

GROUNDWATER IN TEXAS MARKETABILITY AND MARKET VALUE

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**Texas
Groundwater
Marketing**

**Regional
Planning**

**Supply
v.
Demand**

Capitalization

**Groundwater
Transactions**

**Economic
Threat**

Introduction

In an article in the April 2007 edition of *The Water Report (Texas Groundwater – Rule of Capture and Groundwater Management in Texas—TWR #38)*, your author provided an overview to the complicated history of the Rule of Capture in Texas and recent efforts by the State Legislature to develop a statewide system of management. The Legislature is attempting to impose requirements for regional planning and conservation in order to ensure sustainability of aquifers and availability of groundwater over a period of 50 years, while honoring the Rule of Capture as the State's preferred groundwater doctrine. This article examines a number of factors influencing groundwater transactions and marketing in Texas.

An Interesting Letter

The following letter was published on April 20, 2007 in *The Austin American-Statesman* (Austin, TX):

As an old Texan, it occurred to me 20 years ago that with the population growth in Texas we may have a hard time finding a drink of water some day. To the scientists and young biologists who tell us that Texas is going to be parched, my answer is: So, what's new? Having grown up on a farm in Central Texas, I did what my father did. We watched the weather. We read the Farmers' Almanac before we read the morning paper. We have had 10-year droughts and three-year droughts, floods and tornados for at least 80 years...Seems we have a problem: too damn many people. — Henry Streety

Mr. Streety is a wise man. He probably hasn't read any of the water-planning reports prepared for the 16 regional water-planning groups designated by the Texas Water Development Board (see TWR #38), but his short letter cuts to the core of many of Texas' current and future water-supply problems: an imbalance of supply and demand. Mr. Streety's letter also has modest implications for understanding many of the perceptions Texans have about the value of groundwater.

Groundwater Transactions in Texas

As of 2006, groundwater accounted for 59 percent of the 18 million acre-ft of water used in the State of Texas. Groundwater is especially important in the westernmost areas of Texas, where there are insufficient sources of surface water to support most of that semi-arid/arid region's population and industries. With the growing expectation that cities and industries will require more water than current sources can provide, many entrepreneurs have become interested in capitalizing on the sale of groundwater or the acquisition or sale of rights to groundwater.

An article in the June 16, 2007 edition of *The Austin American-Statesman* entitled "Water Merchants Brace for Future Droughts" underscores the growing interest in groundwater transactions in Texas (see www.statesman.com/business/content/business/stories/other/06/16/16water.html). The article notes that oilman T. Boone Pickens and about 15 other water marketers in the State "are working on projects that would allow them to pump rural groundwater and ship it to urban areas." The article further notes: "No large cities currently go to marketers to get groundwater...but the marketers are gearing up by getting pumping permits in order and buying water rights." In the same article, Gabriel Eckstein (faculty, Texas Tech University's School of Law), sums up the expectations of marketers and many landowners who are hoping to see an active system of groundwater transactions develop in the State: "There's a lot of water marketers out there, but (Texas Municipalities) are going to be paying a heck of a lot to get that water."

In contrast to the optimism of Boone Pickens, other water entrepreneurs, and Professor Eckstein, the prospect of marketing groundwater has been a source of concern for many landowners who fear that the sale of water or water rights is a threat to the economies of rural counties. (See House Research Organization Focus Report – *Groundwater Management Issues in Texas*, p.5: website: www.hro.house.state.tx.us/focus/groundwater79-14.pdf.)

The logic is as follows: by allowing water traditionally used to support agriculture to be transferred to other ("higher valued") uses, the State risks undermining the economies of counties which have relied not only on irrigation, but also on enterprises which are linked either directly or indirectly to a healthy agricultural sector. The transfer of water from agriculture to municipal or other industrial uses might enrich landowners but harm agricultural supply companies and mills, possibly leading to bankruptcies.

Types of Groundwater Transactions

Texas
Groundwater
MarketingTransaction
Types

Rule of Capture

Transactions involving the sale of groundwater or groundwater rights are not new in Texas, as cities and landowners in rural counties have engaged in such transactions over many decades. All groundwater transactions in Texas are based on one of three types: 1) land is purchased, which also conveys the right to pump groundwater (Rule of Capture); 2) water rights are severed from the land and sold to buyers; 3) landowners sell water to users, while keeping their land and water rights.

1) **RULE OF CAPTURE:** Under the Rule of Capture, the right to groundwater follows ownership of land. Groundwater is considered to be part of the surface estate. Acquisition of land also entails the right to use all water beneath the surface of that land. Consistent with this perspective, land appraisers in Texas have not considered the value of groundwater apart from its association with the surface (e.g., ranching, irrigation, wildlife maintenance). As one result, models of “highest and best use” have not factored in any value related to potential transfers of water (e.g., the sale of water to cities and industries). Some landowners, entrepreneurs and attorneys have argued that this approach to property appraisal leads to undervaluation of groundwater, especially in cases involving condemnation of property for the purpose of gaining access to groundwater. (See Jim Matthews, *Recent Cases Involving Water Law and Related Issues*, The University of Texas School of Law, Texas Water Law Institute, Nov. 4-5, 2004, at www.utcl.org/eLibrary/preview.php?asset_file_id=344.) Barring issues specifically related to condemnation, the reluctance of land appraisers to consider uses of water unrelated to traditional uses of land might be regarded as highly speculative and not in keeping with accepted standards of property appraisal.

Severed Rights

2) **WATER RIGHTS SEVERED FROM THE LAND:** In areas such as the Texas Panhandle and nearly all other counties of west and southwest Texas, water rights are often severed from surface rights and sold to cities, to Groundwater Conservation Districts (GCDs), or to entrepreneurs seeking to enter what many hope will become a lucrative market for groundwater (see sidebar, next page). In such cases, sellers retain ownership of the surface estate, along with the right to use water for domestic purposes.

Water-Only
Sales

3) **LANDOWNER SALES OF WATER:** In many areas of Texas, landowners sell water to cities or industries, without relinquishing their rights to groundwater. Contracts between sellers and buyers often include “take-or-pay provisions” which require buyers to pay an amount to the landowner equivalent to a set minimum water volume whether or not that volume is actually pumped.

Valuation

In areas where land and groundwater are not severed, the *in situ* value of groundwater can be based on differences in the assessed values of irrigated land and dry land. This yields a value for groundwater on a *per acre* basis, which is independent of the volume of recoverable groundwater in storage beneath a property. If a specified volume of recoverable groundwater is estimated to be in storage beneath a property, then the value of groundwater is often calculated on an *acre-foot* (AF) basis. (An AF is equivalent to the volume of water required to fill an area of one acre to a depth of one foot, or ~325,850 gallons.)

What's My Water Worth?

One of the first questions which many potential sellers of groundwater ask is: “What’s my water worth?” On the buyers’ side, the question is: “What’s it going to cost me to purchase that water or that landowner’s water right?” It remains very difficult to answer either of these questions.

There is no organized statewide marketing system in Texas which puts sellers and buyers in touch with each other. Information that participants need to make reasonable assessments of the market value of groundwater is not supplied in any organized manner. In practice, each side brings its expectations to the bargaining table, hoping to negotiate the best possible deal. Mr. Streety’s letter above underscores one of the operative perceptions which seem to form the opinions of many landowners and water entrepreneurs in Texas today: *Too many people and not enough water*. As evidenced by the comments of Professor Eckstein noted above, one might conclude that people with water or water rights to sell might expect substantial economic gains should a market or markets evolve.

Beginning with the *not enough water* assessment and applying economists’ standard linear supply-demand curves to the problem, one might conclude that selling groundwater in Texas is a sure-fire way to get rich. For some, that might be the case now, and for others, the prospects might be better over the long run. However, it’s not necessarily a sure bet for everyone. Mr. Pickens’ company appears to be betting on the long-run.

Texas Groundwater Marketing

Regional Factors

Historic Value

Before jumping to conclusions about the market value of groundwater in any area of Texas, buyers and sellers should take heed of the lack of any defined market value for groundwater in Texas. There are, instead, many potential market values based on the many various factors that influence marketability. Landowners and water entrepreneurs often don't consider these facts when first entertaining the thought of selling water or buying/selling water rights.

Factors Influencing Marketability and Market Value in Texas

One overarching factor affecting the market value of water in Texas is the breadth of regional differences. Any attempt to assign a market value to groundwater in one region of Texas based on prices paid in other regions of the State is problematic. Accomplishing this task requires an understanding of the differing market structures, market conditions, geology/hydrology, and the relative bargaining power of parties within the different regions. Texas is very large and the population of the State is highly concentrated in major urban areas. Hydrologic conditions are often so different from one region to another that it is advisable to break the whole up into smaller parts. All these steps are essential to developing a reasonable understanding of the factors which drive differences in market value both between and within regions.

For many years, groundwater in Texas had minimal established value, apart from its association with the overlying land. A standard practice of cities and industries was to acquire enough property for a well field, then to pump whatever water was needed to meet their respective requirements. This was possible under a strict interpretation and application of The Rule of Capture Doctrine. Typically, the cost of groundwater was associated with the cost of the land, the well, the pump, the pipeline, and the electricity or the gas or diesel needed to run the pump. On the basis of my evaluation of groundwater transactions in Texas, I have identified at least eight factors which, today, seem to be significant determinants of marketability and of the market value of groundwater in Texas. These factors are listed below, not necessarily in order of importance.

Marketing Severed Water Rights: The T. Boone Perkins Example

T. Boone Pickens (Mesa Petroleum and Mesa Water Group) has acquired water rights beneath thousands of acres of land in Robert County, Texas. His objective is to sell water to Texas cities located many hundreds of miles from Mesa's future Panhandle well fields (See *Water for Sale: Mesa Group Has Water – Will Deliver*, in *Southwest Hydrology*, V. 3, no. 2, p. 22-22 (2004), website: www.swhydro.arizona.edu/archive/V3_N2/featurette6.pdf).

In the June 16 article referenced earlier, Mr. Pickens clearly lays out his reasons for wanting to sell water to users 500 miles or more from Roberts County:

"Four years ago (2000), my neighbors and I joined together to find a buyer for groundwater underlying our property in Roberts County, Texas. This water can best be described as "surplus," since the Region A (Amarillo) Planning Group — the northernmost 21 counties in the Panhandle — didn't factor it into their 50-year plan presented to the Texas Water Development Board in 2001. This water also isn't needed by the Canadian River Municipal Water Authority (CRMWA), nor by the City of Amarillo, which are the only two major markets in the Panhandle. We offered to sell them our water, and both turned us down."

"CRMWA and Amarillo bought water rights from several landowners, which we have no quarrel with, but those left out did not have the same opportunity. Also, we recognized that when CRMWA went into production in December 2001, it would place our water in jeopardy of being drained. That is what triggered our forming the Mesa Water Group.

"Our water also can be considered 'stranded' because it can't be used for irrigation due to the topography of the land — mostly rolling hills, canyons and mesas. In fact, out of the approximately 2.5 million acres in the four northeastern-most counties, only about 100,000 acres are under irrigation — about four percent. So using our water for farming is not an option."

"After nearly two-and-a-half years and considerable legal and engineering expense, permits were finally issued (by the CRMWA) in July 2002. That gave us everything we need to complete a project to deliver 150,000 acre-feet of water per year to the Dallas-Fort Worth metroplex, San Antonio, or El Paso — all in time to avert serious shortages."

"And we didn't turn to Washington to ask for legislation, or money, or help with regulations. We worked within existing laws and regulations and spent about \$30 million of private funds to create a viable plan to supply new competitively priced water in Texas."

"Another group of about 150 Roberts County landowners representing an additional 190,000 acres have filed for permits to export water beneath their land. They want the same rights from the Panhandle Groundwater Conservation District that CRMWA, Amarillo, and the Mesa Group already have. They are entitled to those permits and they should get them. What my neighbors and I propose to do is nothing unusual. CRMWA is doing it today and Amarillo plans to do it in the future. We find ourselves with vast quantities of water that can't be used for irrigation or sold to the major markets in the area. It is only reasonable that we would seek to sell it elsewhere in the state."

Mr. Pickens makes an interesting case for the marketing of groundwater in Texas. Who knows? One day such entrepreneurship could provide the drink of water Mr. Streety writes about in his letter.

**Texas
Groundwater
Marketing**

Competition

Aquifer Assets

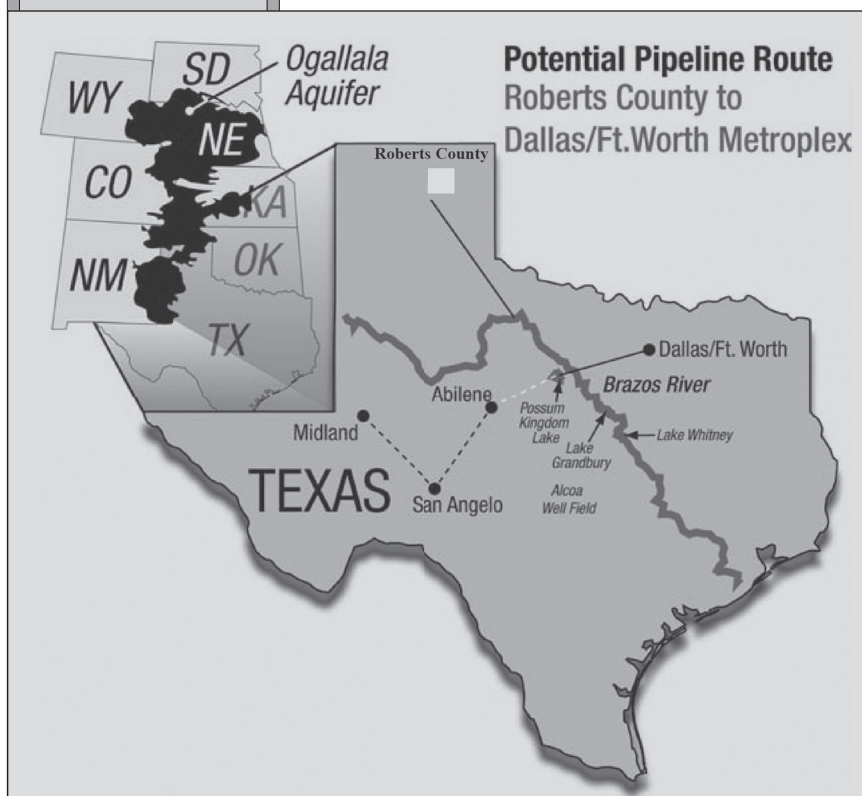
Water Quality

Regulations

**Agricultural
Production**

MAJOR MARKETABILITY FACTORS INCLUDE:

- Number of Competitors for the Resource: Competition for groundwater should drive up the price of the resource. Alternatively, if there are few major users of groundwater in a region, then negotiated prices could be much lower than expected by landowners.
- Number of Known Sources of Groundwater and Sellers of Land, Water Rights or Water: Competition among sellers, all other things being equal and assuming one major buyer or minimal competition among buyers, should act to lower price. Alternatively, if sellers are able to organize a groundwater cartel, then their bargaining position should be stronger and prices negotiated for water or water rights could be higher than under purely competitive conditions among suppliers.
- Volume of Recoverable Water and Estimated Life of the Resource: Land with a large volume of water in storage *might* command a higher price than land with a small volume of recoverable groundwater. In addition, property overlying an aquifer which is recharged quickly *might* command a higher price than a property which lies above a “mined” aquifer. [A “mined” aquifer is one where the rate of withdrawal exceeds the rate of recovery, so that the volume available is decreasing]
- Proximity of the Resource to the Purchaser: Transporting water long distances can be very expensive, especially if the consuming end is at much higher elevations than a potential well field.
- Expected Costs of Installing Wells and Other Production and Treatment Facilities
- Estimated Production Costs and the *Quality* of Groundwater: The investment required to develop a resource and to maintain, transport, and treat groundwater *might* be sufficient to justify a lower offer price, in the absence of other competitors, where the quality of the groundwater is an issue for the end user.
- Regulations Limiting Volume of Water: If there are any regulations which limit the volume of water available that can be pumped from an aquifer or which impose spacing requirements for wells, they must be taken into account. This has the effect of essentially amending the Rule of Capture.
- Value of Agricultural Production Attributable to Irrigation: Many farmers are potentially large suppliers of groundwater. They own land over aquifers which are capable of producing large volumes of water. In such cases, the value of groundwater can be related to the market value of crops if irrigated land is involved. For a landowner, the sale of groundwater or a water right represents an opportunity cost associated with the potential loss of income from irrigation. The sale of groundwater or of a landowner’s water right (assuming no duress) should generate enough income to cover, at least, that income or any other income associated with the on-property use of groundwater or sale of groundwater for other uses.



It is not possible to precisely quantify the relative significance of each of the above factors in any given groundwater transaction. Furthermore, one should not expect any particular factor to carry the same weight across Texas’ many and disparate regions. While economic models often assume broad knowledge and rational behavior by negotiating parties, few parties to a Texas water negotiation can claim access to all relevant information. Furthermore, there is no guarantee that all parties in a groundwater transaction will behave rationally even if all have access to the same body of information.

General Summary of Groundwater Transactions

Your author reviewed groundwater transactions in Texas over a six-year period, 2001 - 2006, as reported by *Water Strategist* (monthly publication of Stratecon, Inc. providing information on water transactions in Texas and other western states). Most of the groundwater transactions during these years took place in central, south, and west Texas.

Leases outnumbered sales, with lease terms typically ranging from 5-to-10 years. Leases are different from purchases of water rights. With

Texas Groundwater Marketing

Municipal Purchases

Value Fluctuations

Secure Sources

Lease Strategy

a lease, the landowner sells water on a yearly basis for a period of years. At the end of the lease a new contract may be renegotiated. With the purchase of a water right, the landowner (or the water right holder) sells his right to produce groundwater from a piece of property "in perpetuity."

Nearly all groundwater transactions have involved leases of water or the acquisition of water rights to support a broad range of municipal uses. Transfers to industrial or agricultural interests are less common.

Most lease prices for municipal use have ranged from \$66 - \$77 per AF per year. The Edwards Aquifer Authority Groundwater Trust (Central Texas) has reported a small number of leases up to \$100/AF per year. Transactions involving the sale of groundwater rights (with no transfer of the surface estate) range from \$270/AF (Canadian River Municipal Water District) to \$250/acre (Mesa Water). In Central Texas, water rights associated with land overlying the Edwards aquifer often sell for between \$1,000 to \$2,000/AF.

Clearly, there is no established market value for groundwater in Texas. It is necessary to consider the mix of factors outlined above before reaching any conclusion about current or future lease prices and permanent transfers of water rights. Such exercises are not trivial, especially where an outright purchase is involved transferring the water right for perpetuity. Nevertheless, many landowners are now looking at groundwater, which has traditionally been used to support ranching and farming operations, as a resource with potentially greater market value than its traditional uses provide.

Conclusion

Is anyone going to get rich selling groundwater? It is reasonable to expect that market values in many areas of Texas will rise over the next decade. This will largely be in response to efforts by cities and regional water authorities to acquire secure sources of water to meet projected long-term needs. Because the water needs of smaller cities are much different from the needs of Dallas, Fort Worth, San Antonio, or El Paso, it is inadvisable to take speculations as to the potential upper end of market values too seriously. As noted above, there are many factors which influence sales prices.

For the foreseeable term, it is highly probable that landowners will prefer leases with terms of 5-to-10 years, rather than longer-term leases or sales. This strategy will likely be an outgrowth of expectations by landowners that market values will continue to rise as the population of the state grows and as major users try to lay claim to secure supplies to avoid shortages and economic problems stemming from supply shortfalls.

Buyers and sellers of groundwater would be well-advised to take stock of existing resources and the number of competitors and potential suppliers of water. Other factors to consider include projections of water demand by the Texas Water Development Board and negotiated lease and sales prices (historic). It is advisable to assess both demand-side and supply-side structures and market conditions.

Assembling the best information, one can enter into negotiations as a well-informed participant bargaining from the strongest position possible.

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Author's Note: For many years, I have subscribed to models of price formation as described by two minerals economists: Marian Radetzki (Luleå University, Stockholm) and Walter Labys (West Virginia University). Although their work specifically addresses matters related to international mineral commodity markets, the basic principles of market analysis developed by Radetzki and Labys are applicable on a smaller scale to a resource such as water. For further information, readers should refer to the following sources: (1) *Market Structure and Bargaining Power: A Study of Three International Mineral Markets*, by M. Radetzki (1978), in *Resources Policy*, v. 4 (1978), Elsevier Pub., p. 115-125; and (2) *Market Structure, Bargaining Power and Resource Price Formation*, by W. Labys (1980), D.C. Heath Pub., 240 p. Also, For a discussion of problems associated with economic models (and other models of human behavior), refer to Chapter 10 (The Scandal of Prediction) of *The Black Swan – The Impact of the Highly Improbable* by N.N. Taleb (2007), Random House Pub., 366 p.