7-20-2004

Water Markets Features for Rio Grande Water in El Paso County Texas

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This is the abstract of a presentation given on Tuesday, 20 July 2004, in session 7 of the UCOWR conference.

“Water Markets Features for Rio Grande Water in El Paso County Texas”

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Abstract:

The El Paso Water Utility (EPWU) entered into its first contract for purchasing water from the El Paso County Water Improvement (Irrigation) District #1 (EPCWID) in 1941. This contract was the first of four water agreements that transfer water from the U.S. Bureau of Reclamation's Rio Grande Project into municipal use. Under the Rio Grande Project, water was developed in accordance with the 1939 Rio Grande Compact for irrigation use by Elephant Butte Irrigation District (**EBID**) in New Mexico and the El Paso County Water Improvement District #1 (**EPCWID#1**) in El Paso County, Texas. Transfer of agricultural water into municipal use has continued to the point where EPWU now purchases and leases in excess of 50,000 acre feet of water during an "average" water year. The purchase price varies from $15 per acre-foot for "early contract water" to a current contract price close to $200 per acre foot/per yea and rising. Negotiations over the most recent contract were difficult and lawsuits have resulted. EPWU is currently designing a 27.5 million gallon per day desalination facility to augment its ground water production capabilities. The new desalination plant will make use of the Hueco Bolson aquifer that is gradually being depleted and turning brackish simultaneously. As part of EPWU's comprehensive plan, Rio Grande water will serve as a renewable resource base to meet future demands. El Paso is a city of 700,000 residents that is projected to double in population in less than 50 years. Water demand is projected to be in excess of 200,000 acre-feet per year in 2050. Since EPCWID controls Rio Grande Project water in Texas, the two entities must find a mutually beneficial solution.

This paper reviews the contract history, water pricing, and water deliveries by both the EPWU and EPCWID over the last 55 years and presents future choices. The potential for a water market is evaluated and boundaries for water values are established using the costs of developing water from desalination and the costs of importing mined groundwater from remote Texas aquifers

Introduction:
It has been said that 'water is the wealth of the west'. If it has been so in the past, it will be more so in the future. In El Paso County, Texas, New Mexico and the Mexican state Chihuahua meet in a harsh desert under the slopes of the Franklin Mountains on the Rio Grande. Shielded by mountains on three sides, this semi arid region is blessed by more than 200 days of sunshine annually and receives an average of 8 inches of rain annually.

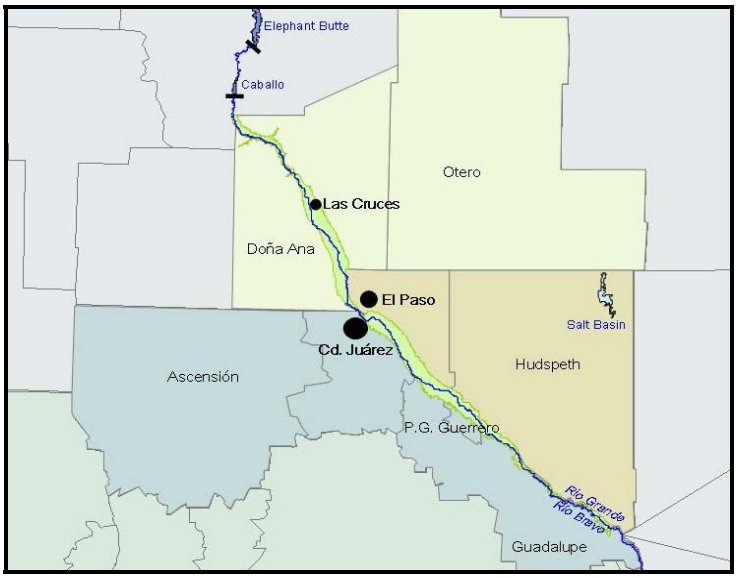


Figure 1 El Paso, TX
(Source: Edd Hamlyn, CERM at UTEP, 2004)

El Paso is facing two major challenges. First, El Paso's population is increasing rapidly and second, the fresh water portion of the Hueco Bolson is being depleted. The city of El Paso has grown by 10 % and the county has grown by 15 % in last 10 years. It is estimated that, the county of El Paso will reach 850,000 by 2020 and 1.5 million by 2050. Figure 2 shows the county's population for last 50 years and population projection for next 50 years. El Paso receives water from 2 sources, 1) Ground water from Hueco and Mesilla aquifers and 2) Surface water from the Rio Grande from El Paso County Water Improvement District #1 (EPCWID#1). EPCWID#1 transfers water through four separate surface water agreements. Previous studies have shown that the Hueco aquifer recharge rate is only four to five percent of the annual withdrawal rate. Therefore, securing a larger share of Rio Grande surface water supply is the most obvious choice. To understand the challenges faced in acquiring Rio Grande water the history of the 1906 Mexican Water Treaty and the Rio Grande Project must be reviewed.

The Mexican Treaty and the Rio Grande Project:
The Rio Grande River is an interstate and an international stream. It rises in Colorado and flows southward for more than 400 miles across New Mexico. After leaving New Mexico, it forms the boundary between United States and the Republic of Mexico for about 800 miles. The majority of Rio Grande water is used for irrigation in Colorado, New Mexico, West Texas and, finally in Mexico. In the1890s, extensive settlement and irrigation development occurred in Colorado and New Mexico, West Texas and, finally in Mexico. In the1890s, extensive settlement and irrigation development occurred in Colorado and New Mexico. This led to water shortages downstream in the Republic of Mexico and the U.S in the El Paso/Ciudad Juarez region. The

Mexican farmers complained to the Mexican Government about the water shortages and eventually Mexican Government to the U.S. Government. In 1906, a treaty was formed between the Republic of Mexico and the United States Department of Interior. The U. S. guaranteed an annual delivery of 60,000 acre-feet of water at the head of International Dam in El Paso, TX. To meet deliveries under the Mexican Water Treaty and to develop water reclamation project in the Elephant Butte- Fort Quitman section, the United States Bureau of Reclamation decided to build a dam at the Elephant Butte reservoir to meet all the water requirements. That was the beginning of the Rio Grande Project, the project received attention for two reasons, first, it was the first reclamation project after the passing of the "Reclamation Act-1902", and second, the Elephant Butte Dam was the biggest man made structure in the U. S. Figure 3 shows the Rio Grande project area. The Rio Grande Project furnishes irrigation for about 178,000 acres of land out of which 60 % is in New Mexico and 40 % in West Texas.

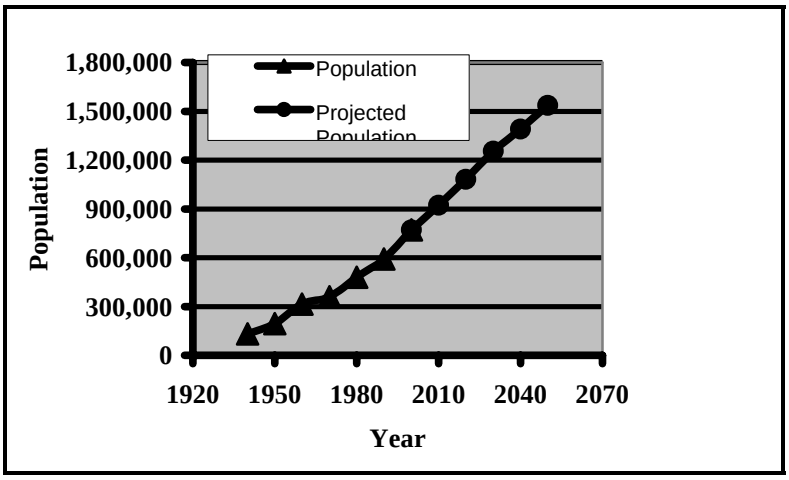


Figure 2 El Paso, TX, Population data for last 60 years and population projection for next 50 years

(Source: Edd Hamlyn, CERM at UTEP and Texas Water Development Board (TWDB))

Rio Grande Project Water Distribution:

The Rio Grande Project water is distributed to two irrigation districts and Republic of Mexico's 009 Irrigation District by the U.S. Bureau of Reclamation. These water agencies are, Elephant Butte Irrigation District (EBID), the larger one, and the El Paso County Water Improvement District #1 (EPCWID#1). The Bureau of Reclamation carefully calculates, allocates, and releases the water allotment each year from the Elephant Butte dam. The allocations may vary significantly during drought and high run off years. As the water is released from the Elephant Butte dam, each district co-operatively determines the allotment and receives the water allotment for that respective year.

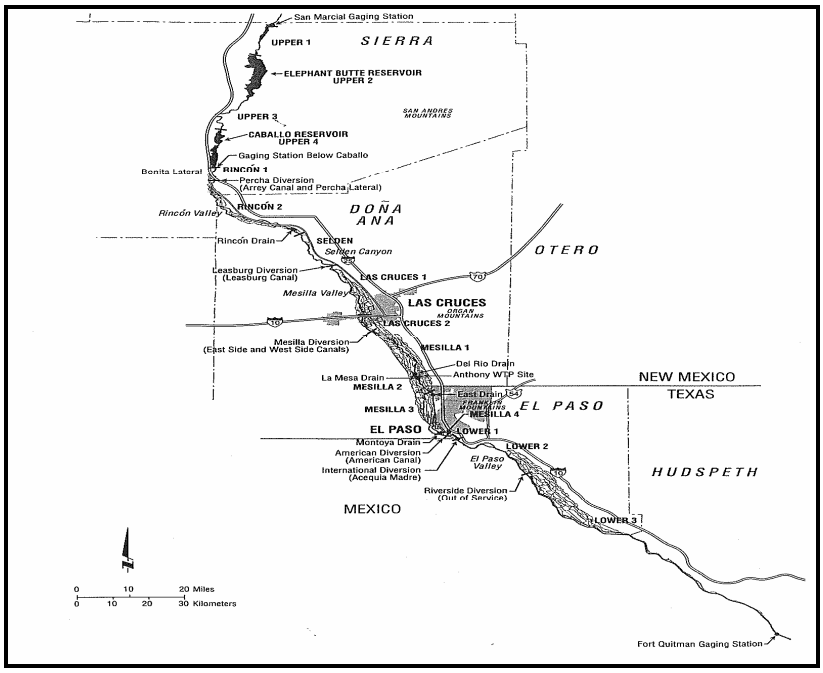


Figure 3 The Rio Grande Project
(Source: U.S.B.R., 2003)

El Paso Water Utilities and Public Service Board (EPWU/PSB) and Surface water transfer contracts:

El Paso Water Utilities (EPWU) is the major water utility company in the County of El Paso, under the guidance of Public Service Board (PSB); EPWU operates and maintains the water and waste water systems for the County of El Paso. The EPWU entered into negotiations with the EPCWID#1 in the early 40's and currently purchases water under four separate contracts. These contracts authorize the EPCWID#1 to transfer irrigation water received by the "Qualified Landowner" having "First Class Water Rights" under the Rio Grande Project to EPWU. The summary and main features of these contracts are described in Tale 1 below:
As seen from the Table 1, the earliest water contract allowed the EPCWID#1 sell for only 2000 acres of water rights. The EPWU built its first water treatment plant in 1941. Consequently, as the years past, the city's population was rising and EPWU needed additional surface water to fulfill water demand for its customers. EPWU entered into second contract with EPCWID#1in 1967, which allowed the EPWU to lease unlimited amount of water rights for specific years. To treat that additional water, the EPWU built an extension of the surface water treatment plant in 1967. Today, these two plants are called as the "Canal Street WTP" and treat about 40 MGD water for EPWU. In mid 80's with the rising population, ground water sources for EPWU were depleting, EPWU wanted additional water and because of that EPWU entered into third contract with EPCWID#1. This contract was not authorized by U.S.B.R. and only few terms were amended. In 2000, the EPWU entered into 4th contract with EPCWID#1 for additional bulk water. The prices of the water increased from $15.00 from previous contract to $194.00 and rising to the latest contract. EPWU managed to secure maximum of 28,116 acre-feet of water annually. To treat this additional water, EPWU built the second water treatment plant, known as the " Jonathan Rogers WTP".

Table 1 Summary of the Contracts

Contract Year	Authorized Land Acquisition or Leasing or Water Purchase by EPWU	Maximum Annual Delivery Allocations	Main Features
1941	**Purchase of** 2000 **Acres of water rights land**	3.5 **acre-feet/acre**	- **The acquisition Water rights will be from "Qualified Land owner" only** - **City will provide diversion facilities at suitable locations** - **The quantity of water rights land will not exceed** 2000 **acres** - **The annual delivery allocations will not exceed** 3.5 **acre-feet /acre**
1962	**Leasing of Unlimited Acreage for the period of** 25 **years**	3.5 **acre-feet/acre**	- **City will obtain tracts of water rights land from qualified land owner** - **The tracts will not be more than** 2 **acres in single ownership and must be inside the city limits, except as authorized by the district on case by case basis** - **Obtaining tracts will be sole responsibility of the city** - **City agreed to pay all taxes for the water rights land leased on behalf of qualified land owner**
1991	**Unlimited Acreage of land can be leased for the period of** 75 **years**	3.5 **acre-feet/acre**	- **Features similar to the 1962 contract** - **Never signed by USBR, only EPWU, EPCWID#1 and mayor of City of El Paso signed the contract** - **Additional** 1000 **acres purchasing** - **Leasing limit increased from** 25 **years to** 75 **years**
2000 (Third Party)	➢ 11,000 **feet of water purchased in 2001** ➢ 8,000 **Acre-feet of water pre-purchased for future city use** ➢ **Up to** 28,116 **Acre-feet of water made available for purchase annually from 2002**	**Maximum** 28,116 **Acre-feet of water available for sale, acreage can be changed according to the annual district allocation**	- 11,000 **acre-feet of water was purchased in 2001** - **In addition to** 11,000 **acre-feet of water,** 8000 **acre-feet of water pre-purchased for city's future use** - **In 2002 and beyond, the purchase limit was increased to** 28,116 **Acre-feet, depending upon the annual delivery allocations to city from district** - **City has to deliver not less than** 12,000 **acre-feet of "Usable Sewage Effluent" from Haskell Street WWTP plus additional " Other Usable Sewage Effluent"** - **Prices of majority district water made available under this contract increase from** $ 193.40/ **acre-feet in 2001 to** $ 260.00 **per acre-feet in 2010** - **Federal Government receives 5% of amount paid to the district**

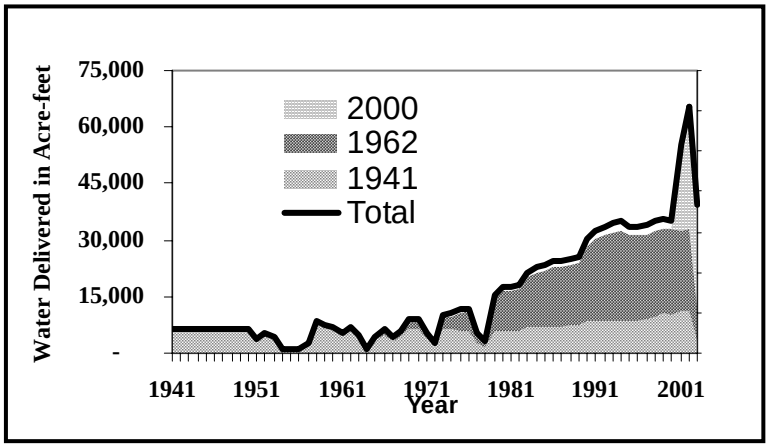
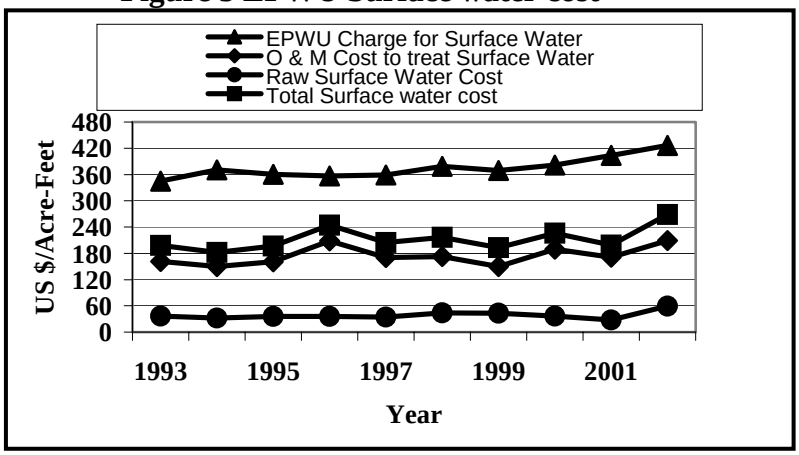


Figure 4 Surface Water Transferred from EPCWID#1 to EPWU

(Fierro, Ed, EPWU, 2003)

Figure 5 EPWU Surface water cost



In recent testimony, Ed Archuleta, General Manager, EPWU, said, "Because, the irrigation district manages and controls the project water, it can create and coordination issues in scheduling the delivery of surface water when it is most needed in El Paso. Despite numerous hurdles, EPWU has maximized the use of Rio Grande Water". For El Paso residents rapidly, rising water bills may well become the norm given the current cost of acquiring surface water from EPCWID#1. As mentioned earlier, recent contract has resulted complications over the water pricing (acre-feet of surface water used to be $15.00 acre-feet with previous contracts, but with recent contracts the price rose to $194.00 acre-feet and will continue to increases to $260 by 2010.

1) Desalination Plant: PSB is planning to construct a desalination plant in a joint project with Fort Bliss. The desalination plant is designed to produce 27.5 mgd of drinking water. The capital cost for construction of desalination plant is $ 60-70 million dollars. This desalination plant will produce about 30,800 acre-feet of drinking water/year.
2) Importation: Importation of water from areas outside El Paso area has been proposed for a number of years, and was considered before the desalination plant. Water Importations out of El Paso includes, water ranches owned by EPWU in Dell City, Van Horn and Antelope Valley. Hunt Building Corporation (HBC) also owns water ranches. HBC has plans to develop water ranches and sell the water back to the EPWU.

3) Additional Surface water rights: As mentioned earlier, recent contract mechanism have resulted complications in surface water transfers and EPWU has came to the point where for additional surface water, it is paying $194.00 acre-feet. Eventually, the EPWU customers have to bear this cost. In the same testimony, Mr. Archuleta, said, "The Conversion of agricultural to municipal water transfer is an issue that EPWU has long continued to promote. Given regions of urban growth and increased water consumption, and decreased farming, it has become necessary to decrease our reliance on ground water and increased surface water consumption". Figure 6 shows the water resources for EPWU and future demand for next 50 years.

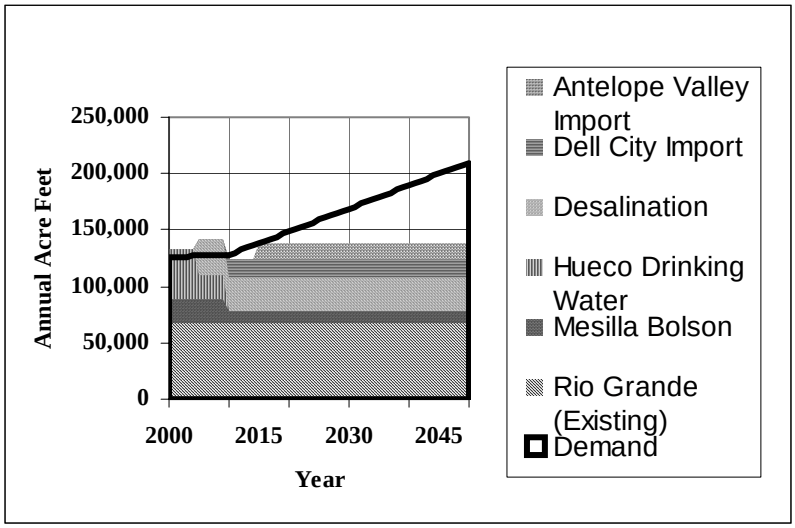


Figure 6 Water Supply and Demand
(Source: Armstrong, J., Brown and Caldwell, 2004)

From Figure 6, it can be concluded that, the water demand is rising and available water sources in the present and in the future will not suffice the water demand for El Paso residents. Acquisition of additional water is the biggest challenge EPWU is facing. Additional water can be made available from irrigation. Figure 7 shows the water demand for El Paso County for next 50 years. Figure describes the irrigation demand as well as the municipal demand. The irrigation demand is decreasing as agricultural land is converted into subdivisions, which leads to increasing municipal demands.

Farmers in many western states are quitting farming business and transferring their water rights to the municipal sectors in exchange for financial compensation. From the Figure 7 it can be concluded that, more water will be available for the municipal sector and the gap between available water resources and the water demand will be minimized. Because of the many institutional barriers, water transfers have complicated process and are serious impediments to future water transfers. Due to these complications, El Paso residents are paying higher water bills. El Paso needs a water transfer mechanism that minimizes institutional barriers in an effort to make the system economically efficient.

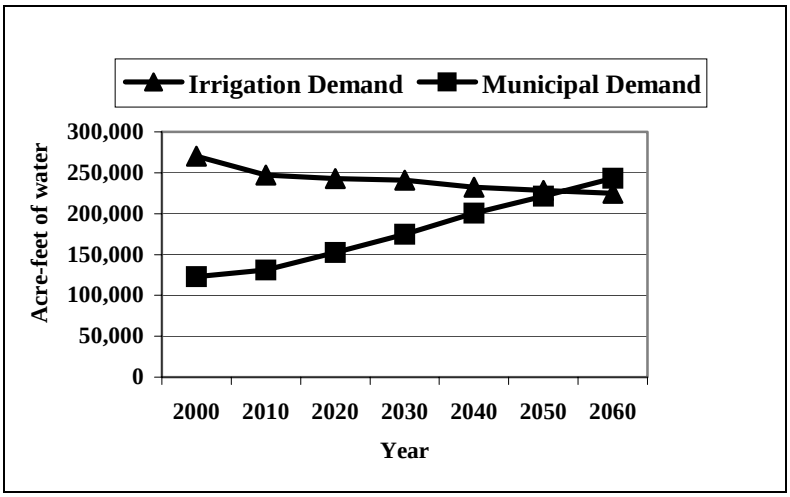


Figure 7 Water Demand of El Paso County over next 50 years
(Source: Texas Water Development Board, 2004 (TWDB))

Differing priorities and physical water systems dictate the type of water transfer that is appropriate. The key in water transfers is to utilize the available water resources and the existing physical system to create a new water resource in less time and with little investment. This is beneficial to the water rights holder as well as to the potential buyer of the water rights. During the course of gathering data for this paper, the following question was asked to EPWU and EPCWID#1, "Is water marketing possible in El Paso?" According to Mr. Angle Colon, Water Accounting Supervisor at EPCWID#1, " water marketing is feasible and EPCWID#1 is the only entity that can start the water marketing". Former EPCWID#1 General Manager, Ed Fifer proposed the program as well. Water marketing will benefit farmers through compensation for their water rights and EPCWID#1 by reducing the cost of acquiring additional water. Water entities like, Hudspeth County Water Improvement District and Lower Valley Water District, which are in the same basin, will also benefit. Potential purchasers could also include the Republic if Mexico after working out technical and institutional issues.

The most obvious water transfer mechanism would be the creation of a water bank for the County of El Paso. Water banking could minimize institutional barriers while being beneficial for both farmers and potential buyers. The water bank can start as the "El Paso County Water Transfer Center (EPCWTC)" managed by a subset of board members from both the EPCWID #1 and the EPWU and a representative of the U.S.B.R. Operational rules could be determined through a mediated process prior to startup. Transactions of the water bank would be administrated through a bank administrator who would follow terms and conditions agreed upon during the mediation process. What follows is a potential scenario for the water transfers.

Administrator: The Executive Administrator of the El Paso County Water Transfer Center

Potential Depositor: A Person having first class water rights in the Rio Grande Project Water will deposit his/her water rights in the water bank for the stipulated amount of time. Filling a completed application form for deposit can make the deposit in the water bank. At the same time, the depositor will obtain a receipt of depositing the water into the water bank. The administrator will notify the potential depositor within 15 calendar days of receiving the application for deposit, if additional information is needed to complete the application. Within 30 days following the receipt, the administrator will notify the Board of Directors of EPCWID#1 and the depositor of the acceptance or refusal of the deposit

Potential Buyer: The Person or entity that is willing to buy the water from the water bank. A potential buyer will register himself or herself with the water bank. In the case of El Paso County, the willing buyers could be, El Paso Water Utilities (EPWU), the Lower Valley Water District (LVWD), the Hudspeth County Water Control & Improvement District, and the El Paso County Water Control and Improvement District #4. Water can also be sold to Republic of Mexico through the International Dam, since City of Juarez, MX is projected to run out of their ground water source (the Hueco Bolson) in the next 5 years.

Possible Scenarios: For water transfers to occur, there are 2 possible scenarios. 1) Water transfers for 1 year and 2) water transfers for 3-5 years. Each scenario has its own advantages and disadvantages.

1. Water Transfers for 1 year: This scenario is advantageous for the farmers, the farmers will be benefited by the water rights compensation regularly if they decide to transfer their water rights every year. If the forecast predicts favorable for irrigation, he/she can always go back to the farming and earn the revenue from the irrigation. A water utility company like EPWU; tries to project its water resources at least 2 years ahead. From that aspect, EPWU may not have an advantage under this scenario. On the other hand, if emergency water has to be created in drought water years, it can be created from 1-year transfers. Some water banks water transfers have shown that, through 1-year water transfers, large quantities of water can be made available for municipal entities in very little time to augment water supplies during drought periods.
2. Water Transfers for 3-5 years: This scenario is ideal for the County of El Paso. Farmers as well as utility companies can mutually benefit from this scenario. The farmers can transfer their water for 3-5 years and receive compensation for their water rights, if they want go back to irrigation, they can do it after 3-5 years. For the utility company like EPWU, it can design its water resource system with 3-5 year water transfers. Water rights are becoming a “commodity”, that commodity every one wants to secure, EPWU as well as the farmers. With 3-5 year water transfers, farmers and the EPWU can have security for the water rights.

Water Banking Process: The water banking process will work on the simple bidding process. Potential buyers and potential sellers will register themselves with the water bank. On specific date, the potential buyers will bid on the available water rights. The potential buyers and the administrator will also be present at the bidding process. In the El Paso County, the potential buyers are small in number compared to the potential sellers. This situation may create some complications in the bidding process. The potential buyers could control the market via limited competition during the bidding process. The potential sellers would have to take the prices bid by the small number of potential buyers. To avoid this situation, a mechanism has to be formed. One solution to this problem is that the administrator will ask the potential sellers for the lowest bid they will accept for their water rights while the potential buyers state the highest price they will pay for the water. With matching the prices, the administrator can allocate the water rights to the respective potential buyers. Figure 8 describes the Institutional structure for water bank in El Paso County, TX.

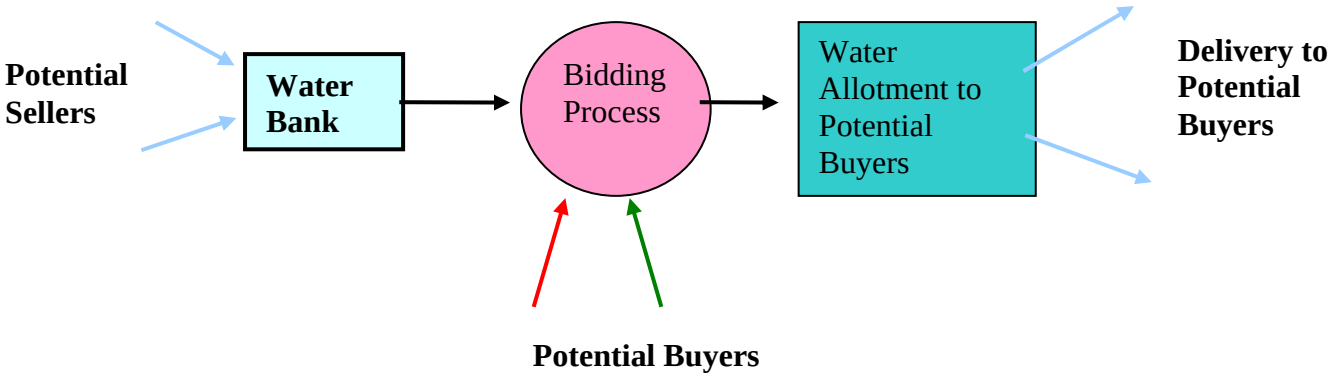


Figure 8 Water Banking Process

With this unique and simple mechanism, free from institutions and complicated contracts, water can be transferred in a timely manner with compensation going directly to the farmer while the buyer minimizes transaction costs. This water marketing system will not only benefit the water rights holder but also the water through efficient access to a renewable resource – the Rio Grande.

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