

Groundwater Monitoring Wells

What is a monitoring well?

By definition in Texas Water Code § 27.002, a

“Monitoring well means 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 principle 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:

- 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 regarding 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?](http://bseacd.org/2015/11/what-makes-a-good-monitor-well/)” at <http://bseacd.org/2015/11/what-makes-a-good-monitor-well/>.

If a municipality or private well owner has a 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 Water Science and Conservation Division at (512) 463-8043 or your local Groundwater Conservation District (<https://texasgroundwater.org/gma-map/>) for additional details.

How are monitoring wells used?

Monitoring wells are used to 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 determine the direction of groundwater flow, location of discharge points, and groundwater travel time. Water-level measurements obtained from monitoring wells are used in the process of determining the “desired future conditions” of an aquifer. The Desired Future Condition of an aquifer (adopted in accordance with Section 36.108 of the Texas Water Code) 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 are also used to 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 may be 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.

For additional information on monitoring groundwater, see

- Texas Water Development Board (TWDB) at: <http://www.twdb.texas.gov/groundwater/data/>
- Texas Alliance of Groundwater Districts (TAGD) at: <http://www.texasgroundwater.org/>, and
- United States Geological Survey (USGS) at: <http://waterdata.usgs.gov/nwis/gw>.

For additional Frequently Asked Questions (FAQs) visit the Texas Groundwater Protection Committee’s FAQ webpage at <http://tGPC.texas.gov/frequently-asked-questions-faqs/>.