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The Texas Water Market

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Water marketing is alive and well in Texas. Selling groundwater and surface water rights on the open market is one solution to encouraging more economically efficient use of water.

In many parts of Texas where water is scarce, particularly in the lower Rio Grande Valley, water marketing has gained a foothold. Between 1980 and 1986, more than 28,000 acre-feet (AF) of agricultural water rights were sold to municipalities (Table 1).

Is there a need for water marketing in Texas? Many rapidly growing cities need to develop or acquire additional water supplies to meet current or future demands. Traditionally, those demands have been met by constructing new reservoirs or drilling water wells. Recently, however, those traditional strategies are being questioned. Reservoir development is becoming more costly and time-consuming, since many of the best reservoir sites have been developed and many projects face environmental and legal challenges. Groundwater supplies in many regions of Texas are now of limited quality or quantity.

On the other hand is water marketing necessarily a positive development? Water is a commodity that is essential for life. Should it be totally unregulated and go to those with the wherewithall to purchase it? If it is marketed, would those without the means find themselves without water?

In a typical water marketing scenario, water rights or water supplies would be purchased on the open market from willing sellers, usually agricultural producers. In theory, purchasers could pay less for the water or the water rights than would be required to develop new water supplies, and the newly acquired supply could be put to use much more rapidly. From a seller's point of view, the economics of water rights transfers may also make sense. In many instances, individuals in the lower Rio Grande Valley are

receiving a higher price from the sale of their water rights than they originally paid for their land. Texas' depressed agricultural economy may lead to increased sales of water rights. Profits from irrigation, which increases the likelihood that a crop will grow every season and usually boosts yields, are diminished when crop prices are low.

Energy prices associated with irrigation systems are costly inputs that could be eliminated in a rainfed farming operation. Right now, water or water rights may be a farmer's best cash crop.

TEXAS' WATER LAWS

Texas has a complex set of usage rules for its waters, depending on the source of supply. A new book published by the Texas Water Resources Institute (TWRI) makes Texas water law easier to understand (Reference 1).

Groundwater, for example, is virtually unregulated. Under Texas law, groundwater belongs to the person who owns the land above it or to the person who can capture it. It is private property that may be used or sold without receiving prior authority from the state.

For the purposes of water marketing in Texas, the right to pump groundwater can be obtained in two ways: 1) Land with groundwater supplies beneath it can be purchased, and 2) permission to pump groundwater can be obtained without purchasing the land.

Laws governing surface water in Texas are much more complicated and vary according to location. Surface water rights are a recognized property right and can be sold. However, when a right to use water for irrigation is sold to a municipality, the right must be first brought before the Texas Water Commission (TWC) to change the purpose of use. Generally, water rights are not leased but sold.

If the entire amount of water is not used in a given year, sales of surplus water are permitted but only among similar users. Surplus water from an irrigation right cannot be sold to municipalities for domestic consumption, for example.

A key issue when considering water sales is the question of ownership. Do persons with surface water rights own those rights and, as such, have the power to sell those rights for a profit? Conversely, are those persons with surface water rights merely allowed the privilege of using waters that belong to the state? If so, should unused surface water rights be reallocated by the state to others who would use them? The TWC's position is that sales of surface water rights are encouraged, particularly in the lower Rio Grande Valley. At the same time, cancellation proceedings initiated by the TWC in 1985 and 1986 threatened many with revocation of their water rights.

HOW THE LAWS EVOLVED

The first factor to influence Texas water law came from early Spanish explorers, missionaries, and settlers. Land was classified as irrigable or nonirrigable, and water

rights were apportioned by the Spanish and Mexican governments. In 1840 Texas adopted a "riparian" system that was almost the opposite of the Spanish water law. The riparian system gave persons who owned property near rivers or streams the right to use water as long as they owned the adjacent land.

Finally, a prior appropriation system (modeled after mining laws enacted in many Western states) was adopted in 1899. Under this set of laws, settlers who first made beneficial use of surface waters were given preference over those who came later. The irrigation acts of 1913 and 1917 required persons wishing to use state waters to file an application for a permit with the state Board of Water Engineers. The permit could be developed into a "perfected right" by beneficial use in accordance with the terms of the permit.

In 1967 the Texas Legislature passed the Water Rights Adjudication Act to quantify riparian rights and to integrate them into the state's regulatory system. The act required riparian users to file claims with the TWC for evaluation and quantification. All users of state waters (for other than domestic and livestock purposes) had their rights evaluated and defined through the adjudication process. Individuals, municipalities, industries, and others can petition the TWC for new permits. The TWC compares the amount of water available in a river to the rights that have already been granted. If a river has not been fully appropriated, additional rights may be granted.

The TWC may totally cancel a water right or may reduce the amount of water allowed by that right. Rights can be cancelled if there is a 10-year period of nonuse or partial use.

CASE STUDIES: WEST TEXAS

Historical information on the transfer of water rights in Texas is scarce. An exception to this is a book titled *Western Water Flows to the Cities* (Reference 2). This book scans water development in El Paso, Midland, and Lubbock where competition for water has been fierce and supplies have been scarce.

El Paso began using surface water rights to the Rio Grande River in the early 1940s, and now about 15 percent of its water supply (15,000 AF) comes from the river. The city began buying irrigated land and transferring the water rights to municipal use in 1942. El Paso now has a lease program where owners of once-irrigated lands that have since been urbanized can lease their agricultural water rights to the city. In return, the city will pay the water taxes.

A growing conflict in the El Paso area concerns urbanized farmland. Many irrigators can sell their lands at prices as high as \$10,000 an acre because subdivisions are reaching into previously farmed lands. Many irrigators want to sell their farmlands because of the high prices, but they want to retain surface water rights after the property has sold. City officials believe that surface water rights are attached to specific parcels of land and should be retained with the land.

Midland went 50 miles west to the towns of Wink and Kermit in 1965 to purchase 20,000 acres to develop a groundwater well field to supplement surface supplies.

In the High Plains, the cities of Lubbock and Amarillo have each purchased significant groundwater rights. Lubbock acquired 50,000 acres of groundwater rights in the 1950s and is still purchasing groundwater supplies. Now attempting to acquire as many acre-feet of groundwater rights as it pumps annually (about 10,000 AF), Lubbock purchased the groundwater rights to 1,900 acres of land earlier this year. Amarillo has purchased groundwater rights to more than 163,000 acres, and completed a 25,000-acre purchase in 1986.

Prices for groundwater rights in the High Plains generally range from \$100 to \$400 per acre, depending on the amount of groundwater available, water quality, and how close the land is to distribution lines. The cities generally purchase only the groundwater rights with an agreement that the seller can still pump water but not for irrigation.

When land is purchased, many cities then lease the acreage back to agricultural producers who can use the land in dryland production. Prices for sales of land with good quality groundwater vary from \$500 to \$1,000 per acre. The value of the water under a piece of land can be as much as three-fourths the combined value of the land and water.

Water conservation research funded by TWRI, the Texas Agricultural Experiment Station (TAES), and others may enable farmers to pump less groundwater through the development of water-efficient technologies such as the Low Energy Precision Application (LEPA) system, which increases irrigation efficiencies from 60 percent to as much as 98 percent. Management systems developed by TWRI and TAES such as furrow diking and conservation tillage keep more water on the field to reduce the need for irrigation (Reference 3). These developments "create" new water supplies by eliminating waste and may make it possible for irrigators to market "surplus" groundwater.

TEXAS' MOST ACTIVE WATER MARKET

Water markets in Texas are most active in the middle and lower Rio Grande Valley below International Amistad Reservoir.

Before progressing to specific case studies, it's necessary to briefly review the history of water rights in the Rio Grande Valley. During a prolonged drought in the 1950s, claimed water rights exceeded available supply. When the level of water in Falcon Reservoir fell below the minimum required for domestic needs in 1956, the state filed suit against Hidalgo County Water Control and Improvement District No. 18 along with 39 other water districts and 650 private corporations and individuals (Reference 4).

The results of the suit, which cost \$10 million and took 15 years to decide, are extremely important. Water rights in the lower Rio Grande were adjudicated on a case-by-case basis. Cities were allocated more than 140,000 AF of municipal water rights per year. Irrigation districts and agricultural producers were awarded as much as 2.5 AF of water

per irrigated acre per year. Irrigation rights were divided into "Class A" and "Class B" rights. "Class A," which was given to those who could prove they had a water right, superseded "Class B." which was assigned to those who had less certain claims.

A watermaster system was enacted. Administered by the TWC, the watermaster monitors water usage and sees that only those persons with rights use water in accordance with the terms of those rights.

Municipal water rights in the lower and middle Rio Grande are protected through a reserve in Amistad and Falcon reservoirs. Municipalities are assured of receiving their full water rights as long as there are sufficient water supplies in the reservoirs. Allocations to agricultural users and irrigation districts vary according to climate conditions and water levels in the reservoirs. Holders of agricultural water rights in the lower Rio Grande Valley were allocated an average of only 41 percent of their rights from 1978-1985.

Whenever a municipality purchases agricultural water rights, it must petition the TWC for conversion to municipal rights before using the water. When "Class A" rights are converted to municipal rights, they are converted at a rate of 0.5 AF of municipal rights per 1.0 AF of agricultural rights. The ratio for "Class B" rights is 0.4 to 1.

In summary, the water market flourishes in the Rio Grande Valley for a number of reasons:

- 1) Water rights in the middle and lower Rio Grande Valley have been fully adjudicated.
- 2) The TWC has been reviewing the amounts of water used by holders of surface water rights. In 1985 the TWC instituted cancellation proceedings for many holders, and water rights were reduced in many instances following cancellation proceedings. Faced with the prospect of losing water rights yet receiving no compensation, many holders sold their rights.
- 3) Groundwater supplies are limited (in quantity and quality) in much of the Rio Grande Valley. This increases competition between agricultural and municipal interests for a limited amount of surface water. Scarcity also makes acquisition of existing surface water rights the most plausible strategy for expanding water supplies.
- 4) The cities are growing, both in terms of population and area. To meet projected growth, supplies may have to be expanded.
- 5) Growth of the cities is displacing irrigated agricultural lands with new housing and industry. Since the amount of irrigable land is limited, many former irrigators are finding themselves with irrigation water rights and no land to irrigate.

McALLEN: A DIFFERENT POSTURE

While other cities in the Rio Grande Valley are busy purchasing agricultural water rights, the City of McAllen has taken a decidedly different approach to solving its water problems.

The city is buying surplus supplies of raw water at a cost of \$15 per AF from nearby towns such as Pharr to satisfy short-term demands. McAllen is not purchasing agricultural water rights even though usage exceeded its water rights by 3,900 AF in 1986.

Alan Booe, utilities engineer for the city, explained McAllen's position: "Once agricultural lands that were previously serviced by irrigation districts become urbanized and cease being irrigated as farm land, the water rights to those lands should be converted to municipal rights. Municipalities with rapidly expanding service areas shouldn't have to go out and purchase water rights. The rights should be transferred with the municipalities paying the irrigation districts the same price that districts charge individual irrigators for their water supplies."

Are McAllen and other cities in the Rio Grande paying too high a price? McAllen pays \$26 per AF for raw water deliveries, compared with an average of \$18-\$26 per AF paid by irrigators. However, the raw water cost represents only 13 percent of the cost of delivering treated water to individual customers.

Bills filed in the Texas Legislature (Senate Bill 631 and House Bill 1538) would have permitted the type of transfer that McAllen officials proposed. Since the bills did not pass, cities in the Rio Grande Valley will continue to rely on water marketing to expand supplies.

ADDITIONAL APPROACHES TO WATER MARKETING

In another marketing approach, municipalities supply lower-quality water to agricultural producers, golf courses, and industries. More than 30 Texas cities provide sewage sludge and roughly 220 municipalities provide treated effluent to agricultural producers for crops such as corn, wheat, oats, turfgrasses, hay, sorghum, soybeans, and milo. The agricultural operations are either city-owned and -operated farms or private operations.

The City of Houston, for example, has an extensive program where sewage sludge is supplied to agricultural producers who apply it as a substitute for fertilizer. Houston supplies roughly 90 dry tons of sludge on a daily basis. Although farmers don't pay for the sludge, it reduces their need to purchase fertilizer. A Waller County farmer with 500 acres saved \$45,000 during the 1986 growing season by applying sludge instead of commercial fertilizers. For urban areas, sludge and effluent giveaways also make sense. It's less expensive to give the sludge away than it is to dispose of it.

The City of Kerrville supplies treated effluent to a city-owned farm and to a nursery that grows turfgrasses and as many as 20,000 oaks and shade trees. Many west Texas cities such as Lubbock, Midland-Odessa, and Amarillo have similar programs in which they

supply treated effluent to nearby farmers and golf courses as part of their wastewater treatment programs.

A potential water marketing opportunity is being investigated in a research project of the Texas Agricultural Experiment Station (Reference 7), but the project may require institutional changes before it could be implemented. Mesquite and other undesirable range plants have been estimated to consume as much as 38 percent of Texas' water budget (10.2 million AF). If the mesquite were replaced by grasses that consumed less water, additional ground and surface water supplies could be created. Sponsors may find it economically viable to begin such a project if they are assured that they will receive the conserved water. As the law now stands, however, increased groundwater yields would still belong to individual property owners regardless of who developed the additional supply. Even newly created surface water supplies may go to existing water rights holders rather than the organization that sponsored the conservation effort.

One of the most talked-about examples of water marketing was proposed recently in southern California. The Metropolitan Water District (MWD) proposed paying for new technologies that would conserve agricultural water usage in a large area serviced by the Imperial Irrigation District (IID). In return, the MWD would receive a majority of the water farmers had conserved. The idea was sound. Irrigators would save water, and irrigation costs would be reduced. The MWD would "create" new supplies at a much lower cost than required to develop an alternative supply and could receive the water in a short time period. Unfortunately, this proposal has not been implemented since negotiations between the MWD and the IID have not been completed (Reference 8).

This type of water market is going on in Texas, although in a different way. Part of House Bill 2, implemented by the passage of Proposition 1 in the 1985 general election, authorized a program of state-subsidized loans and grants that are available to irrigators and irrigation districts to help them increase water-use efficiencies. The conserved water is not going to a particular municipality or water consumer, but the water is intended to prolong the usable lifespan of Texas' water supplies, thus benefiting the overall statewide economy.

CASE STUDIES: RIO GRANDE VALLEY

Many cities in the Rio Grande Valley are purchasing surface water rights to expand their supplies. In almost every case, water rights acquisitions aren't considered the sole remedy to water shortages. Conservation programs, efforts to reduce transmission and infrastructure losses, and the short-term storage of water within the Rio Grande River are also components of a comprehensive strategy to guarantee that water will be available when needed.

Since 1982 the City of Brownsville's Public Utilities Board (PUB) has been acquiring water rights from individuals and purchasing raw water supplies from the Brownsville Irrigation and Drainage District (BIDD) to meet short-term needs. The city passed a \$1 million bond proposal in 1984 and purchased 4,532 AF of irrigation water rights and 54

AF of municipal water rights. These were converted to 1,985 AF of municipal water rights at an average one-time cost of \$500 per AF of municipal rights. In addition, the PUB has a contract with BIDD to purchase 5,000 AF of raw water annually through 1988 at a cost of \$110,000 (\$22 per AF). These purchases increased Brownsville's water supply to 30,367 AF, enough to meet projected demands until 1992 (Reference 5). Brownsville also has a program that requires individuals bringing new property into the PUB service area to provide their own water rights or pay a fee equal to 1.5 AF of water rights for each acre of land brought into the district (usually about \$750).

The PUB is also investigating the feasibility of two "channel dams" (Reference 6) that would straddle the Rio Grande at Brownsville and Donna. Roughly 340,000 AF of water is released annually from reservoirs along the Rio Grande but is never used. Flood releases, spills, and climate changes may occur between the time the water is released and the time it reaches its point of use up to a week later. This unused water could be stored behind channel dams and put to beneficial use. PUB-funded studies indicate that channel dams could recover as much as 155,937 AF of water annually for U.S. and Mexican water users, with Brownsville receiving roughly 30,000 AF a year.

The Cameron County Fresh Water Supply District No. 1 is the water supplier for South Padre Island ("the Texas Riviera"), Port Isabel, and neighboring communities. Peak usage is concentrated during summer vacation months, spring break, and warm-weather holidays. The district is building its water rights holdings to meet those peaks through water marketing. It began purchasing agricultural water rights in 1982, and since that time water rights holdings have increased from 3,750 AF to 5,685 AF. This year the district set aside \$400,000 for water rights acquisitions and advertised that it was seeking water rights in the local newspaper. Within a few weeks, respondents offered to sell more than \$1 million of agricultural rights. The district expects to purchase 1,457 AF of agricultural water rights at \$685 per AF.

The City of Harlingen currently proposes to purchase as many as 4,500 AF of agricultural water rights at Spruce of more than \$1 million, or \$600 per AF. This purchase would augment the city's present supply of 17,070 AF of municipal water rights, and the total is intended to provide the city with sufficient water through the year 2005. Agricultural water rights are being purchased from the Harlingen Irrigation District, as well as from individuals.

These are not the only instances of cities in the Rio Grande Valley buying agricultural water rights and converting them to municipal rights. Edinburg recently purchased 840 AF at an average price of \$577 per acre. Sales of agricultural water rights to other irrigators in the middle Rio Grande Valley (below International Amistad Reservoir but above International Falcon Reservoir) are less common but have sold for as much as \$1,000 per AF.

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