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Buried Treasure

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"The water question is solved," Dallas proclaimed in 1890 when a well drilled on the courthouse square gushed water 42 feet in the air.

Four years later Waco boasted of that city's twenty wells providing "a practically inexhaustible quantity of soft, clear, and sparkling water."

Dallas and Waco long ago outgrew their groundwater resources. Because their water supplies attracted too many users, both cities must now compete for surface water rights with other cities, industries, and irrigators.

Groundwater levels continue to drop as much as 20 feet per year in the areas around Dallas and Waco. This decline forces groundwater users to pay higher pumping costs, to install new pumps, or to drill new wells. Many others dependent upon groundwater have had to search for surface water supplies, learn to use less water, haul water, or move.

Few towns anywhere in Texas can now claim adequate water to meet future demands. While more than half of all towns and cities in the state still depend entirely on groundwater for their water supply, many know that soon, very soon, they too must compete with others for surface water.

Texas still has more than 325 million acre-feet of fresh water stored beneath its land surface. That is more than ten times the amount of water held in all the reservoirs in the state. An additional five million acre-feet enters underground storage areas on the average each year.

Groundwater comes from rain or other precipitation which moves by gravity through the layers of earth. The water fills porous layers of rock, sand, sandstone, or limestone. A rock or clay layer below stops the water from moving deeper into the soil profile.

If enough water is contained in an area to produce a usable supply, the storage area is called an aquifer. Aquifers store fresh water beneath over half of all land surface in Texas.

As an aquifer fills, the water level of the aquifer rises towards the earth's surface. In areas with clay or rock above as well as below the water-saturated layer, groundwater is held under pressure. Pumping too much water from an aquifer causes the water level to decline or the pressure to drop.

Groundwater offers some tremendous advantages over surface water.

- Naturally filtered as it makes its way through layers of soil, groundwater is generally free of bacteria and sediments.
- Groundwater is less affected by rainfall variations, and therefore a more dependable source during low rainfall years than surface water.
- Treatment and distribution costs are minimal compared to surface water because groundwater is usually high in quality and near to the demand site.
- Some aquifers can hold water for centuries without losing water to evaporation or seepage. Aquifers are also more protected from pollutants than are surface sources.
- Wells and pumps have much less impact on an environment than dams, reservoirs, canals, and other surface water development facilities.

TREASURE OR TROUBLE

Groundwater is undoubtedly one of Texas' most valuable treasures. Dependence upon it, however, is probably the major reason why future water supply is a critical problem for the state today. The easily obtainable, seemingly inexhaustible, groundwater in Texas has caused the following situations:

- 1. Cities and industries prosper far from rivers or reservoirs.
- 2. Fields produce lush crops in semi-arid regions.
- 3. Heavy water users locate in water-short Gulf Coast areas.
- 4. Seventy percent of all water presently used comes from underground sources.

This year Texans will pump more than twice as much groundwater from underneath the surface than nature will return to underground storage areas.

Declining water levels or pressure in some aquifers may simply inconvenience well owners. Users may have to enlarge or deepen their wells or pay more in pumping costs, but they will still have adequate water. More serious effects of declining water levels in the state, however, include irreversible environmental damages such as reduced spring flow affecting rivers and bays, land surface subsidence intensifying flood risks on the Gulf Coast, and salt water intrusion spoiling underground areas for freshwater storage.

TEXAS GROUNDWATER LAW

Texas water laws complicate the groundwater depletion problems in the state. The Texas Water Code considers surface water as the property of the state and requires permits for its use. Groundwater, on the other hand, belongs to the owner of the land above it and may be used or sold as private property.

Texas courts have consistently ruled that a landowner has the right to pump all the water he can from beneath his land regardless of the effects on other wells.

While the depletion of an extremely valuable natural resource is of concern to the state as a whole, there is no statewide management of groundwater and no statewide incentives to conserve groundwater. The only efforts to manage groundwater extraction in Texas at the present time are on strictly local levels and for limited objectives by underground water conservation districts. Most of the state's major aquifers are not even within the jurisdiction of an underground water conservation district.

The responsibility for managing the amount of groundwater pumped has traditionally been given to local districts because of the differences in geologic makeup and recharge capabilities of aquifers in the state. Renewable aquifers such as the Gulf Coast or Edwards continually receive water from rain infiltration and surface water seepage. Nonrenewable aquifers, the Ogallala is a good example, contain water collected for centuries, but receive little or no current rainfall.

Management objectives for these types of aquifers differ considerably. Groundwater pumped from a renewable aquifer should be balanced against the average annual recharge rates, while quantities pumped from a nonrenewable aquifer determine how long a time the existing groundwater supply will last.

The Harris-Galveston Subsidence District is the only district actually controlling the quantity of groundwater pumped. This control, limited to large wells in Harris and Galveston counties, is not to protect the groundwater resource, but to prevent the land surface from sinking further due to overpumping of groundwater.

Underground water conservation districts on the High Plains control the distance between wells to reduce competition for water, but have not exercised their authority to control the quantity of groundwater pumped.

CURRENT QUESTIONS

Corwin Johnson, a professor at the University of Texas School of Law, feels that there are serious and glaring gaps in state law for managing groundwater in Texas. The major shortcomings he lists in the Winter 1981 issue of *Discovery* include:

- Lack of coordination of groundwater and surface water rights.
- No policies to protect renewable aquifers from damage due to excessive withdrawals.

- No official state policy on the optimum rates of depletion of nonrenewable aquifers.
- Absence of methods to resolve conflicts among pumpers.

Johnson sees general lack of interest in the state as the most formidable obstacle to changing state groundwater laws. No major changes in the laws have been seriously considered in recent legislative sessions, he says, and no Texas public official or agency advocates any major changes in groundwater law at this time.

Even though changes in groundwater laws have not received much attention by the Texas legislature, discussions concerning groundwater management have taken place during recent state water planning efforts. This spring, for instance, the Texas Department of Water Resources questioned Texans participating in the public input phase of state water planning:

"Is state control of groundwater needed?"
"Should the state pursue a policy of regulation and control in those regions of Texas where conservation districts are not formed and operated?"

Answers to groundwater management questions are difficult since groundwater is both private property **and** a natural resource important to the entire state. Answers are critical, however, for the depletion of other natural resources has meant oil booms followed by bust times and mining towns turned to ghost towns.