Texas Hold'Em Water Market Challenges
SAN ANTONIO WATER SYSTEM

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Abstract

Shuffling – In a sleepy little region known as south central Texas, water rights are an intense issue, maybe even "high stakes." The Edwards Aquifer Authority (EAA), a groundwater conservation district, makes the policy and rules through a regional public process like an objective dealer that doesn't participate in the game. EAA was created to protect the Edwards aquifer, a designated sole source of drinking water supply by the Environmental Protection Agency (EPA). For San Antonio Water System (SAWS), a municipally owned water and waste water utility, and the region this aquifer is an important current and future water resource. SAWS' challenge is to acquire enough water rights in the short-term Edwards market while diversifying supply.

Dealing – Here we provide an explanation of how water has been leased, sold and held. SAWS has dedicated several staff and a team of support folks that work on items concerning this "cornerstone" water for SAWS.

The Blinds – 1100 other permit holders represent the "blinds". SAWS, the largest holder, has almost 40% of the permitted rights. Another blind is the EAA's enabling legislation. Texas water issues are at a legal crossroads and Edwards permitted groundwater is a valuable "Chip" or currency ripe for speculation.

"Hole Cards" – SAWS is working on a host of alternative sources; however, SAWS is now only 5% diversified. SAWS' financial strength and clear acquisitions strategy make it a formidable buyer. Conservation practices have taken per capita usage numbers from 225 gpcd to 132 gpcd even with phenomenal growth in the past 20 years. SAWS stores Edwards water in the nation's second largest Aquifer Storage and Recovery project (ASR) to shift seasonal supplies or for short-term intensive drought situations, as in 2005-2006. Other regional interests create hole cards, such as endangered species, surface water rights administration, and economies of scale.

As the famous country songwriter Kenny Rogers sings, "You've got to know when to hold'em, know when to fold'em, know when to walk away, know when to run – Never count your money while sitting at the table…" This paper explores SAWS' Edwards water market lessons learned while managing Edwards groundwater permits.

THE SHUFFLE

Introduction – "Can We Have It All?"

We "Call" your bet and raise you the following perspectives to offer insight to the question "Can We Have It All?" with respect to the water market activities of south central Texas. We will explore the geographic & water balance setting, Texas water law, groundwater conservation districts (primarily the Edwards Aquifer Authority (EAA)), permitting, the "Deals," and the "Hole Cards" in an attempt to offer perspective to the complex setting that is every bit as exciting as a high stakes poker game.

Geographic & Water Balance Setting

Geographically the Edwards aquifer is located in south central Texas and is a wondrous geologic gift formed by the ancient deposition of sediment which created large beds of Cretaceous limestone. These ancient depositions were exposed to varying successive periods of weathering while being laid down. More recent structural activity, somewhere from 5-23 million years ago, created faults running through Texas. This fault system is known as the Balcones Fault Zone (BFZ), a narrow band running from Dallas southward to turn westward just north of downtown San Antonio heading west nearly reaching Del Rio, Texas.[1]

Karst aquifers are characterized by the presence of sinkholes, sinking streams, caves, large springs, and a well-integrated subsurface drainage system.[2] The San Antonio Segment of the Balcones Fault Zone Edwards Aquifer in south central Texas is one of the largest and most important karst aquifer systems in the United States. Generally, the water quality in the aquifer is high. The section of aquifer from which the marketed groundwater rights emanate extends through parts of Kinney (not officially in the EAA boundaries but geologically a small portion at the groundwater divide flows east), Uvalde, Medina, Frio, Atascosa, Bexar, Comal, Guadalupe, and Hays counties and covers an area approximately 180 miles long and 5 to 40 miles wide. The aquifer is the primary water source for much of this area including the City of San Antonio.

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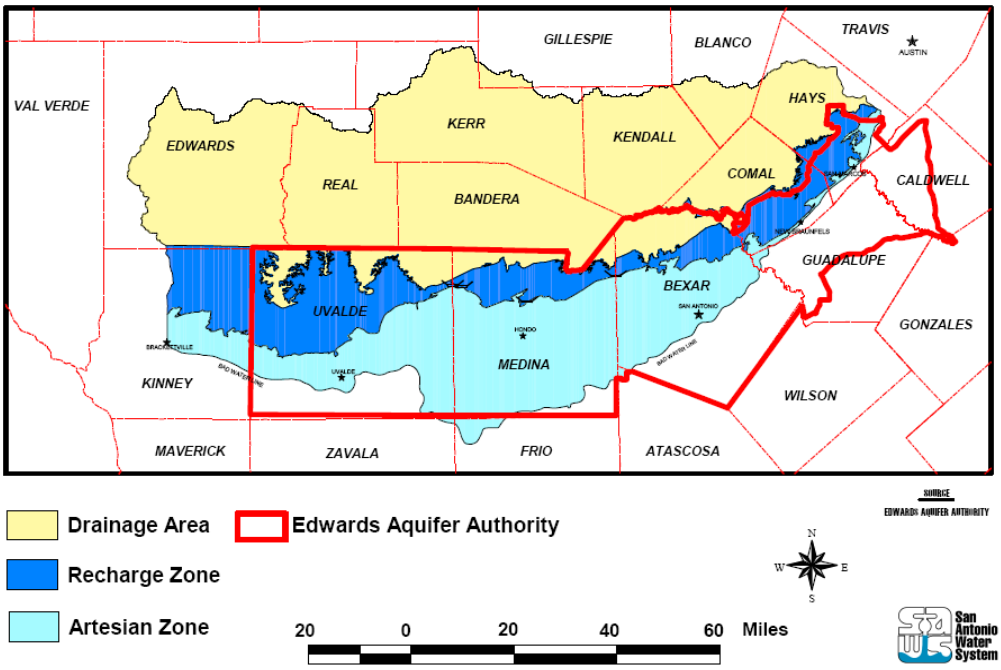
[1] Karst Regions of Texas, Richard Smith & George Veni, NSS Convention Guidebook 1994, pg. 8
[2] Edwards Aquifer Authority Bibliography 2005, Report No. 06-04 pg. 2.

Historically, the cities of Uvalde, San Antonio, New Braunfels, and San Marcos were founded around large springs that flow from the aquifer. [3]

We are focused on water rights derived from a specific area corresponding to figure entitled **"Edwards Aquifer Region"**. The prolific nature of this aquifer is due to its karst influences; the Edwards Plateau draining into the escarpment is one of the largest continuous karst areas in the United States.[4] The Edwards is one of the most productive groundwater systems in the United States, characterized by extremely high capacity water wells and high spring discharges.[5]

EDWARDS AQUIFER REGION



It is often asked: "How much water does the aquifer system contain?" Estimates have been made as high as 175 million acre-feet but no one really knows. Because of the cohesive nature of water much of this large estimate would not be recoverable. Thus, a more reasonable estimate is 40 million acre-feet or so. One thing that is certain is that because of the location of key springs, less than 1.0% on average is pumped in order to

[3] Ibid.
[4] Karst Regions of Texas, Richard Smith & George Veni, NSS Convention Guidebook 1994, pg. 8
[5] Edwards Aquifer Authority Bibliography 2005, Report No. 06-04 pg. 2.

protect listed endangered and threatened species. Annual recharge during the instrumental record fluctuates from a high of approximately 2.5 million AF (1992) to a low of approximately 44,000 AF (1956).[6] During the instrumental record, historic mean recharge is approximately 719,000 AF with a median of approximately 586,000 AF. As long as it continues to rain and the quality of water entering this unique aquifer is protected it will be a renewable resource and continue to be an excellent "cornerstone" water supply for the region.

Texas Water Law

Texas classifies its water into one of two broad categories: surface water or groundwater. The conjunctive management of these two water categories is not generally recognized legally. Surface water is "held in trust" by the State of Texas and its use is appropriated to users through permits known as "water rights" and awarded in order of "first in time, first in right." Any impoundment, sale or lease of surface water is highly regulated and governed by specific case law, statutes, and other rules. Surface water rights are subject to cancellation if not used in whole or part within a consecutive 10-year period, a "use it or lose it" policy.

Groundwater use, in contrast, is based on the English common law doctrine, generally known as the "right of capture," under which the deepest well and most powerful pump get the water with few exceptions. Since 1904, Texas courts have considered groundwater movement to be "so secret, occult, and concealed that any attempt to administer any set of legal rules in respect to [it] would be involved in hopeless uncertainty". [7] The Texas Legislature prefers protection of groundwater through locally managed groundwater conservation districts (GCDs). Local creation and control of such districts is preferred since it provides for the diversity of climate, water use, and aquifer conditions in Texas. In 1949 the Texas Legislature, in a move to protect local groundwater and limit pumping impacts, allowed for the voluntary creation of groundwater conservation districts (GCD). Typical duties of a GCD include:

- Development and adoption of a comprehensive management plan

[6] Edwards Aquifer Authority Hydrologic Data Report for 2005, Report No. 06-01, August 2006, pp. 23-39
[7] Houston & T. C. RY. Co. V. East, 81 SW 279, 280

- Rulemaking authority to implement the plan
- Establish a well permitting system for drilling or modifying wells that produce more than 25,000 gallons per day
- Maintain records on wells and their production
- Provide groundwater resource information to state agencies.

Additional legislation was introduced in 1987 and 1997 to encourage the establishment of such districts, and encourage their creation it did do! Only 10 GCDs existed prior to the 1985 legislative changes, which then ushered in another 33 GCDs. An additional 62 GCDs have been created since the second legislative push in 1997. To date, 95 GCDs have been created in part to preserve 57% of all fresh water use and nearly 80% of all agricultural water use in Texas.[8]

The Edwards Aquifer Authority (EAA)

In 1959 the first GCD for the Edwards Region and the sixth in the State was created as the Edwards Underground Water District (EUWD). For approximately 33 years the EUWD performed activities to conserve, protect and recharge groundwater related to the Edwards aquifer.

The perfect regulatory storm formed in the early 1990's. After weathering two droughts of the 80's, failed attempts at diversification, few conservation initiatives, a lawsuit filed by the Sierra Club - *Sierra Club vs. Department of Interior*, and a series of other events spurred momentum for some changes. The City of San Antonio had departments of the city presenting conflicting challenges related to water resources. The Alamo Water Conservation and Reuse District plans presented the potential for impacts to the City Water Board's planned "Applewhite" reservoir, which was an attempt at diversification by utilizing surface water resources. City Council took matters to a vote to establish a single utility responsible for water, wastewater, stormwater, and reuse. The San Antonio Water System (SAWS) emerged May 19, 1992. It was consolidated out of three predecessor agencies: the City Water Board, the City Wastewater Department and the Alamo Water Conservation and Reuse District. In response to intense water

[8] Managing Texas' Groundwater Resources through Groundwater Conservation Districts, Guy Fipps, Texas Agricultural Extension Service, November 1998

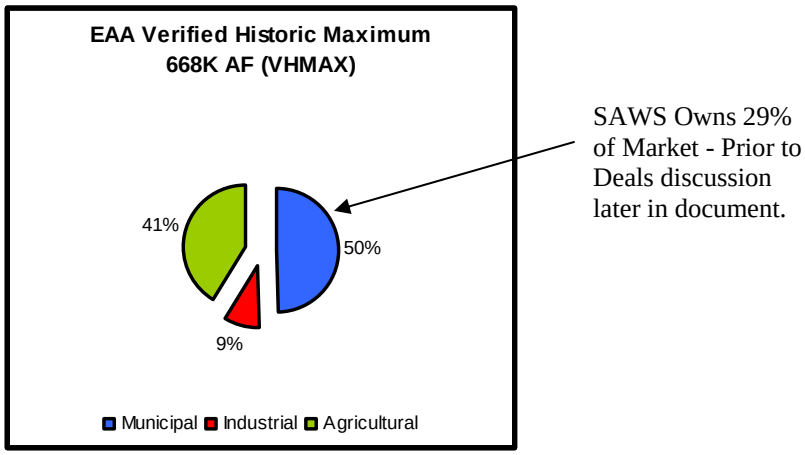
challenges, related to litigation under the Endangered Species Act (ESA) centered around the endangered Comal Fountain Darter (*Etheostoma fonticola*), the Texas Legislature passed SB. 1477. The act created the Edwards Aquifer Authority (EAA), a special GCD that would take the Region into the future with permitting of groundwater withdrawal rights, enforcement of drought usage rules, and protection of endangered species. The replacement of the existing GCD with a new regulatory authority was necessary given the complexity of the water issues and the competing interests for the actual water.

Out of the tumultuous early 90's developed a water market that has been struggling with uncertainties and various market influences. Nearly ten years of permitting and amendments brought about what we call "the Deals," an examination of SAWS activities in the often misunderstood niche market for Edwards Aquifer groundwater withdrawal permits.

The Permitting Status – What is There? And What is Being Used?

What exactly is an Edwards aquifer permitted groundwater right worth? This important piece of information is crucial when dealing in the Edwards water market. Up until 2004 many transactions were conducted with interim authorization facts and the circumstances of that particular permit's history or application is what was used in its evaluation. That being said, many facts surrounding the permitted amounts also impacted the value of that permit; these included usage rules during droughts, changing legislation, and endangered species considerations that over-shadow the certainty of these rights. That aside, Edwards aquifer permitted groundwater withdrawal rights are still a valuable resource and here we will provide some permitting perspective.

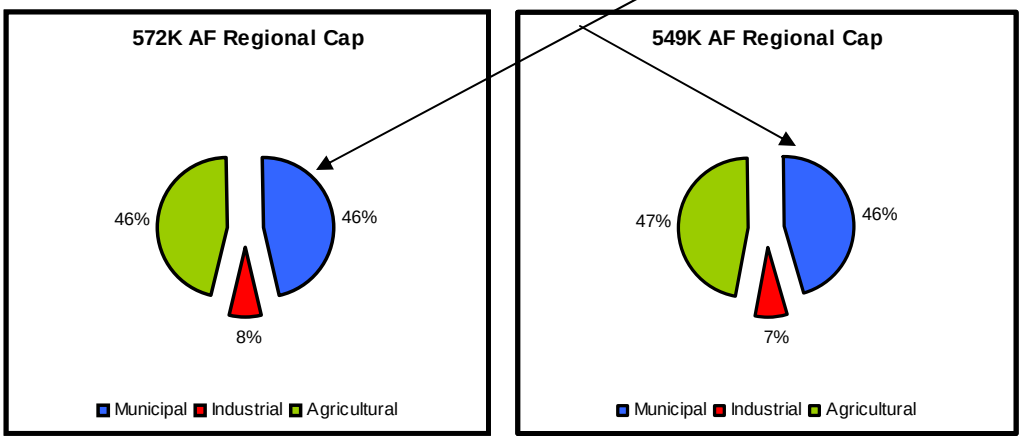
The permitting process officially began in 1996; however, permitting was being worked on prior to this while the EAA was working through some challenging litigation "dealing" with voting rights issues. Some 1100+ applicants filed applications for permitted rights requesting 800K+ acre-feet of water rights. Through a verification process, EAA developed a Verified Historic Maximum (VHMAX) Value based on information submitted during this application process that corresponds with the following pie chart:



Permit applicants either accepted these or contested the numbers provided under the VHMAX proposals. Approximately 70% of the applicants accepted the EAA's recommendations. It is important to recognize that in the legislative process, agricultural interests lobbied and obtained what is known as the "irrigator minimum;" an entitlement to two acre-feet per acre of land irrigated during the historic period without the same burden of proof as other users. Contesting the proposed permit amount began a process of being heard in the State Office of Administrative Hearings (SOAH) court. Most cases settled out of court or before official ruling by the SOAH Judge; those without further challenge received a settlement amount or judgment. Currently there is a small number of litigation remaining: less than five in settlement cases or further litigation representing a small amount of water on a regional scale.

Roughly two permitting scenarios exist that recognize regional water rights and have been considered during SAWS' participation in the market. Both sets of numbers are based on the same permitting process. The major differences are in the permitted ceiling caps and floor thresholds. Regional pumping can exist somewhere between 340K acre-feet and 572K acre-feet per annum without engineered methods to protect endangered species during 97% of hydrologic conditions, to an extent maximally feasible and regionally affordable, based on rational probabilities of catastrophic drought events. The following pie charts depict water distributions in broad user categories dealing with these two caps of generally accepted amounts including cases that went through the SOAH process:

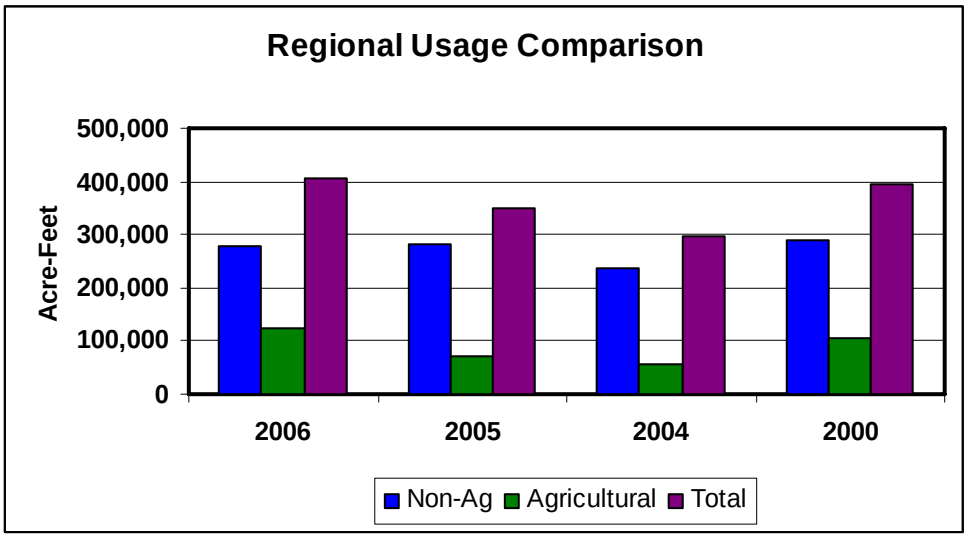
SAWS Owns 35% of Market and leases approximately 5% under these scenarios.



Adoption of the 572K acre-foot cap has reopened the permitting process. Technically EAA is reissuing permits under this new legislative mandate; this is expected to take place during the fall of 2007. The permitted amounts are already a part of the permitting history but in order for every permit holder to get their new amount, the EAA has to back out of the permits they issued at 549K acre-feet and adjust roughly 30% to their new permitted amounts under the 572K acre-foot cap due to recent legislative amendments. The 549K acre-foot cap honored what was known under the SB. 1477 legislative language as "the statutory minimums" of permit holders. Prior to the 2007 legislative amendments the 549K acre-foot cap gave the most complete picture of the permits values to the market, a process that took about ten years of work from 1994 until 2004. At first glance, these charts do not appear to be that different. However, drilling down into the data provides for some interesting perspectives into permitting water rights in a predominantly private property owned state. A couple of items to note detail about the dynamic nature of transfers in the market and items the charts do not explore adequately. Under the new legislative cap of 572,000 acre-feet a year (left graph), the share of the permitted amount "dealt" to irrigators appears to be less than under the old 549,000 acre-foot cap (right graph). However, the new legislative cap of 572,000 acre-feet per annum is a significant boon to irrigators since they received additional water above and beyond other users, such as municipalities.

SAWS' Share of the Market

SAWS' share has grown about 6% in ownership since the advent of the market. SAWS grew from 29% in VHMAX to 35% under the permitted scenarios. Leases are steady at approximately 5% of SAWS' Edwards holdings but fluctuate according to management. It is apparent in reviewing various usage years impacted by different weather conditions that recent total usage is below the total permitted amount. Agricultural usage is consistently less than what has been permitted and authorized on an annual basis by the EAA.



This being said, SAWS' Water Resources Plan Update 2005 outlines goals of involvement in the Edwards water market. [9]

A Market System Set Up to Take Off

The EAA's primary directives received from the Legislature during its creation in 1993 were to:

- Introduce a permit-based system to regulate aquifer pumping and
- Solve any allocation problems via a water market.[10]

The permitting scheme heavily favored irrigators by giving every verified irrigated acre two acre-feet of groundwater rights, much more water than was generally used. Many

[9] http://saws.org/our_water/waterresources/waterresourceplan/WaterResourcePlanUpdate20050621.pdf as of August 1, 2007

[10] http://www.tpj.org/watchyourassets/aquifer/index.html as of July 30, 2007.

irrigation permit holders never engaged in much irrigation, abandoned the practice given the high cost of fuel, or increased their conservation practices. Only 25% of the irrigation groundwater rights were pumped in 2005.[11] The municipal and industrial permit holders could only be permitted for their average water use from 1972 through 1993. During those years SAWS pumped a low of 112,624 acre-feet in 1973 and an almost 70% increase for a maximum of 190,430 acre-feet in 1988. Further, San Antonio's population has increased by more than 30% since 1992. Most municipal pumpers are having to scramble to meet similar growth and as a whole pumped 79% of their permit allocations in 2005.[12]

Within a year after EAA was established, the City of San Antonio 2050 Water Plan called for leasing of western (irrigation) groundwater rights as a strategy to meet the cities interim needs and a part of the long-term water demand.[13] SAWS first groundwater rights lease and purchase both occurred in 1998 when the permit scheme was anything but settled.

The EAA required permit applications to be filed in December 1996. In April 1998, the EAA proposed permits and allowed for other permit holders to file protests on any other proposed permit through August 1998. SAWS chose to protest about 600 of the proposed permits, offending many of the related irrigators and business owners. By November 1998, the EAA proposed permits were determined to be invalid due to a rule technicality. The EAA had to redo their rules and did not propose new permits until November 2000 after which one had six weeks to file a contest on other permits. Again SAWS chose to contest several hundred permits. The EAA issued its first 106 permits in January 2001 and continued issuing permits at its monthly board meetings over the next three years. Currently the EAA has made a determination on all submitted permits, though some are in district courts being appealed by the permit holder. The permitting scheme is still in flux, in that the last legislative session required the EAA to issue permits that recognized a total historic annual maximum of all the permits of 572,000 acre-feet.

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[11] Ibid.
[12] Ibid.
[13] http://www.edwardsaquifer.org/pages/chrono1994.htm as of August 1, 2007.

THE DEALS

Presented below are several case studies involving various forays by SAWS into the Edwards water market. These cases serve as examples of how the market has evolved.

Groundwater Rights Lease Market Development

SAWS employed two different economic firms to guide it in developing a groundwater rights market. One area of the country that SAWS studied was the front range of Colorado. Land development rules in the greater Denver area required developers to provide water rights for the projects that they were developing. Huge speculation in water rights ensued; water rights prices spiked and fell back to a more reasonable trading range within a year or two. The physical ability to access the water in Colorado from a canal or river, as in other western states, restricted the transferability, and hence the market price, of the water rights. Both economic firms indicated that market development of the Edwards aquifer would be expedited because the aquifer itself would serve an easy means for delivery of the traded water.

During the summer of 1998, SAWS sent a proposal to all those that had applied for a groundwater withdrawal permit from the EAA. SAWS was soliciting groundwater to lease for two, three, or five years. One problem for SAWS was that it had challenged many proposed irrigation permit amounts at the time lease bids were being solicited. However, SAWS received about 60 bids, representing about 10% of the permit holders, though was unable to accept all of those with favorable lease prices because of the contested permit situation. Initial lease prices that were accepted by SAWS ranged from $70 to $80 per acre-foot per year. SAWS was unable to modify any of the lease offers to accept a lesser number of acre-feet for a contested permit without it becoming a counter offer. SAWS initially pledged to share all the acquired water with other public purveyors through a regional alliance of water supply agencies.

SAWS relied heavily on an economic study of the value of water for irrigation prepared by Mr. Charles Kreitler and Mr. Bruce K. Darling.[14] The table below

[14] Value of Groundwater as presented by Charles W. Kreitler, Ph.D. and Bruce K. Darling, Ph.D., the Seventh Annual Conference on Texas Water Law, Nov. 13-14, 1997, Austin, TX.

summarizes the average difference in return between an irrigated acre and a dryland acre for several different crops during 1994 and 1995. The study area included 18 counties in south central Texas, including the bulk of the EAA region with the exception of Atascosa and Uvalde Counties. The prices in the table can be interpreted to be the upper limit of the value of production attributed to irrigation because they have not been adjusted to reflect the additional operating expenses due to irrigation.

Crop	1994	1995
Corn	**$36.41**	**$40.42**
Sorghum	**$57.24**	**$30.87**
Wheat	**$88.48**	**$47.65**
Cotton	**$232**	**$171.35**

SAWS expected to see lease rates within the range of values in the table with a little markup to help entice irrigators to lease. SAWS had a standing offer to lease water for 5-years beginning in 2003 for $77 per acre-foot. Since initiating a lease market in summer of 1998 and through September 2001, SAWS has participated or helped arrange leases for over 42,800 acre-feet. SAWS does not have evidence that its leases have displaced any cotton or vegetable acreage. Leased acre-feet have seemed to come out of the lower valued crops, corn and sorghum, from previously irrigated pastureland, or irrigation water allocated but rarely used. Remember, the EAA permitting scheme gave irrigators two (2) acre-feet for every acre proved to have been irrigated within the historical period (June 1972 through May 1993); however, SAWS' staff estimated that current irrigation practice requires on average only 1.25 acre-feet per irrigated acre.[15] Therefore, even active irrigators on average would have groundwater rights to lease.

Regional Water Resource Development Group – The "ROAR DOG"

In December 1997 the San Antonio Water System (SAWS) convened a group of water purveyors to work together to meet municipal water needs for this fast growing

[15] BBC Memorandum of February 25, 2004 to SAWS, RE: Estimating the Base AF Value

area. Though the region was working on long-term plans to deliver alternate sources of water, the only short-term municipal remedy was acquisitions of irrigation water rights.

Several organizational models to effect the irrigation to municipal water transfers were examined and later discarded. Establishing a new state governmental agency was expected to be impossible given a legislative session ending in June 1998. There was universal concern with allowing a private entity to become the market maker. The most expedient means of meeting municipal needs was by using established agencies.

Several agencies stepped forward with their version of how to organize a water market. Eventually the group of interested purveyors selected two agencies: SAWS and the San Antonio River Authority (SARA) to meet the water needs of a joint "buying group" of purveyors. An Interlocal Agreement was drafted which was adopted by thirteen (13) original members. SAWS was to serve as the "Agent" for the newly formed Regional Water Resource Development Group (RWRDG). SAWS would arrange for all transfers via either sale or lease within the pricing constraints established by the RWRDG Management Council. SARA would serve as the "Administrator," allocate water rights, and handle all finances.

The Interlocal Agreement served only to outline the basic tenets of the group operation. Another document specifying operating procedures was developed because regulations governing amount and transfer of water rights were still evolving. Having easily amendable group rules allowed the RWRDG to quickly refine its operations without waiting for approval by all participating councils or boards. Generally, water rights could not be acquired until an order was placed. Once water rights were acquired, they were allocated by SARA, the administrator, among the participants based on their respective order.

The lease market has been robust since coming into being in 1999, but it has been also relatively steady through 2005. A typical 3-year lease went for $77 per acre-foot, while 10-year leases went for $82 per acre-foot. Also, the RWRDG agent (SAWS) initiated few if any marketing efforts since the permit holders themselves were calling to initiate the leases. This era also had limited leasing activity by private water brokers. If a permit holder was interested in a lease, there were not many options. Per SARA's

website, the RWRDG had leased approximately 57,934 acre-feet as of June 2005.[16] Typically, 90% of the leased water rights that SAWS, as the agent, secured for the RWRDG were in turn allocated to SAWS. The remaining 10% of the permits were allocated to RWRDG participants depending on the lease orders.

SAWS withdrew from the RWRDG in late 2005. Unfortunately, SAWS' departure contributed to market fragmentation and greater competition, all of which SAWS had hoped to avoid by creating a collaborative acquisition model initially. As the RWRDG agent, all RWRDG participants were required to direct any potential acquisition deal to SAWS. After withdrawing from the RWRDG, SAWS now knows less about the public leasing market than it did as the RWRDG agent. In addition, RWRDG and SAWS are now in competition with one another. Even though RWRDG as a whole has far less water needs than SAWS, RWRDG appears to be offering higher lease rates, initially $95 per acre-foot and now up to $125 per acre-foot. SAWS has restructured its lease program around a higher lease rate as well with lease rates ranging from $100 to $140 per acre-foot, depending on the length of the lease. For any lease 6 years or longer, SAWS will pay a signing bonus.

The only method SAWS has about learning the details of other leases is by requesting information from the EAA. One item to be entered on the form seeking approval by the EAA of the temporary transfer of leased water rights is the price paid per acre-foot under the lease. Most public agencies will enter the lease price on the transfer form since it is already discoverable information and because of the desire to be forthcoming with other public agencies. If neither party to the lease was a public entity, then rarely, if ever, is the lease price entered on the EAA transfer forms. The EAA has received so many negative comments on disclosure of private transactions prices that it is considering repeal of this rule.

SAWS might also be able to glean some lease information, certainly volume of water and perhaps price, by perusing the county property records. Typically, SAWS does not file the lease in the county records, only a memorandum of lease that identifies the permit, the real property from which the permitted water rights are derived, the volume of water leased, and the term of the lease. The bulk of the lease transactions would be

[16] http::/www.sara-tx.org/site/Water_Resources/Water _Supply.php as of 7/30/07

recorded in any of three counties: Bexar, Medina, and Uvalde. Bexar County has property transactions that can be viewed via a website and generally current as of two weeks prior to view date, copies of which can be printed for free. Medina County has only recently created a system for on-line retrieval of records and any copies made, even from your own computer, are for a fee. Uvalde County maintains an on-site database from which to retrieve any recorded leases or memorandum of lease. SAWS has not attempted to look at this type of record since our own filings contain no lease price details.

Permanent Groundwater Rights Market Development

As of June 2005, the RWRDG distributed 18,024 AF of permanent water rights[17], all of which had been acquired while SAWS was the agent. Transactions for permanent groundwater rights have been more difficult to consummate than leases. In the RWRDG era, SAWS was only able to buy two different pieces of severed groundwater rights. In each case, the transaction only involved transferable water rights and not the one acre-foot currently required to remain with the irrigated acreage. The price paid for the 550 acre-feet of severable water was **$700 per acre-foot in 1998**.

In many cases SAWS was required to acquire land in order to get the accompanying water rights. SAWS currently owns 236 acres of land and associated industrial water rights. The RWRDG rules require that some entity in the group agree to own the land. In all cases, SAWS has stepped forward to acquire the land and generally the severable water rights have been shared among RWRDG members in proportion to their requests for water. In the first transaction, February 1998, for industrial rights SAWS exchanged $2,797,700 for 151 acres along Leon Creek in Bexar County, the associated surface water rights, and an Edwards permit for currently 2,713.972 acre-feet. This comes to **$1,031 per acre-foot** when considering the total purchase price. These water rights were not offered to the RWRDG since SAWS acquired the land at the City's request and not primarily for the groundwater rights. After its purchase, SAWS plugged two abandoned Edwards wells in the floodplain.

[17] Ibid.

The Catfish Farm – the Largest Artesian Well in the World

SAWS' second industrial transaction was very complicated and was accomplished in three parts. In early 2001, SAWS paid $9,000,000 for 85 acres of land, 10,000 permanent industrial acre-feet, and a five-year lease at $25 per acre-foot on 7,724 acre-feet or **$900 per acre-foot** based on the total transaction price. The origin of the groundwater rights was the infamous "catfish farm" in southwest Bexar County, in full operation for only one season in 1991. The farm, officially Living Waters Artesian, Ltd., used enough water to support 250,000 people or one quarter of San Antonio's population at the time and the produced water was used to raise catfish in raceways before discharging the water to the Medina River.

The photograph below was taken during the short period in 1991 when the farm was in full-swing operation.

When it was drilled in the early 90s, this was the largest water well in the world. There is tremendous artesian pressure at this location. When this well came in, it blew out rocks the size of basketballs 20 feet into the air![18]

Luckily, the transaction included a right of first refusal on the leased water rights. The EAA finalized the "Catfish Farm" permit in the amount of 22,500 acre-feet in August 2002, the second largest permit issued. SAWS was able to buy another 3,125 acre-feet under the permit in May 2003 for $5,468,750 or **$1,750 per acre-foot** by meeting the offered sales price of a speculator. The remaining 9,375 acre-feet was purchased by SAWS in January 2004 for **$1,590 per acre-foot**. The RWRDG felt that the prices on the two later pieces of the permit were too high and collectively chose only

[18] http://www.edwardsaquifer.net/pucek.html, as of July 31, 2007.

to participate in the initial purchase of 10,000 AF. Just over 8% of the initially purchased water rights were split between five other RWRDG members with the remainder to SAWS.

Acquisition of Dirt and Water Rights

SAWS has acquired 13 irrigated farms throughout Bexar, Medina, and Uvalde County. The SAWS Board adopted a policy in October 1997 that limited the acquired groundwater rights while requiring preservation of "the cultural, social, environmental, and economic interests of those in the region affected." SAWS owns almost 6,000 agricultural acres. Because of SAWS' commitment, each farm is leased, is currently in agricultural production, and the tenants pay taxes on the property at the agricultural tax rate. SAWS properties currently had issued or proposed groundwater rights totaling 9,046.3 acre-feet. Again half of this water, 4,523 acre-feet, was severable from the property and was distributed among the RWRDG participants for municipal use.

SAWS acquired the 13 farms in only three transactions. The first two purchases for individual farms occurred early in the process, May 1998 and May 1999. The two farms totaled just over 711 acres at an average price of $1,900 per acre with associated water rights. The remaining 11 properties were acquired in a single $8,728,051 transaction in February 2001. About 17% of the land acquired in the large transaction did not come with water rights so the average price per acre only averaged $1,678 per acre.

SAWS timing for the purchase of irrigated farmland with groundwater rights turned out to be quite fortuitous. Total initial investment in the land and groundwater rights between 1998 and 2004 was just shy of $40 million yet the groundwater rights alone at current market prices would be valued at $110 million. In the meantime, SAWS has collected $1.1M in lease income from its tenant farmers over a ten year period. SAWS was fortunate to acquire the property before it fully reflected the value of the evolving water rights market.

SAWS also has another way to make more transferable groundwater rights from its irrigated properties. The EAA rules provide a process whereby any savings in irrigation efficiency because of the installation of more efficient equipment can create transferable water rights out of the base acre-foot that otherwise would be restricted to

use on the originally irrigated land. An example would be replacing flood irrigation with drop nozzle center pivots. Corners of fields that are no longer irrigated because of the new equipment can also be converted to transferable water. SAWS is anticipating converting an additional 1700 acre-feet to transferable from its irrigated farms at an average price of $500 per acre-foot, an additional $8,000,000 value from the purchase of the irrigated farms.

Currently SAWS has designated four of the irrigated farms as surplus on which all transferable groundwater rights have been put to municipal use and all convertible groundwater rights based on more efficient irrigation equipment have been designated as transferable. SAWS will soon put these properties out for a public bid. Bids will be evaluated not on the dollars offered, but rather the amount of transferable groundwater rights offered, generating even more return on the initial monetary investment.

Can SAWS duplicate its success through future acquisitions of irrigated farmland? The answer is possibly, but not likely. Irrigated farmland in Medina and Uvalde County has escalated to reflect the value of the transferable groundwater rights. Also in many sales the transferable rights may be reserved by the seller leaving only the part of the base acre-foot that might be converted to transferable with new, more efficient irrigation systems. Further, these counties have experienced a general escalation in rural land values. The median value of rural land in these two counties, also including Frio, Maverick, and Zavala Counties has increased 56% between 2003 and 2005.[19] Other factors noted as pushing rural land prices upward include: baby boomers' desire for retirement land, development of "ranchettes", and the popularity of hunting.[20]

Low Tech Solicitation

After the middle of 2001, SAWS, as agent for the RWRDG, sent over 1000 Requests for Proposals (RFP) for the permanent acquisition of Edwards groundwater rights. One of the speculators, described below, then sent a letter to all EAA potential permit holders suggesting that they not respond to the RFP. Regardless, SAWS received

[19] *Ranches are Back as the Hottest Property to Get Flipped,* J. Hiller, San Antonio Express-News, September 16, 2006.
[20] Ibid.

five (5) offers to sell groundwater rights. Prices per acre-foot ranged from $900 to $2,500 with a total of 1260 groundwater rights being offered for sale. RWRDG elected to only accept the 216 acre-feet offered at $900 per acre-foot. Unfortunately, this deal was never consummated since the offer was tendered by a real estate agent which the owner of the property contended did not have authority to make such an offer. This RFP process received no media coverage.

High Tech Solicitation – the ORBIS Experiment

In early 2003, SAWS was trying a new means of purchase and acquisition with a private company, ORBIS Online. Having just completed a successful bid process for chemicals, SAWS approached ORBIS about using their propriety on-line bidding software to acquire Edwards Aquifer groundwater rights. ORBIS operates a 24-hour reverse auction which lists the maximum price the company is willing to pay, displays the current bids on-line, and allows bidders to go in and adjust their bids based on what they see their competitors offering.

SAWS worked with ORBIS to create different acceptable price bids based on the volume of groundwater rights offered for sale. The specifics are listed in the table below.

Range in Acre-feet	**Maximum Acceptable Price Per AF**
10-75	$1,650
76-150	$1,675
151-200	$1,700
251-400	$1,725
401+	$1,750

In March 2003, SAWS then notified 778 of the permit holders, predominantly those holding irrigation permits, announcing the reverse on-line auction and the related training sessions. Bidders had to register with ORBIS before they could enter a bid and 20 bidders did so. ORBIS actually received nine bids on the auction day, April 22, 2003, at least one bid in each of the designated size categories, and three of which were below the max price. In an economic sense the reverse auction was a success. A total of 1,676

acre-feet were offered for sale at an average price of $1,708.84 per acre-foot.[21] Unfortunately, SAWS did not end up accepting any of the bids. This was particularly disappointing for ORBIS, since they only get paid based on a percent of business actually consummated, and for the bidders, since they did not have deals either. However, the greatest blow was to SAWS' credibility in the market. SAWS was seen as shopping around for market prices without having any real intent on purchasing water rights.

Here Come the Speculators

If SAWS could see an impending shortage of Edwards groundwater rights, so could others. Others with money came to participate in the Edwards market with the hope of financial gain. As one speculator's website states, "There are many reasons to conserve, but one of the most compelling is financial incentive. Applying a basic economic principal, limited supply combined with growing demand results in increased market prices".[22] In fact, SAWS was able to acquire 11 irrigated farms for $8,728,051 in one single transaction in February 2001 because of a speculator. The company that amassed the land holdings was acquired by another company whose business model did not include farmland in south-central Texas. SAWS was the only ready buyer with both the need for a lot of water and cash on hand. A deal was quickly consummated.

Though one of the first speculators left the market several others have since entered. Below is a table with some information on entities that appear to be purchasing water rights.[23] Note that it can be very difficult to accurately track sales since their recognition by the EAA can be delayed and partnership names can change. For example, Laguna Water has had three different versions, creating a specific portfolio of water rights for varying groups of investors.

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[21] *San Antonio Express-News.* "SAWS gets bids online," Jerry Needham. April 24, 2003.

[22] http://prosites-stebmaster.homestead.com/Edwardswater/Topics.html as of August 2, 2007

[23] http://www.tpj.org/watchyourassets/aquifer/index.html as of August 2, 2007

Water Broker Companies	2007 Permits in Acre-ft	2005 Permits in Acre-ft	Est. Value of Selling 2007 Permits	Est. Value of Leasing 07 Permits per Year
Laguna Water II, Ltd.	3,119	2,917	$17,154,500	$389,875
Woodley Water, Ltd.	3,100	1,920	$17,050,000	$387,500
Aqua Capital Management, LP	1,061	0	$5,835,500	$132,625
Eckard Natural Resources Group, LLC	862	571	$4,741,000	$107,750
Edwardswater.com, L.L.C.	175	229	$962,500	$21,875
TOTALS	**8,317**	**5,636**	**$45,743,500**	**$1,039,625**

Estimated Values - selling at $5,500/acre-ft; leasing $125/acre-ft per year.

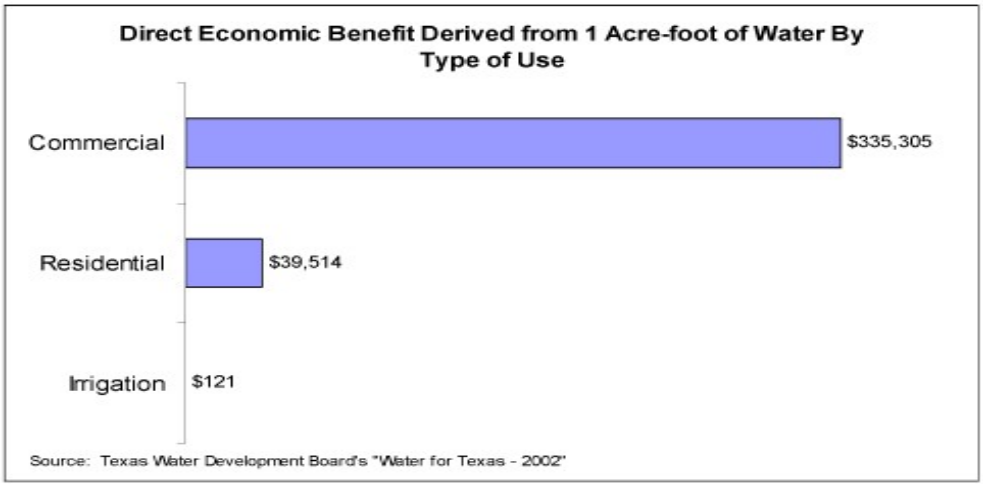
Another source of market information is the county property records. Looking at a mid-July 2007 report, which includes transactions from the period of January 1st 2007 through mid- July 2007 for Uvalde transactions alone: Aqua Capital Management, LP acquired 2687.45 acre-feet, Eckard Natural Resources Group, LLC bought 50 acre-feet, the current manifestation of Laguna Water bought 469.3 acre-feet of which 409 acre-feet came from another speculator, Edwardswater.com, LLC. Yet in the same period, Edwardswater.com also bought an additional 135 acre-feet and another speculator, not listed in the above table, purchased 67 acre-feet.

One of the more interesting of the speculators is Edwardswater.com which has maintained an extensive website[24], positioned itself to be an educational source to and an advocate for irrigation water rights holders, and has commissioned its own economic and hydrologic studies. Edwardswater.com is based in Uvalde, Texas and, along with most of the other speculators, has strong local ties. Some facts cited by Edwardswater.com include the following information for Medina and Uvalde Counties in 2002:

1. 64 irrigated farms were added from 1992 to 2002 for a total of 539 irrigated farms in 2002.
2. Market value of crops sold was $50,480,000.
3. Average difference between sales less production expenses per farm was only $7,517.
4. Average government payment per farm was $19,064.

[24] http://edwardswater.com/ as of August 2, 2007.

The same website candidly includes the following chart.



Aqua Capital Management, Inc., a more recently arrived speculator participating in the Edwards market, began buying up water rights in 2006.[25] Shortly thereafter, this company water leased some of these same rights to Bexar Metropolitan Water District (Bexar Met), the area's second biggest purveyor to help meet the districts needs during the then extreme drought of 2006.[26] Though headquartered in Omaha, Nebraska, this company recently opened a local office in San Antonio, Texas.

Retail vs. Wholesale and Short-term vs. Long-term

There are really two types of markets in water rights: the retail and the wholesale. In the retail sense, some folks that have owned or acquired water rights have turned around and sold small parcels in half to several acre-feet increments either for individual homes or small businesses. These retail transactions have commanded a higher price, up to $6,250 per acre-foot, either because the need is so great and/or the cost can be amortized as part of the bigger building project. From the seller's standpoint, this retail transaction is paperwork intensive and therefore requires a higher price.

The water rights that are traded in the wholesale market are not quite as expensive. It is difficult to determine how big a transaction has to be to reach the wholesale level with a reduced price. SAWS has a minimum transaction size of 20 acre-

[25] http://www.tpj.org/watchyourassets/aquifer/index.html as of August 2, 2007

[26] San Antonio Express-News, "Forget gold, double your pleasure (and money) by buying H_2O rights," Roddy Stinson, February 20, 2007.

feet in order to limit transactional costs and to avoid paying any premium for small pieces of otherwise "retail" water rights.

A Farmer's Perspective

SAWS has heard for years from various irrigators that when the time came to sell, SAWS would be the first to get the call. On several occasions, the irrigator has specifically commented to SAWS that when earnest money contracts are signed or at closing that a local purveyor is the right party to deal with. However, most irrigators have exercised economic common sense and gone after the highest price which is usually that offered by the speculators.

The "Pipeline"

The EAA statute has a specific prohibition against removing Edwards groundwater from either Medina or Uvalde County via a pipeline.[27] This prohibition is credited as a defensive move during the legislative process in 1993 when a San Antonio party commented that "we [San Antonio users] will just come out there and pump Uvalde dry." However, now that the permits are essentially issued, there is an effort to remove the pipeline prohibition.

The Edwards aquifer, both by statute and geologically, has two distinct "pools:" the Uvalde Pool and the San Antonio Pool. The pools are connected by a series of barrier faults known as the "Knippa Gap." The gap is believed to back up aquifer flow creating a water level that is 200 feet higher in the Uvalde Pool. Also, aquifer levels are generally more constant in the Uvalde Pool compared to those in the San Antonio Pool and different drought rules govern each of the pools. Generally, the drought rules required permit holders to increasingly reduce pumping as the aquifer drops to lower levels. Applying the current drought rules triggers for the Uvalde Pool to the historical well level indicate that only in 1958 would pumping have been curtailed by the rules. 1958 was a recovery year after the area's worst recorded seven (7) year drought and a time of limited pumping in Uvalde; wells were being drilled in response to the drought and dryland farms being converted to irrigated farms.

[27] EAA statue, Section 1.28(2) "The authority may not allow for any person to construct, acquire, or own facilities for transporting groundwater out of Uvalde County or Medina County".

Several western irrigators have been promoting development of a pipeline over the last couple of years. They argue that the pipeline, though costly to install, would operate at a small cost since the elevation in Uvalde County is several hundred feet above that in San Antonio. SAWS also has a shortage of supply in western Bexar County that could be alleviated by pipeline delivery to the area. SAWS would be able to pump almost continuously and without curtailment since the Uvalde County pumping would rarely if ever be restricted by drought rules.

The remaining ingredient necessary to make the pipeline viable is a large volume of water rights to be delivered, maybe in the range of 40,000 acre-feet. Irrigators in Uvalde have engaged SAWS in discussion of long-term, 30 year, leases with some type of escalator that brings the lease payment over $800 per acre-foot near the end of the term. Ownership of water rights will continue to be consolidated in anticipation of a pipeline project; however, the use of such rights will probably be restricted to short term leases while the pipeline is uncertain.

Another potential source of water for the pipeline is the "base irrigation" water. The base water is currently restricted to use on the property on which the irrigation rights derive or transferable to other irrigated property via lease of ten (10) years or less. Typically, leases for transferred base water rights are only $25 per acre-foot per year. The legislative purpose of preserving the base water was to preserve some water rights for agriculture alone. Use of the base water for other purposes would also require a legislative change; the lobbying began as soon as Texas' last legislative session ended in June 2007. Some have noted that the EAA board has conflicting goals of "preserving the aquifer for public good and protecting the interests of those who own the right to the aquifer's water."[28] Permit holders that are not irrigating would find it very appealing to have their base water legally made available for municipal or industrial uses, particularly given the current high value of transferable rights.

[28] http://www.tpj.org/watchyourassets/aquifer/index.html as of August 2, 2007

SAWS Re-entry into the Purchase Market

SAWS current water plan[29], 2005 Water Resource Plan Update, adopted in August 2005 identifies a need to acquire up to 35,000 additional acre-feet of Edwards groundwater rights. This same plan also dropped another water supply project, known as the Lower Guadalupe River Authority project that was anticipated to provide 94,500 acre-feet. SAWS' plan sent a signal to the market that prices should increase. Prior to adoption of the plan, SAWS' consultants had warned in March 2005 that an aggressive campaign to quickly purchase a large volume of water could cause the price to rise to at least $3,000 per acre-foot. At that time water rights would have been selling for under $2,000 per acre-foot.

However, in July 2006, SAWS established a bid process for the purchase of Edwards Aquifer groundwater rights with a series of three bid openings. All permit holders were sent a postcard advertising the bid process and three public meetings were conducted to explain the process to interested permit holders. Bidders submitted a signed Purchase Agreement identifying the permit, the acre-feet to be sold, and the selling price.

By August 21, 2006, the date of the first round bid opening, SAWS received only three bids. Offering prices ranged from $5,275 to $20,000 per acre-foot. SAWS staff recommended that the lowest two bids be accepted; however, the SAWS board tabled the item so all offers expired. Furthermore, the SAWS board directed that there be but only one additional bid opening. The staff recommendation and the initial bids received some media coverage in a newspaper article.[30]

The final bid opening was October 20, 2006 in which SAWS received 24 bids ranging in price from $4,895 to $7,500 per acre-foot. Staff recommended acceptance of 14 bids totaling 2,481 acre-feet at an average price of $5,383 per acre-foot. All bids were emphatically rejected as being too high.[31]

SAWS then approached all bidders and asked if they were interested in an individually negotiated purchase at $5,000 per acre-foot. In 2007, SAWS closed on ten

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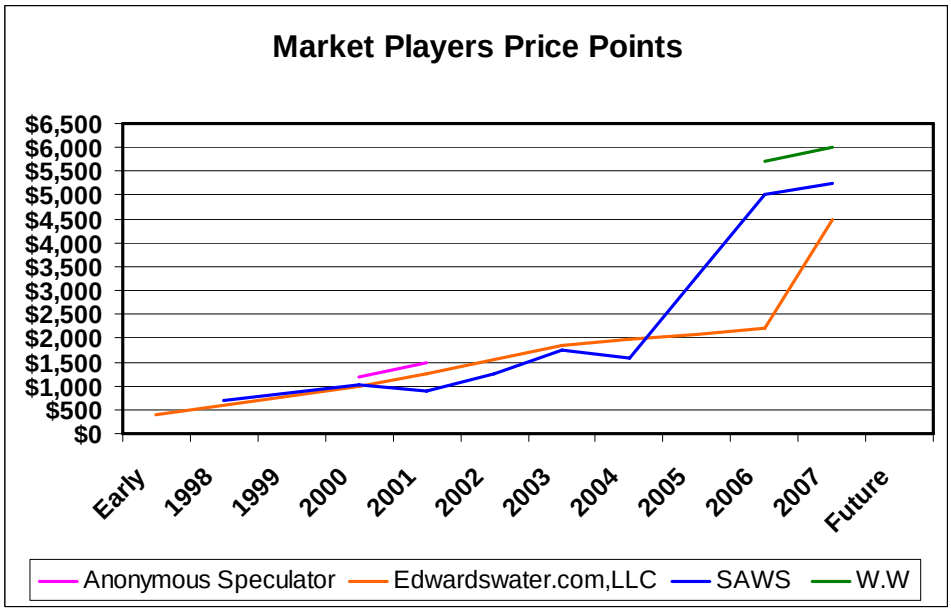
[29] http://saws.org/our_water/waterresources/waterresourceplan/WaterResourcePlanUpdate20050621.pdf as of August 1, 2007

[30] *San Antonio Express-News*, SAWS Plans to Buy Pumping Rights for Aquifer Water, September 1, 2006, by Jerry Needham

[31] *San Antonio Express-News*, SAWS Rejects Water Bids as too Pricy, November 8, 2006, by Jerry Needham

purchases of Edwards groundwater rights for a total of 953.312 acre-feet. The first eight transactions all occurred at $5,000 per acre-foot; however, the last two were purchased at $5,250 per acre-foot. Half of the water rights purchased were already under lease to SAWS while the other half were in addition to SAWS' permanent water rights inventory.

The graph below depicts purchase prices over the last decade in what might appear to be rising in an exponential manner. SAWS has entered and exited the purchase market sporadically. In 2006, when SAWS began talking about accepting $5,000 per acre-foot, the speculators started screaming that SAWS was "killing" the market. Granted there is not much room to make much money if a resale requires a mark-up in price and the lease rates, as discussed below, are relatively low. Prices may automatically escalate when SAWS enters the market. SAWS' best strategy may be to be constantly available to pick up chunks of water rights as they become available by continuously making deals and advertising its interest in purchasing.



Impact on the Lease Market

As one market observer has noted, "almost all water markets are idiosyncratic" because there are a small number of participants, delivery of water may be problematic,

and it operates between uniquely positioned sellers and buyers.[32] Edwardswater.com, the Uvalde speculator, has done a good job of educating the irrigation permit holders. When purchase prices began to exceed $5,000 per acre-foot, the irrigators began to say that lease prices were undervalued. Lease prices should really be $250 per year, they argue, since the present value of a lease rate, given a perpetual term and a 5% discount rate, was equivalent to the $5,000 purchase price.[33] Furthermore, irrigators could be well-versed on the delivery cost of SAWS water alternatives. After Edwards groundwater rights, SAWS next-cheapest source, Carrizo aquifer groundwater, can be delivered at $847 per acre-foot annually.[34]

The second largest water purveyor, Bexar Met, did sign a lease for a sizable amount of Edwards groundwater rights in March 2006 at an initial rate of $125 per acre-foot. This lease rate is subject to an escalator over the course of the lease. SAWS would offer a lease rate of $170 per acre-foot in the last five years of a 15-year lease; however, SAWS has not been able to confirm any higher lease price. Yet lease prices of as high as $250 per acre-foot annually are reported in the media.[35]

Year	Leased Water Rights in acre-feet
2008	19,401.830
2009	10,991.380
2010	7,777.480
2011	5,648.480
20l12	4,231.590
2013	3,396.600
2014	2,350.200
2015	2,150.200
2016	231.300
2017	231.300

[32] Water Markets, Demand, Supply and Value, presented by Paul Bousquet at the Witte Museum 2006 Conference on the Edwards Aquifer, convened April 4, 2006.
[33] Water Markets, Demand, Supply and Value, presented by Bob Willoughby at the Witte Museum 2006 Conference on the Edwards Aquifer, convened April 4, 2006.
[34] Ibid.
[35] San Antonio Express-News, Water as Collateral? By Travis E. Poling, web posted July 17, 2007 at http://www.mysanantonio.com/business/stories/MYSA071807.RedLoans.22bceef.html

SAWS' lease inventory is listed in the above table. SAWS still has a lot of leasing to do if the intent is to maintain a lease inventory sufficient to meet demands and provide for transition as SAWS continues to purchase such rights. SAWS' current leases contain a "right of first refusal" (RFR) which allows SAWS to meet the terms of any purchase offer by another party. One water rights seller offered SAWS a chance to purchase just because they were under a RFR. This clause allows SAWS to have a chance to actually purchase water rights or, if declining to purchase the rights, at least hear the details of bona fide offers. An RFR does not preclude a sale, but does require that the new owner of the rights honor the terms of the lease.

Lessors appear hesitant to lease for what they consider a "long time" when purchase prices are escalating so rapidly. SAWS is hearing regular requests for 3-year leases. Yet SAWS may be getting sales because the water rights are already under lease. At such high sale prices, speculators are not inclined to buy water rights and have to honor a lease for several years at a rate of only $80 per year since the initial rate of return is so low. Thus, just getting more water rights under lease may dissuade a future sale to anyone other than SAWS.

BLINDS & HOLE CARDS DEBATE

In this section, some of the remaining "wild cards" concerning market forces and their impact on Edwards permitted groundwater rights are presented.

The Endangered Species Act (ESA) Dynamics

When considering the Edwards aquifer water market activities one has to be aware of the history and current status involving the ESA. The complex interactions at minimum directly encompass eight endangered species and provide the backdrop for many items that have shaped the Edwards water rights market. Potentially without the endangered species issue groundwater rights permits would still be managed under "right of capture" and not permitted as they are today. The Edwards Aquifer Authority (EAA) act from the early 90's to present has continually evolved in order to provide a balanced solution in order seek Incidental Take (IT) provisions to cover its users, while providing adequate assurances for the long-term survival of species of concern. The challenge

today is a collaborative effort that protects species, honors water rights, and meets the protective requirements of the Department of Interiors' United States Fish & Wildlife Service agency.

The count for federally listed endangered and threatened species in the State of Texas is 107 as of July 2007. The eight species of primary concern with regards to the spring ecosystems at Comal and San Marcos springs are as follows:

Phylum	Family	Genus	Common Name	Federal Status
Anthophyta	Gramineae	*Zizania texana*	Texas wild rice	E
Arthropoda	Crangonyctidae	*Stygobromus pecki*	Peck's cave amphipod	E
Arthropoda	Dryopidae	*Stygoparnus comalensis*	Comal Springs dryopid beetle	E
Arthropoda	Elmidae	*Heterelmis comalensis*	Comal Springs riffle beetle	E
Chordata	Percidae	*Etheostoma fonticola*	Fountain darter	E
Chordata	Plethodontidae	*Eurycea nana*	San Marcos salamander	T
Chordata	Plethodontidae	*Typhlomolge rathbuni*	Texas Blind salamander	E
Chordata	Poeciliidae	*Gambousia georgia*	San Marcos gambusia	E

[U.S. Fish & Wildlife Service (2007). E, Endangered; T, Threatened

As in the beginning any permitted groundwater rights user and exempt status well owner (Exempt is defined by the EAA as registered domestic & livestock operations using $\leq$ 25 acre-feet/yr and federal facilities including Military operations) shares in the responsibility created with regards to the ESA. Regional entities have recognized a need for protection of what is potentially the world's most biologically diverse freshwater subterranean ecosystem[36] and continue to work towards maximally feasible protections.

SAWS is a committed participant in the solution to providing for the appropriate protections both financially and in planning with regards to water resource assets produced from the Edwards aquifer. SAWS believes an equitable sharing of this responsibility should be borne by all the owners of pumping rights and potentially with downstream interests to the extent hydrologic connections are scientifically established. With the issuance of final permits no longer is pumping the single greatest eminent threat to the springs and species. The occurrence of a longer term severe drought or a local water quality incident might be the greatest risk looming today. SAWS is fully aware of these risks and continues to participate in a short term acquisitions market with the belief that it is best equipped to manage these permitted groundwater rights now and in the future.

[36] Stream and Aquifer Biology of South-Central Texas – A Literature Review, 1973-1997, by Robert T. Ourso & C. Evan Hornig, USGS Report 99-243, 1999, pg 12.

Water Resources Development

SAWS Water Resources Planning is a dynamic process that is documented in a 50 year rolling plan that includes a mixture of projects and programs to lessen dependency on the Edwards Aquifer. Timing is a crucial component to bringing on supplies as growth occurs and demand necessitates alternative supplies. Some of the plan's highlights are:

- A nationally recognized conservation program that brought per capita usage numbers down from 225 gpcd to 132 gpcd has consistently bought water resources planning time.
- During that time, alternative groundwater from the Trinity Aquifer was brought on in February 2002, showing SAWS ability to develop sources in its own "backyard" before looking regionally.
- Another strategy of management was the development of the nation's second largest Aquifer Storage & Recovery (ASR) facility. The variable nature of the regions hydrologic conditions and past aversions to surface water reservoirs made ASR technology a great compromise. In October 2004, SAWS began to store Edwards water under its existing permitted rights in the Carrizo-Wilcox aquifer of South Bexar county, a sand aquifer that can hold a great deal of water. An extended drought that occurred from the winter of 2004 and did not break until the spring of 2007 exhibited how important this strategy was since SAWS demonstrated it can mitigate against severe peak dependency on the Edwards Aquifer.
- Currently, developing groundwater in neighboring Gonzales county, surface water from the Colorado River Basin and implementing "brackish" groundwater desalination are projects keeping SAWS busy. However, as demand and development necessitates SAWS is preparing plans that could eventually incorporate coastal desalination as part of the mix.

SAWS activities and that of the state/regional planning efforts along with a host of activities revolving around water have implications on the response of the water

market. SAWS has made a strong commitment to regional balance and understands that it has a lead role in the direction of South Central Texas' water planning future.

Conclusion – "Can We Have It All?"

"Raise" the stakes in that water rights emanating from the Edwards Aquifer will continue to be a cornerstone water supply for various regional users. The percentages of ownership may change over time between user groups; however, healthy mixtures of use that honors regional economic forces and provides a market environment with more certainty are steps in the right direction. It may be too soon for "counting the money," since SAWS is "still at the table" and relatively speaking operating in a young market. However, persistence and taking responsibility for our natural resources along with technological progress or fixes and best management practices we are experiencing tell us: "Yes we can have it all but we will have to embrace change."

Special Thanks

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