



Groundwater Monitoring

Out of sight, out of mind—although this statement may have described many Texans' perception of groundwater in the not-too-distant past, more people now realize that our aquifers hold one of the state's greatest resources, particularly as drought's more immediate effects on surface water resources become understood. In 2019, an estimated 55 percent of all water used in Texas came from beneath the ground. As the state's population continues to grow in the coming decades and increases the demand on drought-depleted reservoirs, groundwater will only become more vital. The Groundwater Monitoring Department provides historical and up-to-date information on the depth of groundwater and its quality in the 31 recognized major and minor aquifers of Texas. The information this group collects is critically important to all Texans. From a regional and often long-term perspective, such as that considered by public sector planners, private consultants, and researchers, management and conservation plans must be based on accurate groundwater data. From a localized and often near-term perspective, such as that taken by public water supply and private well owners, more immediate decisions must be based on real-time water level data in comparison to available historical data.

Annual or Periodic Water Level Measuring

Each year, the Texas Water Development Board (TWDB) and partner entities collect groundwater level measurements from more than 7,000 wells throughout the state. The types of wells measured range from domestic, stock, and irrigation to public water supply, commercial, and industrial. Measuring is generally done with steel tapes, although electric lines and pressure gauges are sometimes used. Monitoring staff normally measure water levels during cooler months when groundwater pumping is at a minimum to ensure that the measurements are most indicative of static or ambient conditions. Several other groups also provide the TWDB with water level measurements: groundwater conservation districts, a few cities, and the U.S. Geological Survey routinely contribute at least 25,000 measurements annually, often providing data quarterly or monthly from a measured well. The TWDB and other entities attempt to measure the same wells each year, recognizing the value of many measurements over a long period. These sites are all part of the TWDB's current observation well network.

Real-time Water Level Recording

The Groundwater Monitoring Department, with the cooperation of groundwater conservation districts and other entities

throughout the state, currently maintains 250 automatic recorder wells in 102 counties. This program has grown steadily in the past several decades, incorporating newer technology as resources become available. The recorders measure groundwater levels in real time and transmit the data by satellite to the TWDB Water Data for Texas website where daily readings are published. The equipment at each site typically consists of dataloggers attached to water level recording devices, such as transducers or floats and pulleys; satellite transmitters; power sources, including solar panels; antennae; and equipment shelters. More than half of the recorders that the TWDB maintains include equipment purchased by groundwater conservation districts. As part of the mandate to collect data, the TWDB is working to incorporate and establish connections to real-time data from the U.S. Geological Survey and other groundwater conservation district instrumented wells.

Groundwater Quality Sampling

In addition to monitoring water levels through continuous recorders and periodic visits, the TWDB routinely samples groundwater in all Texas aquifers. The purpose of this program is to detect changes in groundwater quality over time and establish baseline natural water quality conditions in the state's aquifers. The TWDB samples a representative number of wells and springs from each of the state's nine major and 22 minor aquifers approximately once every four years. As part of the Groundwater Quality Sampling Program, the Springs Monitoring Program was initiated in 2020 to monitor and inventory a consistent network of springs across the state annually. Groundwater quality data collected by other groups that follow the TWDB's sampling guidelines or equally stringent protocols, such as groundwater conservation districts, are also uploaded to the TWDB database. The TWDB provides analytical funding for several of these groups as budget is available. Over a four-year sampling period, approximately 1,300 groundwater quality analyses are collected through TWDB staff and cooperating entities.

Groundwater Databases

We estimate that more than 1.68 million water wells have been drilled in Texas since 1900, although as many as half of these may now be abandoned. The TWDB maintains a groundwater database with information on nearly 130,000 wells originally drilled for the purpose of water extraction and springs in Texas, of which 10 to 15 percent have relatively current information. The TWDB also maintains the submitted

driller's report database that currently includes information on over 400,000 water wells drilled in the last decade. The maintenance of this database not only helps support the Water Well Drillers Program at the Texas Department of Licensing and Regulation but also provides the public with a more complete understanding of water well drilling activity throughout the state. Groundwater data from these two databases are available for free on the TWDB website in several formats. Thanks in part to cooperation from private well owners and public agencies, these are some of the most comprehensive statewide databases in the United States.

Please contact Rebecca Storms at Rebecca.Storms@twdb.texas.gov or 512-475-3302 or visit www.twdb.texas.gov/groundwater/data for more information on groundwater monitoring programs.

This image shows the location of wells (in blue) and springs (in red) in the groundwater database, accessible at www3.twdb.texas.gov/apps/WaterDataInteractive/GroundWaterDataViewer.

