



WRC

Newsletter

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Groundwater Modeling for the Southern High Plains

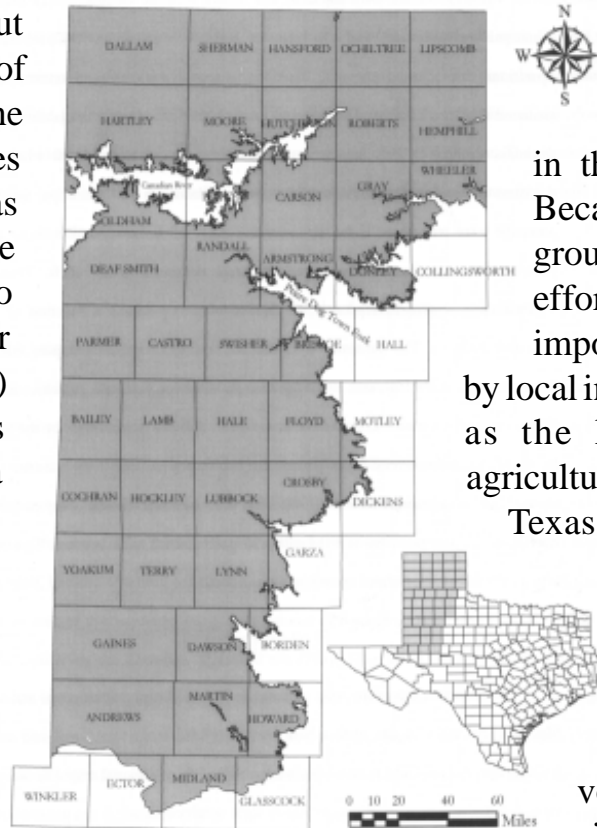
By Jeff Stovall, Ph.D. Candidate at Texas Tech University

In 1997, comprehensive water legislation, known as Senate Bill 1 (SB1), was enacted to place the task of responsible water planning in the hands of regional water planning groups throughout the state, allowing local and regional water interests to formulate their own solutions to their individual water needs. This legislation was brought about by a heightened awareness of the vulnerability of Texas to the limits of existing water supplies to meet increasing demands as population grows and to the effects of drought. The Llano Estacado Regional Water Planning Group (LERWPG) is a 21-member group that is responsible for developing a regional water plan for a 21-county area including Bailey, Briscoe, Castro, Cochran, Crosby, Dawson, Deaf Smith, Dickens, Floyd, Gaines, Garza, Hale, Hockley, Lamb, Lubbock, Lynn, Motley, Parmer, Swisher, Terry, and Yoakum counties of the Southern High Plains.

The principal source of water on the Southern High Plains of Texas is the Ogallala Aquifer. It is estimated that the Texas portion of the Ogallala held over 500 million acre-feet of drainable water prior to the development of irrigation systems on the Southern High Plains.

According to estimates of water use in 1996, water from the Ogallala accounted for over 98 percent of all water used in the Llano Estacado region. Because of this high level of groundwater use, conservation efforts have become even more important, and water planning by local interests has been recognized as the key to maintaining the agriculturally based economy of West Texas.

Determination of the adequacy of water supplies for the Southern High Plains is largely based upon quantifying both the volume of water remaining in the Ogallala Aquifer and



TWDB Model Domain
(TWDB, 2000)

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Groundwater Modeling, continued from page 1

the availability of that water to potential water users. As part of the current regional water planning process, the Water Resources Center was asked to develop a calibrated groundwater model that can be used to assess the groundwater resources of the Southern High Plains and as a management tool for evaluating potential water management strategies.

The project was most directly concerned with the 21 counties that comprise the Llano Estacado region, and the modeling tasks emphasized the aquifer conditions within these counties. The baseline simulation predicts the effects of groundwater pumpage using water demand projections for the region approved by the LERWPG. Historical water table measurements show that the Ogallala aquifer underlying the region held approximately 132,360,000 acre-feet of water in 1995. Using these projections, the model indicates that approximately 104,000,000 acre-feet of water will remain in the Ogallala formation underlying the region by the year 2050. This number represents 79 percent of the volume of water in storage measured in 1995. Of the 21 counties in the region, 12 counties have at least 80 percent of the 1995 volume in storage remaining in 2050. The remaining nine counties have from 21 to 78 percent of the 1995 volume in storage remaining. Castro, Garza, Lamb, and Parmer counties have less than 50 percent of the 1995 volume in storage remaining.

The output of the computer model was also used to calculate the satisfied demand percentage for areas in the planning region. This number represents the ratio of supply to demand. The irrigation water demand accounted for over 96 percent of groundwater use in the region in 1996 and is projected to account for a similar percentage throughout the planning period. Under the baseline simulation, the model indicates that approximately 65 percent of the total groundwater demand for the region can be met in 2050. Seven counties in the region are capable of supplying at least 80 percent of the projected demand, while 4 counties supply less than 50 percent of the demand.

A report documenting the complete results of this project has been submitted to the Llano Estacado Regional Water Planning Group. Additional information can be found in Appendix E entitled "Abridged Results from Groundwater Modeling for the Southern High Plains." of the *Llano Estacado Regional Water Planning Area: Regional Water Plan*. The regional plans and other related details for the entire state are located at the Texas Water Development Board's website at the following address: www.twdb.state.tx.us.

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Needs in *Colonias* Assessed

by Dean Muirhead, Research Associate, Texas Tech

Dr. Ken Rainwater and WRC Research Associates Audra Morse and Dean Muirhead recently traveled to the Rio Grande Valley to tour *colonias* and document needs related to water and wastewater. A *colonia* is an unincorporated area lacking one or more basic utilities. Thanks to the help of local groups in the Valley, the three WRC researcher were able to visit several different *colonias* and meet with local officials to learn about the environmental conditions in Starr, Cameron, and Hidalgo Counties.

Many *colonias* are in outlying areas and are not yet hooked up to a centralized wastewater collection system. Septic tanks are not always in place due to unsuitable soils and their high cost relative to household incomes (less than \$10,000 per year). Most of the *colonia* residents are migrant workers who build their houses in stages. Residents often separate their households wastewaters leaving their houses into greywaters (kitchen and shower drains) and toilet waters. The greywaters are piped to yards and toilet waters are piped into a cesspool. This separation of wastewater streams is similar to NASA's water systems on spacecraft.

The WRC researchers are working with local residents and NASA's Johnson Space Center to identify and compare technologies to manage wastewaters in the safest and most economic manner. Science students from Rio Grande City High School will also be involved in the project by collecting water samples and monitoring water quality. Photos and details about the project are available through a link on the WRC website: www.wrc.ce.ttu.edu/nasa.

Visit to the *Colonias*



Amada Villareal, Starr County; Audra Morse, Research Associate Water Resources Center; Blanca Juarez, Starr County; and Dean Muirhead, Research Associate Water Resources Center



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Water Conservation Community Saddened by the Loss of One of Their Own

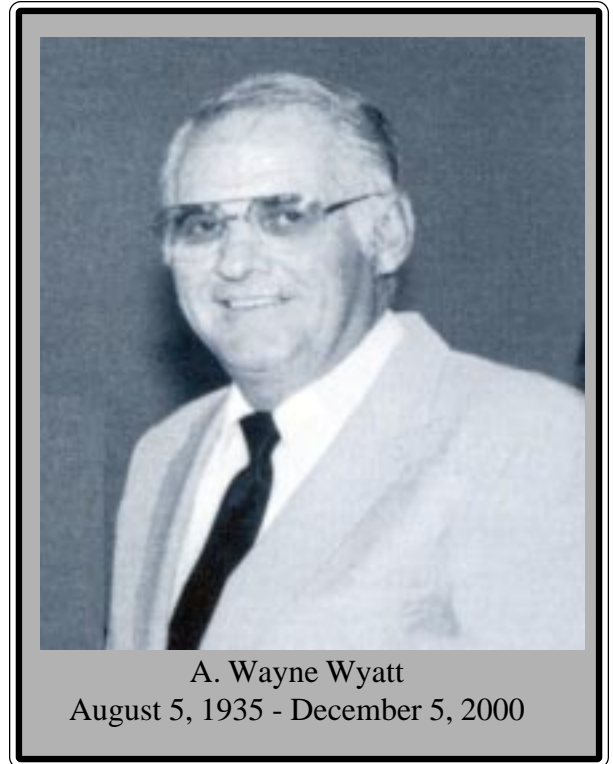
On December 5th 2000, A. Wayne Wyatt passed away at his home from an apparent heart attack. He had been working with water conservation and resources in the south plains since 1957, when he started as a field representative in the area.

Since 1978 he has been the Water District Manager for the High Plains Water District No. 1. At the time of his death he was also the chairman of the Llano Estacado Regional Water Planning Group, whose purpose is to develop a 50 year plan for 21 counties in the southern high plains of Texas. Over the years Mr. Wyatt has authored or co-authored hundreds of technical papers and consumer based technical transfer articles.

A. Wayne Wyatt was closely tied to Texas Tech's Water Resources Center. In 1987 when an advisory board was established he was one of the charter members, and acted as the advisory board's first chairman. He periodically served on the advisory board until his death this last December.

The Llano Estacado Regional Water Planning Group has held meetings regarding the possible establishment of a scholarship in A. Wayne Wyatt's name. As more information becomes available it will be published in the WRC Newsletter.

The family has asked for donations to be sent to the South Plains Food Bank.



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