
Groundwater Conservation Districts: Success Stories

Dana Porter, Russell Persyn and Juan Enciso*

The aquifers in Texas have different quantities of groundwater, recharge characteristics, and susceptibility to contamination. Demand for water from these limited resources is increasing, so our aquifers must be conserved and protected for the benefit of the state's economy, our natural ecosystems, and our quality of life. The Texas Water Code, Chapter 36, calls for the creation of Groundwater Conservation Districts "in order to provide for the conservation, preservation, protection, recharging, and prevention of waste of groundwater, and of groundwater reservoirs or their subdivisions, and to control subsidence caused by withdrawal of water from those groundwater reservoirs or their subdivisions." In Texas, local decision making through Groundwater Conservation Districts has been the rule and not the exception. In fact, Groundwater Conservation Districts are the state's preferred method of groundwater management.

Texas' diverse climatic systems, aquifers, water use patterns, population growth projections, and economy make planning for water use a complex issue. Groundwater Conservation Districts are formed according to local needs; therefore, the roles of the districts reflect differences in local needs. Some districts serve primarily to protect water quality; others work mainly to promote conservation of limited supplies, or to combat subsidence.

Groundwater Conservation Districts are carrying out a number of successful programs to protect and conserve the state's water supplies.

Success
Stories

Success
Stories

Success
Stories

At special conferences, demonstration projects, field days, and public events, districts showcase conservation practices, demonstrate best management practices, and distribute educational materials. For example, the South Plains Underground Water Conservation District sponsors an annual South Plains Water and Soil Conservation Conference and Trade Show, which includes agricultural water conservation practices updates and water level measurement reports for the area. This conference targets agricultural producers, offers continuing education units, and fosters communication among agricultural producers, irrigation industry representatives, and conservation professionals.

Success
Stories

*Assistant Professors and Extension Agricultural Engineers, and Extension Assistant-Water Management, The Texas A&M University System.

Success

The High Plains Underground Water Conservation District No. 1 has built a strong Information/Education program, initiated in June 1954 with the first publication of *The Cross Section* newsletter. This newsletter is mailed free of charge to a subscriber list of more than 6,900 local, state, national and international readers. The District has received two Watermark Awards for communications excellence from the Texas Section of the American Water Works Association for its timely news releases to local, state and national news media. The District also maintains a public service announcement campaign through which 60-second pre-recorded water conservation messages are aired on local radio stations, and 30-second water-related public service announcements are aired on a local TV station. The District regularly displays informative exhibits at area events, fairs and trade shows, and makes informational materials available to the public through their Lubbock office. Many of their publications are on the Internet at <http://www.hpwd.com/>.

Success Stories

Success Stories

Purpose of Groundwater Districts

Groundwater Conservation Districts have assigned duties, and they may invoke authorized powers necessary to fulfill their duties.

A Groundwater Conservation District is required to:

- Develop and adopt a comprehensive management plan for efficiently using groundwater and preventing its waste. The plan also must include measures for preventing land subsidence. This plan must be submitted to, and certified by, the Texas Water Development Board and filed with other districts within a common groundwater management area.
- Adopt rules necessary to implement the management plan.
- Require permits for drilling, equipping, completing, or substantially altering the size of water wells.

A Groundwater Conservation District may also:

- Make and enforce rules necessary to implement the water management plan.
- Make surveys of the groundwater resources.
- Regulate the spacing of wells and/or production of wells.
- Require that unused or abandoned wells be capped or plugged.

The common goal of all Groundwater Conservation Districts is to conserve groundwater resources through local management in order to ensure adequate water for their districts in the future.

Promoting Water Conservation through Education and Public Awareness

Groundwater Conservation Districts use a variety of programs and media to inform the public about water issues and to raise public awareness of the need for water conservation. News releases and public service announcements distributed through newspapers, radio



This Cessna 340 aircraft, equipped with belly racks and wingtip generators, is used for cloud seeding by three Groundwater Conservation Districts in the Texas High Plains.

stations and television stations offer timely information to large general audiences. Some districts publish bulletins and fact sheets with in-depth information on a variety of topics. These materials are distributed at local offices and exhibits at area events. Some districts use Internet sites to make information even more widely accessible. In several districts, newsletters keep subscribers informed of issues, programs and activities in the district.

Groundwater Conservation Districts reach young audiences by distributing educational materials through public schools. These include water conservation textbook covers and other water conservation information. Districts also organize field trips and assist teachers with water education curricula. Some districts sponsor more comprehensive water programs, such as the Learning to Be Water Wise and Energy Efficient program (<http://www.getwise.org/>) and the Major Rivers Water Education program (<http://www.rra.dst.tx.us/Education/MajRivers/>) in elementary schools.

Assisting in Water Conservation through Technical Services

Groundwater Conservation Districts can provide a range of technical support services to help water users with conservation. Such services include monitoring precipitation and aquifer water levels. Several districts test wells, pump plant efficiency, and irrigation system efficiency. Water quality testing can vary from biological evaluations (coliform and fecal coliform bacteria) to more complete water quality analyses (including alkalinity, hardness, chloride, specific conductivity, total dissolved solids, fluoride, iron, ammonia, nitrate, sulfate and pH.) In some districts, water analysis is offered free of charge to residents of the district, and may be offered on a fee basis to residents outside the district. For specific information on water analysis services and fees, residents should contact their districts.



Using agricultural water conservation techniques, such as low energy precision application (LEPA) center pivot sprinklers and furrow diking, improves irrigation efficiency and conserves groundwater.

Success Stories

Learning to be Water Wise and Energy Efficient is a youth conservation education program that has been promoted by several of the Groundwater Conservation Districts, including the Harris-Galveston Coastal Subsidence District. The City of Houston performed a cost/benefit analysis to assess the value of the program, and reported that for every dollar spent the city will gain 5.6 dollars in return. Estimated water savings per educational kit distributed was 22.9 gallons per household per day. The educational program has an Internet site at <http://www.getwise.org/>.

The Santa Rita Underground Water Conservation District has a program to plug more than 350 abandoned wells to prevent contamination of groundwater.

Success Stories

Success

To help prevent contamination of their limited water resources, the Mesa Underground Water Conservation District sponsors a Used Oil and Filter Collection Program. Approximately 40,000 gallons of waste oil have been collected and recycled each year since 1993.

Success Stories

Success Stories

Success Stories

Success Stories

To help farmers implement water conservation practices, some districts make the necessary equipment available for loan. Laser land leveling equipment and furrow dikers, for instance, may be made available for improving agricultural irrigation efficiency. Districts also may participate in the Agricultural Water Conservation Equipment Loan Program through the Texas Water Development Board. Through this program, the districts can make low interest loans available to farmers and ranchers to help them install highly efficient irrigation systems (such as the Low Energy Precision Application systems.) Some districts offer funding and technical assistance for plugging unused or abandoned water wells.

Permitting and Rulemaking Activities

Groundwater Conservation Districts are granted the authority to make and enforce rules for conserving, preserving, protecting, and recharging groundwater, and for controlling subsidence. According to the Texas Water Code, the districts must require permits for drilling, equipping, or completing wells or substantially altering the size of wells or well pumps. Districts may require that unused or abandoned wells be capped or plugged. Districts may regulate well spacing and/or pumpage rates in order to control subsidence and to prevent excessive water table drawdown or reduction of artesian pressure.

Financing Alternatives: Funding for District Activities

Groundwater Conservation Districts vary in size, from partial county or single county districts to multiple county districts. Staffing levels vary from one part-time position to several full-time positions, depending upon the goals of the Boards of Directors and the contributions of the local taxpayers.



This open, abandoned irrigation well is well hidden on CRP land. Groundwater Conservation Districts work to make sure abandoned wells are properly capped to prevent accidents and aquifer contamination.



A moisture meter is used to collect pre-plant soil moisture data. This information helps producers know how much to irrigate before planting.

The Texas Water Code, Chapter 36, allows groundwater districts to levy property taxes to pay maintenance and operating expenses at a rate not to exceed 50 cents on each \$100 of assessed valuation. Most district activities are funded through these ad valorem taxes, for which the maximum tax rates are set by local election. Districts surveyed reported ad valorem tax rates of \$0.0045 to \$0.0575 per \$100 valuation. Hence, the annual tax paid on property valued at \$100,000 ranges from \$4.50 to \$57.50.

Some districts are financed through user fees, which are assessed on the basis of the volume of water pumped or the volume permitted/allocated. Other sources of revenue include permitting fees, permit application fees, and fees for services (water analyses, etc.) provided outside district boundaries. Some districts are able to provide special services and programs funded by grants for special projects from the Texas Water Development Board and the United States Environmental Protection Agency (EPA), through the Texas Natural Resource Conservation Commission (TNRCC).

Special Projects and Research Efforts

Groundwater Conservation Districts conduct special projects, often in cooperation with other agencies and districts, to address special needs. These special projects include groundwater modeling, groundwater recharge through infiltration and injection, area subsidence measurements, groundwater mapping, enhancement of recharge, and weather modification programs. Such projects may be cooperatively funded by federal, state and/or local agencies.

Success
Stories

Success
Stories

Success
Stories

Weather modification/rainfall enhancement programs use cloud seeding to augment normal rainfall, particularly during the peak irrigation season, in order to reduce pumpage and increase aquifer recharge. Programs include the West Texas Weather Modification Association, High Plains Precipitation Enhancement Program, South Texas Weather Modification, Southwest Texas Rain Enhancement Program, and the Edwards Aquifer Authority Precipitation Enhancement Program. These programs are funded jointly by the districts and the state through the Texas Natural Resource Conservation Commission.

Success
Stories

Success Stories

Water quantity and quality have been improved through the Recharge Enhancement Program of the Barton Springs/Edwards Aquifer Conservation District. Recharge into the aquifer through caves in Onion Creek is enhanced by a structure that prevents debris from plugging the cave entrance. The quality of the recharge water is improved by a feature that allows the relatively dirty "first flush" water to bypass the cave entrance. After this "first flush," a valve on the structure is opened to allow clean recharge water to enter the cave entrance to the aquifer. Other activities of the District include cave cleanup programs and household hazardous waste collection programs to remove potential sources of contamination.

Success Stories

Success Stories

Success Stories

For Additional Information

L-5240, "Groundwater Conservation Districts," Texas Agricultural Extension Service.

B-1612, "Managing Texas' Groundwater Resources Through Groundwater Conservation Districts," Texas Agricultural Extension Service.

Electronic versions of Extension publications are available at:
<http://agpublications.tamu.edu/pubs/eenviro/b1612.pdf>

Water for Texas: A Consensus-Based Update to the State Water Plan. 1997. Texas Water Development Board, Austin, Texas.

Web Sites:

Edwards Aquifer Authority
<http://www.e-aquifer.com/>

Harris-Galveston Coastal Subsidence District
<http://www.subsidence.org/>

Hickory Underground Water Conservation District No. 1
<http://www.angelfire.com/tx/hickory/>

High Plains Underground Water Conservation District No. 1
<http://www.hpwd.com/>

Learning to Be Water Wise and Energy Efficient. Nonprofit National Energy Foundation, Salt Lake City, Utah.
<http://www.getwise.org/>

Major Rivers Water Education Program. Red River Authority of Texas, Wichita Falls, Texas.
<http://www.rra.dst.tx.us/Education/MajRivers/>

Springhills Water Management District
<http://swmd.home.texas.net/>

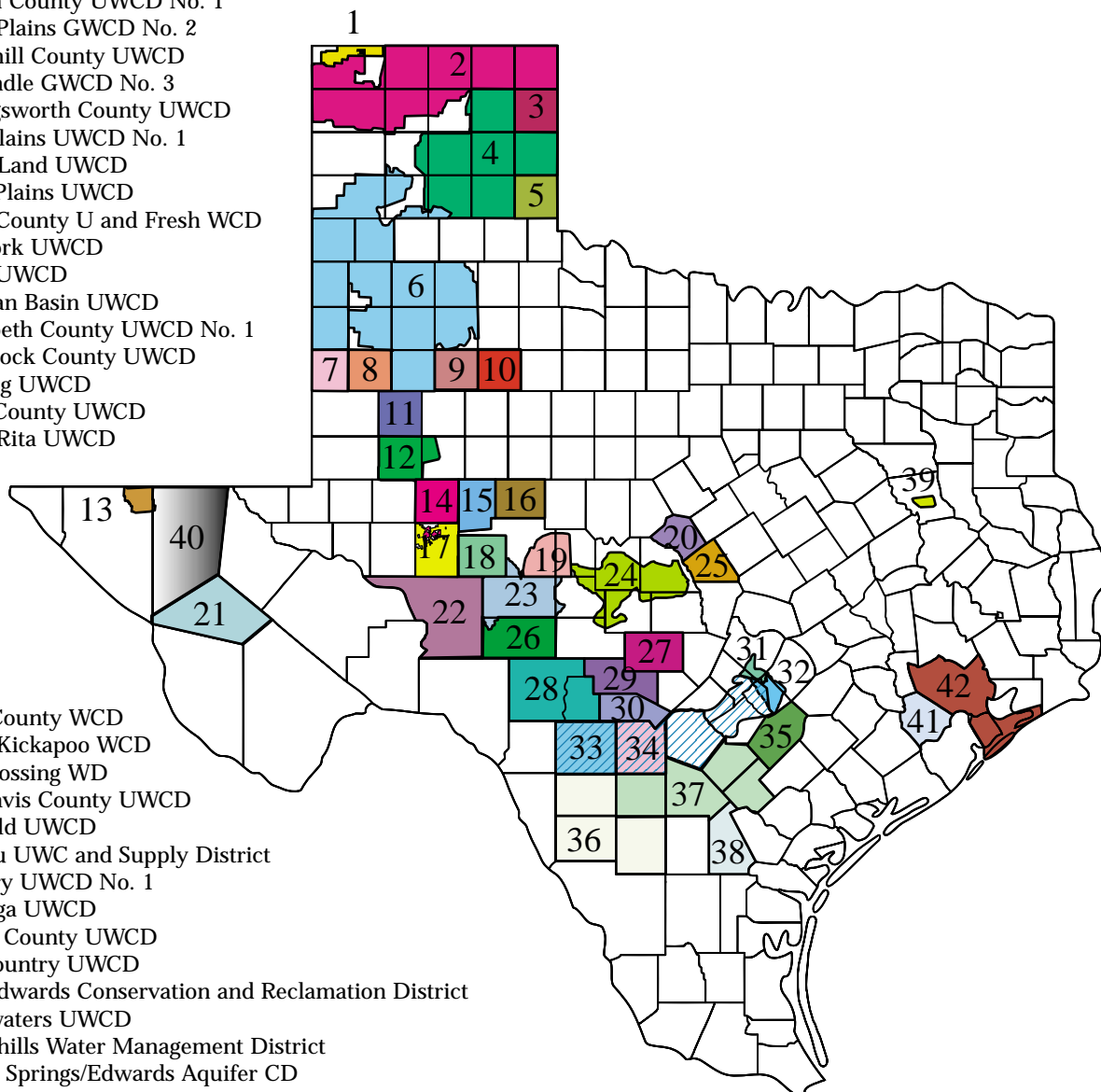
Texas Water Development Board
<http://www.twdb.state.tx.us/>

Acknowledgements:

The authors appreciate the contributions of the Groundwater Conservation Districts in preparing this publication. Special thanks to Scott Holland, President, Texas Alliance of Groundwater Districts, for his assistance.

Conservation Districts

- 1 Dallam County UWCD No. 1
- 2 North Plains GWCD No. 2
- 3 Hemphill County UWCD
- 4 Panhandle GWCD No. 3
- 5 Collingsworth County UWCD
- 6 High Plains UWCD No. 1
- 7 Sandy Land UWCD
- 8 South Plains UWCD
- 9 Garza County U and Fresh WCD
- 10 Salt Fork UWCD
- 11 Mesa UWCD
- 12 Permian Basin UWCD
- 13 Hudspeth County UWCD No. 1
- 14 Glasscock County UWCD
- 15 Sterling UWCD
- 16 Coke County UWCD
- 17 Santa Rita UWCD



- 18 Irion County WCD
- 19 Lipan-Kickapoo WCD
- 20 Fox Crossing WD
- 21 Jeff Davis County UWCD
- 22 Emerald UWCD
- 23 Plateau UWC and Supply District
- 24 Hickory UWCD No. 1
- 25 Saratoga UWCD
- 26 Sutton County UWCD
- 27 Hill Country UWCD
- 28 Real-Edwards Conservation and Reclamation District
- 29 Headwaters UWCD
- 30 Springhills Water Management District
- 31 Barton Springs/Edwards Aquifer CD
- 32 Plum Creek Conservation District
- 33 Uvalde County UWCD
- 34 Medina UWCD
- 35 Gonzalez County UWCD
- 36 Wintergarden GCD
- 37 Evergreen UWCD
- 38 Live Oak UWCD
- 39 Anderson County UWCD
- 40 Culberson County GCD (boundaries not defined)

Groundwater Districts

Special Districts

- Edwards Aquifer Authority
- 41 Fort Bend Subsidence District
- 42 Harris-Galveston Coastal Subsidence District

There are 43 groundwater conservation and special districts in Texas. The Edwards Aquifer Authority contains two conservation districts within its territory.

Produced by AgriLife Communications and Marketing, The Texas A&M University System
Texas AgriLife Extension publications can be found on the Web at: <http://AgriLifebookstore.org>

Educational programs of the Texas AgriLife Extension Service are open to all people without regard to race, color, sex, disability, religion, age, or national origin.

Issued in furtherance of Cooperative Extension Work in Agriculture and Home Economics, Acts of Congress of May 8, 1914, as amended, and June 30, 1914, in cooperation with the United States Department of Agriculture. Edward G. Smith, Director, Texas AgriLife Extension Service, The Texas A&M University System.

Revision