

Texas Groundwater Conditions

Groundwater Importance - Groundwater makes up a large part of Texas' usable and potentially usable freshwater resources and is a fundamental component of the state's total water supply. Groundwater supplied nine million acre-feet of the more than 16 million acre-feet of water used by Texans for domestic, municipal, industrial, and agricultural purposes. Texans used 78.4% of this water for irrigation, 15.7% for municipal purposes, 2.4% for manufacturing, 1.6% for livestock, 1.3% for mining, and 0.6% for power. Approximately 40% of all water used for municipal supply is groundwater. Over half (54.9%) of Texas' population depends on groundwater for its drinking water supply.

Where is it? - Seventy-nine percent (79%) of Texas' 170,000,000 plus acres is underlain by nine **major** and twenty-one **minor** aquifers. **Major** aquifers are regional in scope and produce large quantities of water, whereas **minor** aquifers tend to be smaller and produce less water. Still other undifferentiated, local aquifers may represent the only source of groundwater in areas where major or minor aquifers are absent. Texas' nine major aquifers supply about 96% of all the groundwater currently used.

Texas law mandates water planning (both surface and groundwater) and charges the Texas Water Development Board (TWDB) with its implementation. The most recent State Water Plan, *Water for Texas - 2002*, is the result of three years of efforts by 16 Regional Water Planning Groups, nearly 900 public meetings and hearings, and the combined efforts of the state's natural resource management agencies. The Plan identifies all water user groups, records their projected water demand over the next 50 years, indicates whether the group needs additional water in the future, and provides water management strategies to meet the projected need.

How Good is the Water? - Ambient and Public Water Supply monitoring has demonstrated that overall groundwater quality is good. Ninety-six percent (96%) of the population of Texas is served by Public Water Supply systems that meet or have better quality water than the primary drinking water standards.

The TWDB conducts groundwater resource assessments by collecting data on the State's aquifers, including the occurrence, availability, quality, and quantity of groundwater and the current and projected demands on groundwater resources. This program is carried out statewide through the groundwater level measurement

program, groundwater quality sampling program, and groundwater studies.

Approximately one thousand wells are sampled and analyzed for ambient water quality each year in a five year cycle which covers the entire state. Groundwater is analyzed for major cations/anions, pH, and limited radionuclides, and for other quality parameters including salinity and nitrates. The sampling program is focused on naturally occurring constituents, and as such is not a good indicator of contamination caused by human activities. Similarly, this sampling is not a measure of local impacts on groundwater quality, as the monitoring locations are widely dispersed throughout the area underlain by the subject aquifers and are intended to reflect conditions of the aquifer as a whole.

Results from the 2001 sampling effort indicate areas of concern in Texas. Some samples exceeded the primary drinking water standard for antimony, arsenic, barium, chromium, fluoride, gross alpha & beta, lead, nitrate, selenium, and thallium and the secondary drinking water standard for chloride, fluoride, iron, manganese, pH, sulfate, and dissolved solids.

Contamination cases caused by human activities are tracked annually by the Texas Groundwater Protection Committee (TGPC). The current edition of Texas' *Joint Groundwater Monitoring and Contamination Report - 2001**, documents 7,435 cases of groundwater contamination at regulated facilities. Gasoline, diesel, and other petroleum products make up the major contaminants, as 94% of cases are reported under the Petroleum Storage Tank program. A vast majority of the contamination cases are located near expanding population centers. This contamination is generally confined to the surface or near surface.

Costs of Contamination - Contamination cost in general cannot be accurately estimated. The cleanup of groundwater is expensive and tends to require a great length of time to achieve. Consequently, Texas' first focus is on contamination prevention. Nonetheless, in addition to money received from the Federal government, Texas has established large funds for reimbursement of cleanup costs related to leaking petroleum storage tanks, "state superfund" sites, oil and gas remediation, reclamation of abandoned mine lands, and spill responses.

Efforts to Protect Groundwater - Texas' groundwater protection efforts are implemented

through three types of program activities: 1) groundwater protection, 2) groundwater remediation, and 3) groundwater conservation. The TGPC, comprised of key state agencies with groundwater protection responsibilities, has developed and is implementing the *Texas Groundwater Protection Strategy*.*

Groundwater quality protection is the first programmatic component that defines the states' protection efforts. Section 26.401 of the Texas Water Code (TWC) sets out the goal of non degradation for the state's groundwater protection program. TWC §26.401 also asserts that groundwater should be kept reasonably free of contaminants that interfere with present and potential uses of groundwater. This is achieved through the various permitting and licensing programs

The second programmatic component of Texas' efforts is groundwater quality remediation. Aquifers vary both in their potential for beneficial use and in their susceptibility to contamination. Once contamination has occurred, the goal of remediation programs is to restore the quality of groundwater if feasible. Remediation programs have been developed, which focus on protection of groundwater for high-quality uses, including human health, and address the cost of available remediation technologies. This risk-based approach is protective of human health and the environment, and offers a scientifically sound and administratively effective way to respond to pressures for timely action at larger numbers of sites and the efficient use of both public and private resources. Additionally, the approach considers the actual or reasonable potential for public and environmental exposure to contaminants in the determination of the timing, type, and degree of site remediation.

Conservation of groundwater resources is the third component of the groundwater protection strategy. Texas has the authority to form locally controlled conservation districts with groundwater management powers to regulate well spacing, production control, and conveyance limitations. These districts are the primary mechanisms for groundwater conservation and management in the state.

What Else is Needed? - Lines of communication among the various agencies, organizations, and governments (adjacent states and The Republic of Mexico) should be strengthened to coordinate Texas' groundwater protection strategy with water supply planning

efforts.*

Greater efforts are needed to assess water quality in and contamination prevention for domestic (private) wells in rural and suburban Texas. Public educational efforts are needed to address the operation and maintenance of domestic onsite wastewater systems and to provide information on treatment methods for naturally occurring contaminants..

Additional efforts are needed to better evaluate and address nitrate contamination of aquifers. In some areas of the State, nitrate concentrations are rising in groundwater. Sources are subject to debate, but the potential health and environmental effects are a concern.

A statewide ambient groundwater monitoring system needs to be developed that will meet the various needs of all state agencies. The parameters that are included in ambient groundwater quality monitoring efforts needs to be expanded to include organic and synthetic chemicals.

All available data sources should be checked for validity using accepted quality assurance measures and placed into an electronic format with a spatial data element for indexing in a relational database. Identification and location (spatial, for GIS tracking) of actual and potential sources of contamination should be included.

*Logon to the Texas Groundwater Protection Committee's website (www.tgpc.state.tx.us) for detail of responsible agencies and TGPC publications.



