



Groundwater Monitoring

Out of sight, out of mind—although that may describe many Texans’ perception of groundwater in the past, more people now realize that aquifers are among the state’s greatest resources, particularly as drought’s more immediate effects on surface water resources is understood. In 2022, approximately 54 percent of all water used in Texas came from beneath the ground. As the state’s population continues to grow and increases the demand placed on drought-depleted reservoirs, groundwater will only become more vital.

The Texas Water Development Board (TWDB) Groundwater Monitoring Department provides historical and up-to-date information on the depth of groundwater and its quality in Texas’ 31 recognized major and minor aquifers. The information the TWDB 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 TWDB and partner entities collect groundwater level measurements from more than 8,000 wells throughout the state. The types of wells measured include domestic, stock, and irrigation along with public water supply, commercial, and industrial wells. Measurements are most often taken with steel tapes and electric lines, and occasionally with pressure gauges. The TWDB normally measures 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 50,000 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 cooperative 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 and reports data for 271 automatic recorder wells in 117 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’s 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. Nearly half of the recorders that the TWDB maintains include equipment purchased by groundwater conservation districts. As part of its 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, and to expand the network to counties where no recorders exist.

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. 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 when budget is available. Over a four- year sampling period, approximately 1,800 groundwater

quality analyses are collected or received through the TWDB and cooperating entities.

Springs Monitoring

The Springs Monitoring Program was initiated in 2020 to address the lack of springs data collected and reported on in Texas. The goals of the program are to document the springs of Texas and to monitor short and long-term changes in flow rate and water quality data from a network of springs across the state. There are currently 15 network springs visited by the TWDB annually. The number of springs in the network have changed since the program's inception and will continue changing to meet the evolving goals and needs of the program.

Groundwater Databases

We estimate that more than 1.75 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 includes information on over 650,000 water wells drilled since 2001.

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.

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.

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

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

