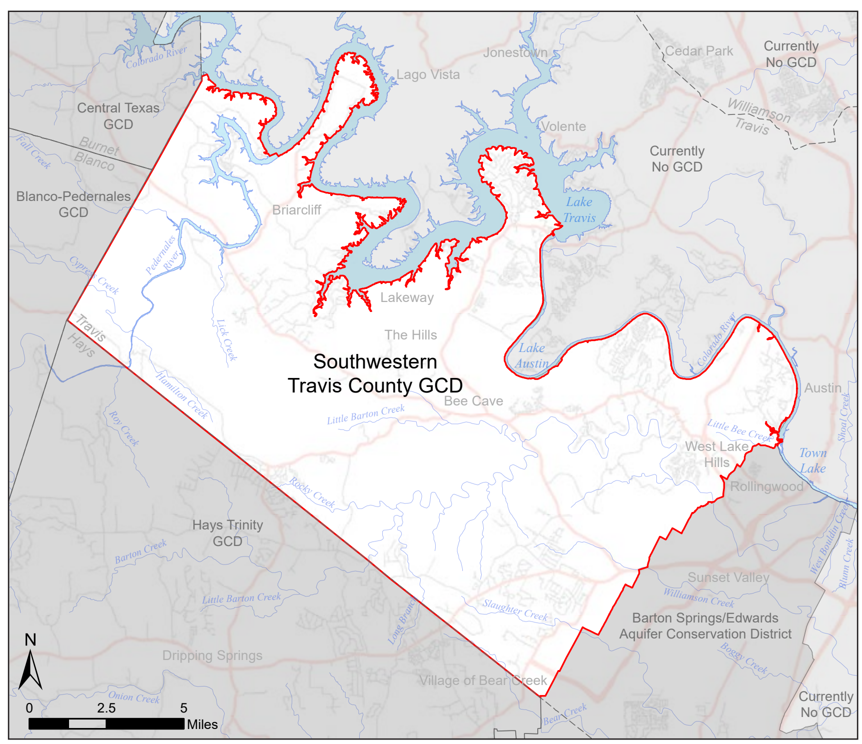


Figure 2*. Southwestern Travis County Groundwater Conservation District territory. Neighboring groundwater conservation districts (GCDs) and areas without a confirmed GCD are also shown.*

Regional Aquifers

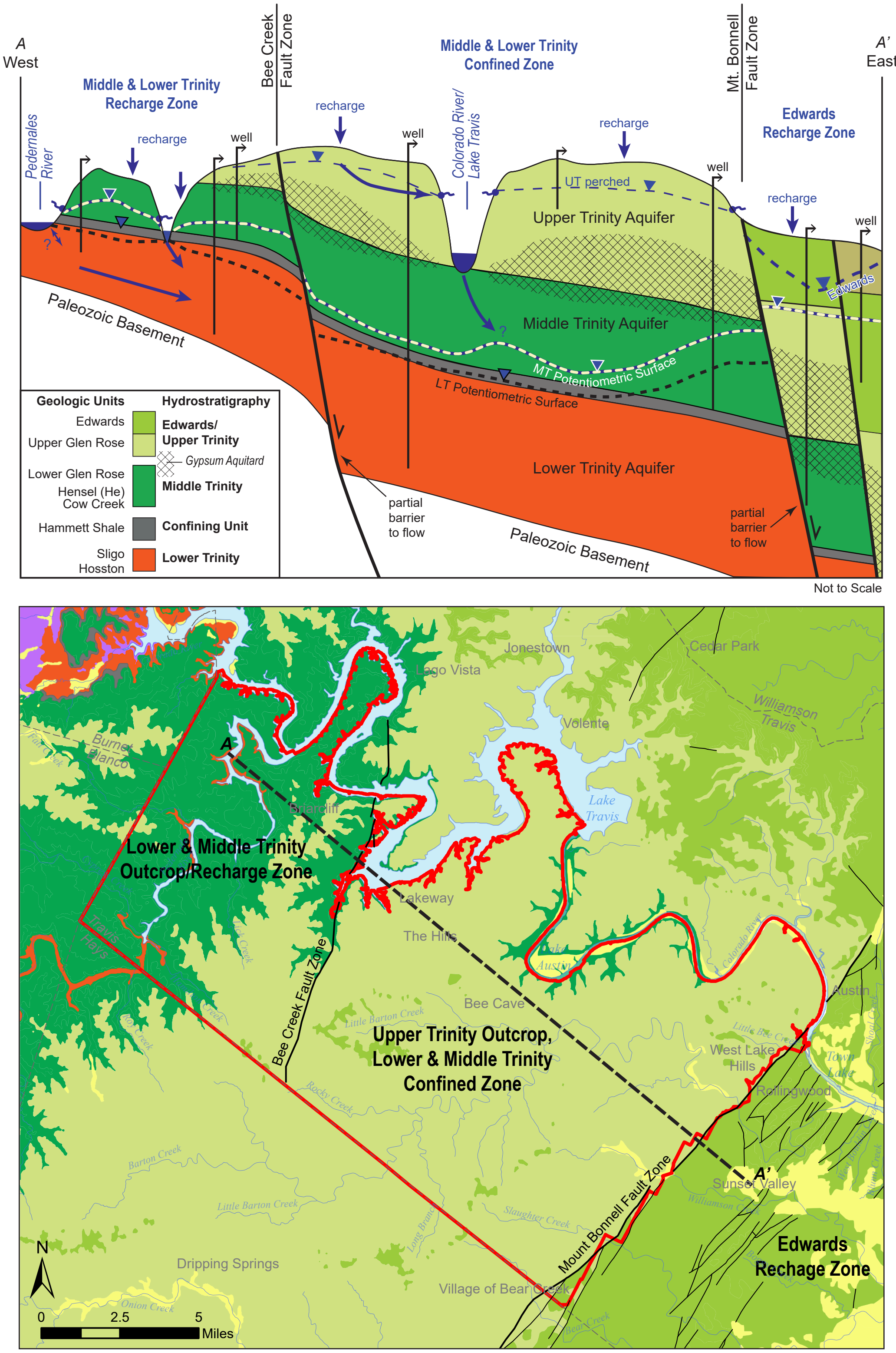


Figure 3. Top: schematic cross section (A-A' on accompanying map) showing generalized hydrogeologic features of Southwestern Travis County (SWTC). Note: potentiomentric surfaces represent the level to which groundwater in an aquifer would rise in a well at a given location and are based on measured water levels in wells. Bottom: geologic map of SWTC. Geologic units shown correspond to those in the schematic cross section above. The Bee Creek and Mount Bonnell Fault Zones are important structural features that appear to limit regional groundwater flow in SWTC.

Edwards & Upper Trinity Aquifers

Within Southwestern Travis County (SWTC), only thin remnants of the Edwards Group occur on hilltops. The Upper Trinity Aquifer is equivalent to the Upper Member of the Glen Rose Formation ("Upper Glen Rose"), which sustains seeps and springs that provide baseflow to creeks throughout SWTC.

Middle Trinity Aquifer

The Middle Trinity is composed of the Cow Creek, Hensel, and Lower Glen Rose formations. While the Middle Trinity is the primary aquifer in Hays County, it is targeted less frequently in SWTC due to depleted water levels that may prevent it from being a reliable source in some areas.

Lower Trinity Aquifer

The Lower Trinity Aquifer is composed of the Sycamore/Hosston and Sligo formations. Recent drilling trends suggest the Lower Trinity is the primary source of groundwater in SWTC.

Paleozoic Aquifers

Paleozoic aquifer units occur in the subsurface in SWTC, but their depths prevent them from being economically viable for production in most of SWTC.

Water-Level Trends

Middle Trinity Aquifer

Available water-level data indicate the Middle Trinity Aquifer is experiencing significant depletion in portions of Southwestern Travis County (SWTC) (*Figure 4*). The decline of Middle Trinity water levels and resulting loss of once-viable supply wells are likely due to pumping that exceeds the aquifer's natural recharge rate. Additional monitoring wells and data are needed to fully characterize water-level trends in SWTC.

Lower Trinity Aquifer

Water levels in Lower Trinity Aquifer wells have experienced a prolonged and progressive decline east of the Bee Creek Fault Zone (*Figure 5*). Water-level declines will likely continue in areas where pumping exceeds the aquifer's natural recharge rate. West of the Bee Creek Fault Zone, the Lower Trinity Aquifer may receive recharge from Lake Travis and the Colorado River.

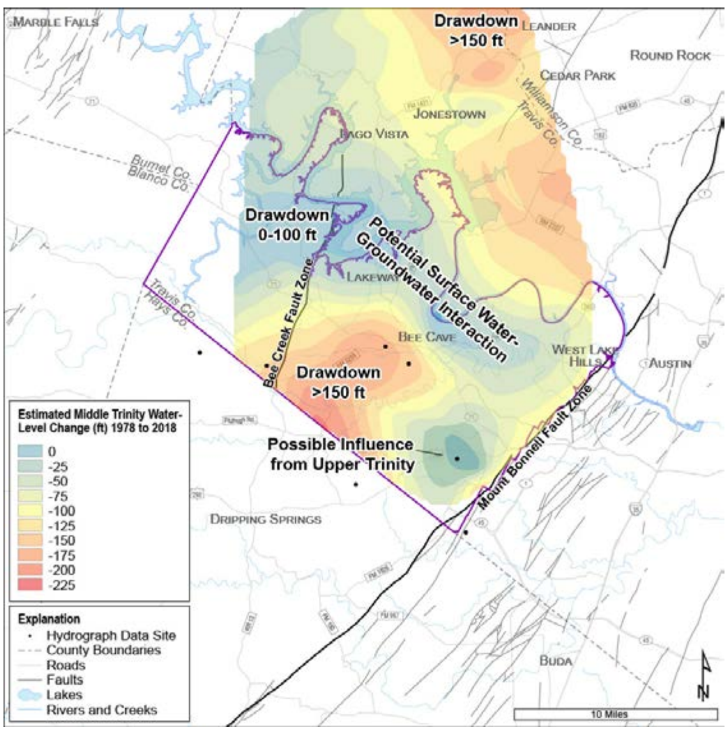


Figure 4. *Estimated water-level changes in the Middle Trinity Aquifer since 1978. Areas along the Colorado River experienced drawdown ranging from 0 to 100 feet, suggesting possible surface water and groundwater interaction. Localized elevated water levels in the southeast portion of the study area near Oak Hill may indicate natural leakage from the Upper Trinity or well completion artifacts. Water-level declines up to 200 feet occur south of the Colorado River near the City of Bee Cave and north of the Colorado River. The decline of Middle Trinity water levels is likely beyond any variation in seasonality and likely represents long-term depletion.*

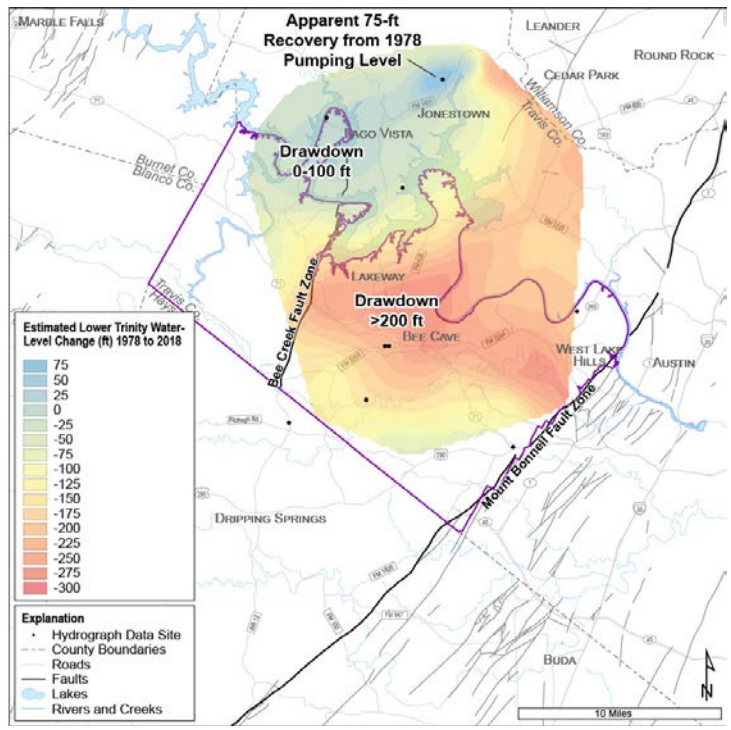


Figure 5. *Estimated water-level changes in the Lower Trinity Aquifer since 1978. Generally, areas northwest of the Bee Creek Fault Zone and along the Colorado River experienced water-level changes ranging from -25 feet to +75 feet, suggesting possible interaction between the Colorado River and Lower Trinity Aquifer. Areas west of the Bee Creek Fault Zone and south of the Colorado River had declines up to 100 feet. East and southeast of the Bee Creek Fault Zone, water-level declines of up to 300 feet are centered between Lakeway, Bee Cave, and Westlake Hills.*

Summary

Water levels in portions of the Middle and Lower Trinity aquifers in Southwestern Travis County have declined significantly since 1978. In areas near the City of Bee Cave, historic Middle Trinity wells are no longer viable as supply wells due to declining water levels. In some locations, the Lower Trinity Aquifer is declining more than 3 feet per year and may also be experiencing deteriorating water quality. Due to the continued drawdown over time, portions of the Middle and Lower Trinity aquifers can be described as experiencing moderate to significant depletion (equivalent to groundwater mining).

Groundwater Users

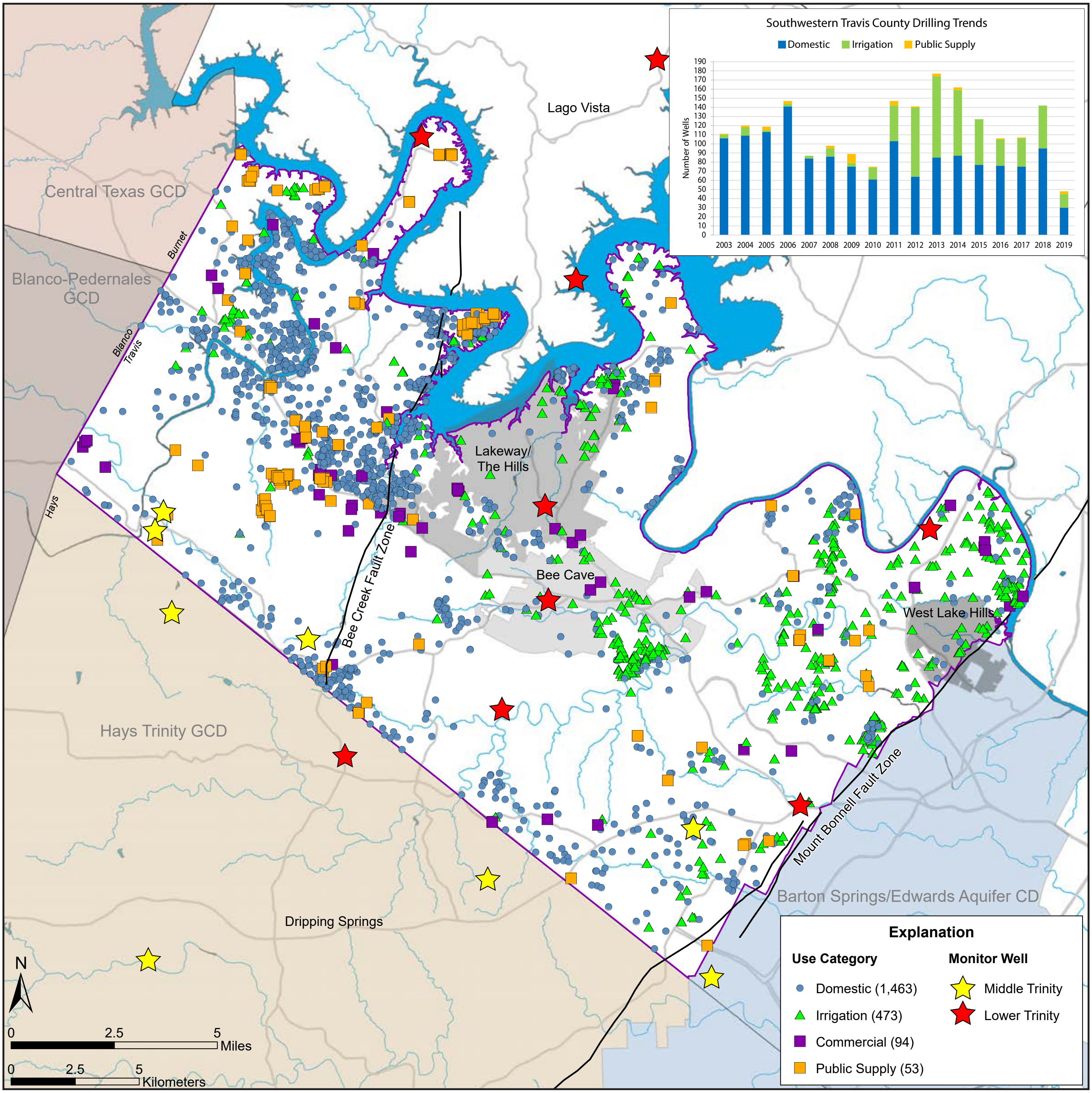


Figure 6. *Map and chart showing wells drilled in SWTC since 2003. As of July 2019, over 2,000 wells have been drilled in SWTC since 2003. Domestic use is the most common use category (well type). Public supply wells are generally concentrated west of the Bee Creek Fault Zone, while irrigation wells are generally concentrated east of the fault zone. Note the distinct increase in the number of irrigation wells drilled after the 2011 drought (see graph), when many water utilities began restricting outdoor watering times and days. Locations of monitor wells with historic and/or continuous water-level data are also shown. Totals shown for each use category are as of July 2019. Data source: TWDB Submitted Drillers Reports Database.*

Well Construction

Drilling rig at BSEACD's multiport monitor well near Bee Cave

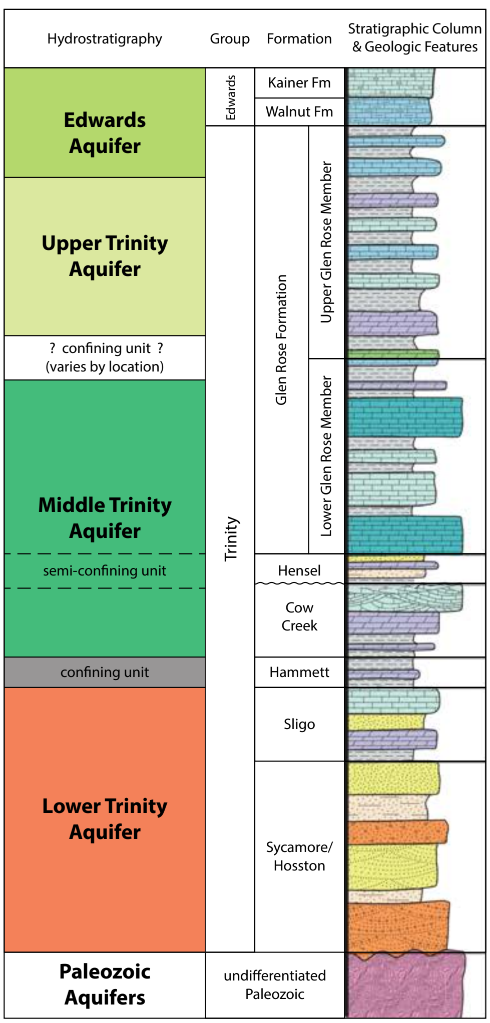


Figure 7. *Generalized stratigraphic column for SWTC.*

Modern wells are drilled by licensed drillers using drilling rigs, threaded pipe, and a drill bit. Hydrogeologists and drillers familiar with local aquifer characteristics can identify optimal well depths that provide the best quality and quantity of water. New wells drilled within the Southwestern Travis County GCD must comply with well construction standards established by the GCD to protect well owners and groundwater users alike.

At the surface, wells should have a solid, concrete pad that sheds water away from the well head and a thick steel sleeve that protects it. The well head should extend at least a foot above the ground and be sealed with a tight-fitting lid with gasket, called a sanitary well seal, to prevent surface water and contaminants from entering the well. There should be a 3/4-inch inspection port to allow for water-level measurements.

Below the surface, the well should be cased, or lined, with PVC or steel pipe. Grout is then injected behind the casing to further fortify it. Casing and grout prevent unstable upper portions of the well from collapsing and also help protect water quality. Typically, the inside diameter of the casing of a domestic well is 4 1/2 inches, which allows for service and installation of a submersible pump and access for water-level measurements.

Slotted or screened intervals of casing are often installed in modern wells to allow production from the targeted aquifer(s) while reinforcing the borehole. In some instances, wells are not cased to the bottom of the borehole. The uncased interval is considered 'open hole,' that is, the well is open to the aquifer or water-bearing rock formation. Whether cased or open hole, a submersible pump is usually positioned near the bottom of the borehole to maximize water availability as the water level fluctuates. The average domestic well usually yields around 10 gallons per minute (GPM), though well yields can vary significantly throughout Southwestern Travis County.

Wells drilled before the creation of the SWTCGCD are not subject to current well construction standards, and consequently may be more susceptible to water quality issues. Drilling logs and driller's records can provide insight into how wells were constructed. If you suspect poor water quality or potential contamination, have your well tested (see the *Water Quality* section of this guide for more information).

For more information about SWTCGCD well construction standards, visit www.swtcgcd.org.

Well Maintenance and Protection

The U.S. EPA's rules that protect public drinking water systems do not apply to individual water systems, such as privately owned wells. As an individual water system owner, it is up to you to make sure that your water is safe to drink.

A well is a direct connection to an aquifer, so protecting the well head is the first line of defense against contamination.

Wells should be checked and tested annually for mechanical problems, cleanliness, and the presence of certain contaminants, such as coliform bacteria, nitrates/nitrites, salinity, or any other contaminants of local concern. Well water should be tested more than once a year if there are recurrent incidents of gastrointestinal illness among household members or visitors and/or a change in taste, odor, or appearance of the well water.

All hazardous materials, such as paint, fertilizer, pesticides, and motor oil, should be kept far away from your well. When mixing chemicals, do not put the hose inside the mixing container, as this can siphon chemicals into a household's water system. Always check the well cover or well cap to ensure it is intact. The top of the well should be at least one foot above the ground.

Common Well Components

	Pump Protector	Pressure Tank	Storage Tank
What does it do?	It protects submersible pumps from burning out due to low yield or low water levels.	It provides pressure for household or irrigation use. Sizes range from 10 to 200 gallons; average size is 44 gallons.	It stores water for peak household or irrigation demand and allows the pump to gradually fill the tank. Sizes range from 2,500 to 6,000 gallons.
How does it work?	It monitors the pump's electrical current and automatically trips a switch to turn off the pump if it runs too long.	It maintains a constant water pressure and turns the pump on once a set volume is used. For example, a 44-gallon tank has a drawdown of 16 gallons.	A float switch triggers the pump once the water level in the tank falls below a set level. Storage tanks reduce stress on the pump.
Do you have one?	These are recommended for all wells, especially shallow wells or wells with known supply issues.	Most well systems have one. Most commonly they are small, blue metal tanks. They are often confused with storage tanks but they are much smaller.	Storage tanks are especially useful for wells in drought-prone aquifers or in formations with low yield. They can be filled by external supplies in emergencies.

Common Household Treatment Systems

	UV	Chlorination	Reverse Osmosis
What does it do?	UV light systems neutralize harmful bacteria without changing the taste of the source water.	Chlorine water treatment methods work to eliminate odor issues and disease-causing bacteria.	Reverse osmosis (RO) systems filter constituents such as bacteria, sulfate, nitrate, nitrite, dissolved salts, and more.
How does it work?	Water passes through pre-filters to remove particles that could hide bacteria, then through a light tube where UV rays neutralize remaining bacteria.	Injected chlorine kills harmful bacteria and oxidizes constituents such as iron and manganese. Usually comes in liquid or pellet forms.	Water is pushed through a membrane material that acts to filter out particles and other contaminants before being flushed from the system as waste.
Do you have one?	The UV light bulb should be replaced annually to maintain effective treatment. Pre-filters need to be cleaned/replaced throughout the year.	Often paired with filtration. Consult with your professional installer to ensure proper treatment through dosage and equipment functionality.	Usually paired with additional filtration methods to extend the life of the RO membrane. Remove particulates, inspect, and maintain regularly.

Water Quality

The Lower and Middle Trinity aquifers are the primary sources of groundwater within Southwestern Travis County (SWTC). Water quality can vary substantially in the Trinity aquifers depending on well location, depth, and construction. Though groundwater within SWTC often requires minimal treatment, well owners are encouraged to test water quality annually to ensure it is safe to use. Common contaminants can jeopardize the health of users, especially vulnerable populations like children, the elderly, or those with compromised immune systems.

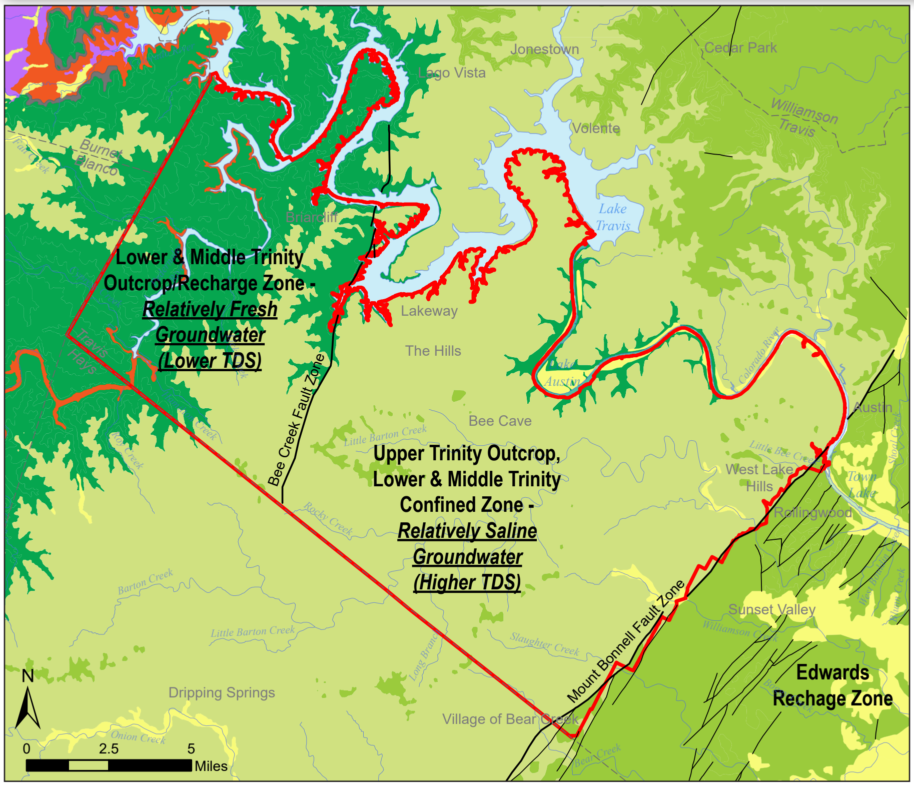


***Figure 8**. Map showing general water-quality trends in southwestern Travis County.*

A simple and comprehensive indicator of groundwater chemistry and quality is the relative amount of total dissolved solids (TDS). Water with less than 1,000 mg/L of TDS is considered fresh, while TDS ranges of 1,000 to 3,000 mg/L and 3,000 to 10,000 mg/L are considered slightly saline and moderately saline, respectively (Brune and Duffin, 1983).

In SWTC and the surrounding areas, TDS and isotope data can generally be used to delineate areas of recharge. In general, groundwater is fresh and relatively young in areas west of the Bee Creek Fault Zone, where Middle and Lower Trinity units are exposed at the surface (*Figure 8*). East of the Bee Creek Fault Zone, groundwater within the Middle and Lower Trinity Aquifers is generally more saline and relatively older, reflecting its isolation and distance from recharge areas. Local exceptions may occur along the Colorado River and other areas due to other geologic or well-completion influences.

The Upper Trinity and Edwards Aquifers both contain fresh, relatively young groundwater owing to direct recharge facilitated by surface exposures throughout SWTC and the surrounding areas.

Common Water-Quality Issues

The presence of fecal coliform bacteria in groundwater indicates that waste from humans or warm-blooded animals may have contaminated the water. Water contaminated with fecal coliform bacteria is more likely to also contain pathogens that can cause diarrhea, cramps, nausea, or other symptoms.

Water with nitrate levels at or above 10 parts per million (ppm) is considered unsafe for human consumption. Nitrate levels above 10 ppm can disrupt the blood's ability to carry oxygen throughout the body, resulting in a condition called methemoglobinemia. Infants less than 6 months of age and young livestock are most susceptible.

Salinity as measured by total dissolved solids (TDS) is also an important characteristic. Water with high TDS levels may leave deposits and have a salty taste and may be a concern for people on salt-restricted diets. Additionally, using water with high TDS for irrigation may damage soil and plants.

Water-quality samples

Drought Impacts

Drought is a common occurrence in Central Texas (*Figure 9)* and can cause significant decreases in groundwater levels and springflow in the Trinity aquifers. In Southwestern Travis County, some Upper and Middle Trinity wells, especially near the City of Bee Cave, are reported to run dry during severe drought. Springs in the area can also stop flowing as groundwater levels decline.

Groundwater is a shared resource, and research shows that collectively reducing pumping slows water-level decline. Water conservation is critical to protecting water availability during drought.

To reduce drought impacts on groundwater users in Southwestern Travis County (including you), the Southwestern Travis County Groundwater Conservation District (SWTCGCD) has adopted drought management rules. SWTCGCD monitors aquifer conditions and key drought indicators, including water levels in designated monitoring wells and data from the U.S. Drought Monitor (*Figure 10*). These indicators help assess groundwater conditions across the District.

Based on declared drought stages and permit types, permitted well owners must reduce pumping by specified amounts and follow an approved drought contingency plan. For details on SWTCGCD's drought management, visit www.swtcgcd.org.

Pumping restrictions and coordinated conservation efforts help protect groundwater supplies for all users by slowing depletion. Every conservation effort—big or small—makes a difference. We're all in this together!

For more information about drought in Texas, including Southwestern Travis County, visit:
www.waterdatafortexas.org/drought.

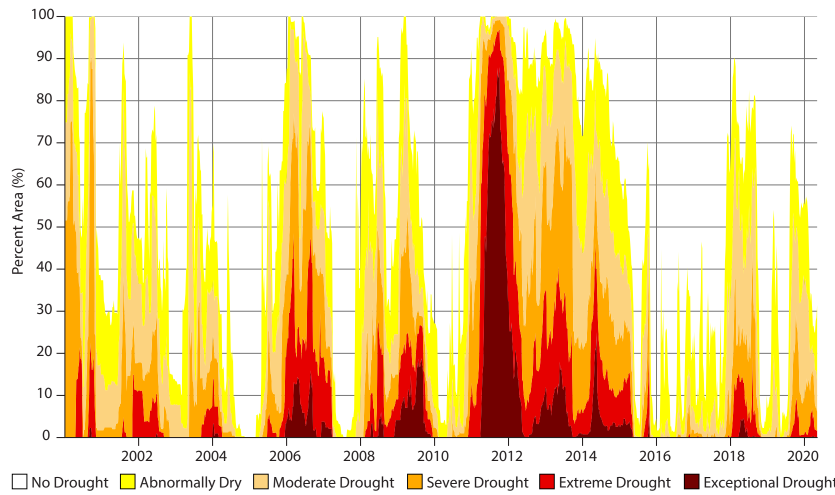


Figure 9. *Percent of Texas experiencing drought conditions. Drought categories shown are from the U.S. Drought Monitor and correspond to SWTCGCD drought stages. See Figure 10 for descriptions of each category. Source: U.S. Drought Monitor.*

Category	Potential Impacts
D0 Abnormally Dry	• Grass fires increase • Surface water levels decline
D1 Moderate Drought	• Wildfire frequency increases • Stock tanks, creeks, streams are low • Voluntary water restrictions are requested
D2 Severe Drought	• Wildfire danger is severe; burn bans implemented • Well water use increases • Mandatory water restrictions implemented
D3 Extreme Drought	• Increased risk of large wildfires • Severe fish, plant, and wildlife loss • Water sanitation is a concern • Reservoir levels drop significantly • Surface water is nearly dry; river flow is very low
D4 Exceptional Drought	• Extreme sensitivity to fire danger • Widespread tree mortality • Most wildlife species' health and population suffer • Devastating algae blooms; water quality is very poor • Exceptional water shortages (surface water sources) • Water table is declining • Water levels at or near historic lows

Figure 10. *U.S. Drought Monitor drought categories, which correspond to SWTCGCD drought stages, and their potential impacts. SWTCGCD drought stages, triggers, and corresponding usage reduction measures and restrictions are defined in District Rule 5.2. Source: U.S. Drought Monitor.*

Water Conservation

Natural climate cycles in Central Texas require residents to regularly alternate between drought recovery and drought preparation. From downpours to drought, Central Texas oscillates between humid, subtropical conditions in wet years and semi-arid conditions during dry years. With three major droughts in the last ten years, 'average' conditions don't seem very common these days. Given limited water resources and projected increases in demand, it is crucial that residents find innovative, water-saving strategies to live by.

Water-Saving Plant Solutions

Every plant is native to some place. Plants thrive where the environment naturally meets their needs. Central Texas native plants are well adapted to the region's dramatic wet and dry cycles and require little to no supplemental irrigation. Other plants, known as adapted or drought-tolerant species, can also survive and thrive in our climate. By choosing native or drought-tolerant plants, residents can reduce water use and maintenance requirements while still enjoying colorful, vibrant landscapes that support wildlife.

Landscaping for Conservation

Native and drought-tolerant plants require about half as much water as turf grass (SAWS, 2010). Replacing all or part of a lawn with a water-wise landscape can reduce outdoor water use by up to 75% (AWWA, 2010), especially when paired with efficient irrigation systems like drip lines or soaker hoses. Incorporating rainwater harvesting is another effective way to conserve water. Rainwater can be collected and stored for later use on landscapes, reducing the demand on groundwater and public water supplies. Even small-scale systems can make a meaningful difference during dry periods.

Adding compost helps build healthy soil and improves water retention, while seasonal mulching reduces weeds and conserves moisture. A diverse landscape not only saves water but also promotes wildlife habitat and improves plant resilience to disease (Damude & Bender, 1999). For plant selection and composting tips, consult your local AgriLife Extension office.

Lawns and Groundwater Use

Traditional turf lawns are not native to Central Texas and often require high inputs of water, particularly during dry periods. Irrigating lawns with groundwater places unnecessary strain on already limited resources and should be minimized or avoided whenever possible. If a lawn is desired, consider native meadow grasses like buffalo grass, blue grama, and curly mesquite. These species are drought-tolerant, support native wildlife, and require far less water than conventional turf. Some non-native but drought-tolerant options include Bermuda grass and zoysia. St. Augustine grass, commonly used in Texas, is not recommended due to its high water demand. Prioritizing native landscaping and incorporating rainwater harvesting are among the most impactful steps residents can take to conserve groundwater and protect long-term sustainability of our water resources.

	Buffalo	Blue Grama	Curly Mesquite	Bermuda	Zoysia	St. Augustine
Texas Native	Yes	Yes	Yes	No	No	No
Water Requirement	Very Low	Moderate/Low	Moderate/Low	Moderate/Low	Moderate/Low	Moderate
Drought Tolerance	Excellent	Excellent	Excellent	Very Good/Excellent	Very Good	Moderate/Good (in shade)
Leaf Texture	Fine	Fine	Fine	Fine	Medium/Fine	Coarse
Mowing Height	2.5-3 in.	3-4 in.	3-4 in.	1-2 in.	0.5-2 in.	2.5-3 in.
Mowing Frequency	7-14 Days	21-35 Days	21-35 Days	3-7 Days	5-10 Days	5-7 Days

***Figure 11**. Turfgrass comparison chart. Source: Texas A&M AgriLife.*

Online Resources

Southwestern Travis County Groundwater Conservation District

www.swtcgcd.org

Hydrogeologic Atlas of Southwest Travis County

http://dx.doi.org/10.26153/tsw/8570

A collaborative study by the Barton Springs/Edwards Aquifer Conservation District (BSEACD) and Travis County focusing on groundwater resources of Southwestern Travis County.

TWDB Water Data for Texas

www.waterdatafortexas.org

Access real-time groundwater-level data, drought conditions, reservoir levels, weather data (TexMesonet), and more.

Travis County Transportation & Natural Resources

www.traviscountytx.gov/tnr

Groundwater Management Area 9

www.GMA9.org

Texas Well Owner Network

twon.tamu.edu

The Texas A&M AgriLife Extension Service has an active Texas Well Owner Network that helps educate well owners about pollution prevention, well maintenance, and water-quality issues.

TWDB Water Data Interactive Map

www.twdb.texas.gov/groundwater/data

Search for nearby well data through the Texas Water Development Board (TWDB) interactive map viewer. Data from the Submitted Drillers Reports Database (wells drilled since 2003) and TWDB Groundwater Database are available.

TCEQ Water Well Report Viewer

www.tceq.texas.gov/gis/waterwellview.html

TCEQ's Water Well Report Viewer is an online, map-based locator of over 800,000 historical reports for water wells drilled in Texas. A water well report includes information about the: well location, depth, and construction; water level; local geology; driller and original owner.

Texas Department of Licensing and Regulation

www.tdlr.texas.gov

Search for licensed water well drillers and pump installers by license number or by county. Search for violations by license type. Click on the 'Search Site' tab to view search options.

LCRA Environmental Laboratory Services

www.lcra.org/services/els

This accredited lab offers a variety of water-quality testing services.

Southwestern Travis County
Groundwater Conservation District
8656 W Hwy 71, Suite 224
Austin, TX 78735
512-276-2875
www.swtcgcd.org

Mission

To preserve and protect groundwater through conservation, education, and waste prevention.

This Guide is brought to you by a collaboration between Travis County Transportation and Natural Resources, the Barton Springs/Edwards Aquifer Conservation District, and the Southwestern Travis County Groundwater Conservation District.

Acknowledgements

The authors would like to acknowledge the collaboration and support from the following agencies, organizations, and individuals: Texas Water Development Board, Shield Ranch, Westcave Outdoor Discovery Center, Travis County Parks, St. Stephen's Episcopal School, The University of Texas at Austin, City of Austin, and Participating Landowners of Southwestern Travis County and Hays County.

Figure Sources

All figures in this guide were adapted from the Hydrogeologic Atlas of Southwest Travis County, Central Texas (Hunt and others, 2020), except for Figures 9–11, which cite their respective sources.

Disclaimer

The information in this document was compiled and made available as a public service by the Barton Springs/Edwards Aquifer Conservation District, Travis County, and the Southwestern Travis County Groundwater Conservation District. Interpretations, evaluations, and professional judgements were made according to standard geoscience practice. However, the authors make no warranty as to the accuracy, reliability, or completeness of the information and are not responsible for any errors or omissions or for results obtained from the use of the information. Use of the information is the sole responsibility of the user.

Copyright 2025