

Protect Your Well Water and the Edwards-Trinity Aquifer

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The Edwards-Trinity Aquifer underlies 30 counties of the Texas Edwards Plateau and extends over 500 feet deep (Fig. 1). Many Texas landowners and cities depend on this high-quality, usually abundant source of groundwater.

The aquifer is mostly a karst formation—a landscape with large spaces and holes that can transmit large amounts of water quickly (Fig. 2). The Edwards-Trinity Aquifer formed when underground limestone dissolved, leaving behind caverns, conduits, and large springs. The aquifer contains caves, sinkholes, sinking



Figure 2. Closeup of a karst formation

streams, and highly productive (easily replenished) water wells.

Because water flows readily through porous limestone structures (Fig. 3), they allow water to seep underground and replenish (*recharge*) the aquifer quickly. However, karst topography is also more likely to allow contaminants to enter and spread throughout an aquifer.

To help keep the water from the aquifer clean and safe, water wells must be built and maintained according to state regulations. If you own a well, groundwater protection is doubly important. You are the manager of your own water system—it is your responsibility to protect your water supply.

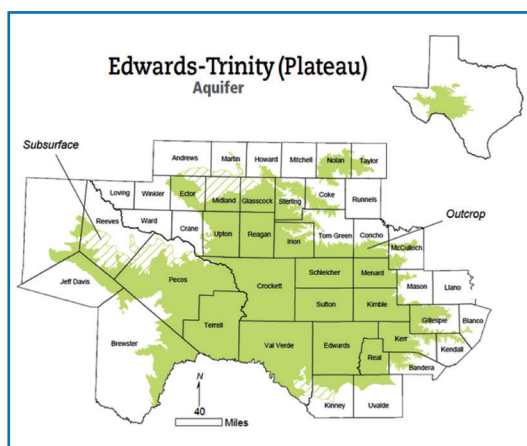


Figure 1. Counties over the Edwards-Trinity Aquifer



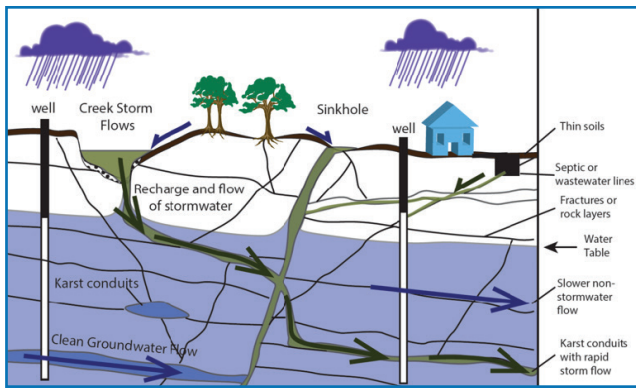


Figure 3. Schematic cross section of the Edwards Aquifer during storms. Source: Barton Springs/Edwards Aquifer Conservation District, <http://www.bseacd.org/publications/articles/edwards-aquifer-storm-flows-and-your-well/>

Groundwater flow and contamination

Karstic topography can easily carry water for miles. Although this high rate of productivity can benefit private well owners, it also means that contaminants can flow quickly over a large area. Recharge can influence water quality dramatically. Depending how deep the water circulates, it can remain in the Edwards-Trinity Aquifer for a few hours or days to many years.

These characteristics of karst aquifers make them especially vulnerable to contaminants where water wells are not built or maintained properly.

State regulations

Texas has strict requirements for well siting and construction as well as the submission of well completion reports (Fig. 4). The construction and licensing requirements are administered through the Texas Department of Licensing and Regulation (www.tdlr.texas.gov/).

The State has set limits on how close a well can be to potential sources of contamination. Wells must comply with not only state regulations, but also incorporated city ordinances and local groundwater conservation district (GCD) rules. The well-head must be at least:

- 50 feet from any water-tight septic tank or liquid-waste collection facility
- 50 feet from any neighboring property line

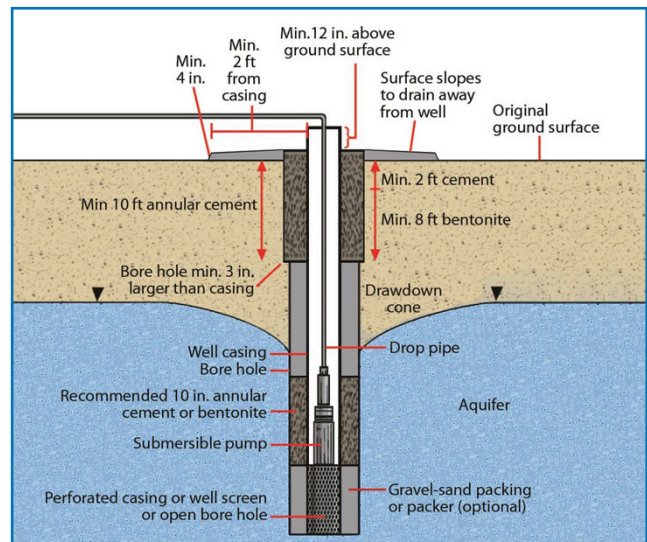


Figure 4. State requirements for water well construction

- 100 feet from any existing or proposed septic system drain field or leach field or dry litter poultry facility
- 150 feet from any shelter or yard for pets or livestock, feed storage facility, and pesticide or fertilizer storage facility

If possible, a new well must not be built in areas that are vulnerable to flooding. It must also be sealed properly to prevent contaminants on the ground surface from seeping down and polluting the aquifer.

If a licensed well driller installed your well after 1983, it probably complies with current Texas regulations on wellhead construction. The well must have at least 10 feet of sealed well casing, which is a tubular structure that maintains and protects the well opening, pull cable, and electrical wires in the well shaft, or *borehole*. The casing must extend at least 1 foot above the ground surface.

You can further protect your well water from pollution by extending the casing to the top of the water table and by sealing the entire annular space, which is the space between the casing and the bore-hole wall. Although the extra casing will increase construction costs, it will also provide better protection for the aquifer.

Above ground, a 4-inch-thick concrete pad must extend at least 2 feet in all horizontal directions to protect the well casing. The casing should

extend at least 1 foot above the ground surface or 1 foot above any known flood level.

This configuration protects the well from floodwater or ponded water and reduces the risk of contaminants seeping into the aquifer around the well casing.

Other configurations may also be appropriate and in compliance with Texas regulations. For information on these alternatives, see <https://www.tdlr.texas.gov/wwd/wwdspecs.htm>.

If you are unsure that your well meets these standards, ask the local GCD to inspect it. A list of GCDs is posted on the website of the Texas Alliance of Groundwater Districts at <https://texasgroundwater.org/gma-map/>.

More information is also available from the *Water Well Basics* guide at http://twon.tamu.edu/media/291840/esc-013_water-well-basics.pdf.

Common contaminants

In addition to making sure that the well was completed and maintained properly, you need to safely store common household items that can contaminate groundwater. Several publications explain how to protect groundwater from common contaminants:

- Fertilizers: <http://twon.tamu.edu/media/469450/managing-fertilizers-to-protect-groundwater.pdf>
- Animal manure: <http://twon.tamu.edu/media/619613/animal-manure-storage-to-protect-groundwater.pdf>

- Waste from septic systems: http://twon.tamu.edu/media/619653/esc-015_septicsyspta-3.pdf
- Pesticides and fuel: <http://twon.tamu.edu/media/619629/twon-pesticides-esc-016.pdf> and http://twon.tamu.edu/media/619633/sc-017_twonpetroleumprod_cxd_pte-2.pdf

What to do about abandoned wells?

An abandoned well is one that is not in use and not capped properly. Abandoned and deteriorated wells can channel contaminants to groundwater and nearby active wells. Abandoned wells can also be a hazard to human and animal life.

To learn more about abandoned wells, see *Plugging Abandoned Water Wells* at <http://twon.tamu.edu/media/385874/plugging%20abandoned%20water%20wells.pdf>.

For more information

- Texas Well Owner Network: <http://twon.tamu.edu/fact-sheets/>
- Water Well Drillers and Pump Installers Administrative Rules: <http://www.tdlr.texas.gov/wwd/wwdrules.htm#76100>
- Edwards Aquifer, Storm flows, and Your Well: <http://www.bseacd.org/publications/articles/edwards-aquifer-storm-flows-and-your-well/>
- Texas Ground Water Protection Committee: <http://www.tgpc.state.tx.us/index.php>

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