

Groundwater Monitoring Wells

What is a monitoring well?

Texas Water Code (TWC) Section 27.002, defines a “Monitoring well as a well that is used to measure or monitor the level, quality, quantity, or movement of subsurface water.”

For example, monitoring wells can either be specifically drilled for monitoring groundwater or may be preexisting domestic or public-supply wells that are also used for monitoring.

Why are monitoring wells important?

Groundwater is one of Texas’ most important resources. Of the 13.9 million acre-feet (one acre-foot is the volume of water that will cover one acre to a depth of one foot or approximately 325,829 gallons of water) used in Texas in 2014, 8.4 million acre-feet (60.4%) is from groundwater and the remaining 5.5 million acre-feet (39.6%) is from surface water. In general, groundwater systems are dynamic and respond to short-term and long-term changes in the environment. This is especially true for karst (limestone) aquifers. Water-level monitoring wells are the principal sources of data about hydrologic stresses on an aquifer. These stresses affect groundwater recharge, storage, and discharge.

What makes a good monitoring well?

Selecting a well to measure for water levels or monitor for water quality and other scientific purposes will depend on several factors:

- Well location;
- Permission from the well owner to measure or sample the well;
- Condition of the well (including the casing) must ensure prevention of pollutants from entering the well; and
- Well completion information (data about which portion of the aquifer or aquifers are contributing water to the wellbore).

For additional details, see Barton Springs Edwards Aquifer Conservation District, November 3, 2015 article: “*What Makes a Good Monitor Well?*” at <https://bseacd.org/2015/11/what-makes-a-good-monitor-well/>.

If a municipality or private well owner has a water well that is rarely used or a well scheduled to be plugged that meets the above criteria, it is possible the well can be repurposed as a water-level or biological monitoring well. If you would like more information, please contact the Texas Water Development Board (TWDB) Water Science and Conservation Division at (512) 463-8043 or your local groundwater conservation district (GCD). See <https://texasgroundwater.org/resources/gcd-index/> or

<https://www.tceq.texas.gov/downloads/groundwater/gcd/gcd-contact-list.pdf/view> for contact information on GCDs.

How are monitoring wells used?

Monitoring wells collect groundwater data for scientific studies and to make environmental regulatory decisions. Scientific uses include the collection of water quality and biological samples, water-level measurements and tracer studies.

Monitoring wells also provide small windows into the aquifer, which is a habitat that is difficult to study. Sampling efforts using monitoring wells may help refine the known extent and size of populations of groundwater species that inhabit the aquifer.

Dye tracer is injected into monitoring wells to figure out the direction of groundwater flow, location of discharge points, and groundwater travel time. Water-level measurements obtained from monitoring wells help determine the “desired future conditions” (DFCs) of an aquifer. The DFC of an aquifer (adopted per TWC Section 36.108) refers to the quantified status of various groundwater variables (such as water levels, water quality, spring flows, or volumes), at a specified time or times in the future or in perpetuity. These same measurements help calibrate groundwater availability models used to quantify the proposed desired future conditions.

Are there other uses for these groundwater data?

Intended use(s) for water-level data depend on the length of data collection. Typically, data collected within days are used in aquifer tests, mapping the altitude of the water table (potentiometric surface), or recording short-term aquifer changes. Long-term monitoring data (collected over years and decades) are used in groundwater-surface water interaction studies, monitoring groundwater flow directions, determining regional effects of groundwater development (such as land surface subsidence), and recording the possible effects of changing weather patterns (which may reduce recharge resulting in lower water levels). In addition, water quality data is used to further understand the habitat requirements for groundwater species, which geologic areas may provide suitable groundwater habitat, and impacts from other issues such as drought and groundwater use.

Resources and Useful Links

- TWDB groundwater data: <https://www.twdb.texas.gov/groundwater/data/>
- Texas Alliance of Groundwater Districts (TAGD): <https://texasgroundwater.org/>
- United States Geological Survey (USGS), *USGS Groundwater Data for the Nation*: <https://waterdata.usgs.gov/nwis/gw>.

Other Frequently Asked Questions (FAQs)

To find additional FAQs visit the Texas Groundwater Protection Committee’s FAQ webpage at <https://tgpc.texas.gov/frequently-asked-questions-faqs>.