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The Evolution of Markets for Water Rights and Bulk Water

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Introduction

Markets for water rights have become a staple ingredient of the water management landscape in New Mexico and numerous other western states, including our neighbors, Colorado and Utah. In other western states, most notably California, it is less common to see outright sales and transfers of water rights from one party and use to another. Instead, greater reliance has been placed on contracting for bulk water through major distributors such as the Metropolitan Water District in southern California or bilateral agreements such as the recent one between San Diego County and Imperial Irrigation District.¹ Regardless of whether the water transactions have involved water rights or only the bulk water controlled by entitlements to water, the markets for accomplishing the reallocation task have largely been informal in character with few organized exchanges as frequently exists for other commodities.

In times of drought, California has turned temporarily to an organized exchange for bulk water as it did in 1991 and 1992,² and California is preparing to do so again with its own Department of Water Resources serving as the exchange agent.³ And a quasi-exchange for bulk water has long existed for Colorado Big Thompson (CBT) water in the Northern Colorado Conservancy District above Denver. There, the District facilitates transfers by maintaining a website on which parties may post bids or offers to “rent” water.⁴ The District, however, does not actively serve as a broker or market-maker for CBT water and explicitly disavows any liability associated with the sales process.

In New Mexico there commonly exist one or more brokers, in those basins exhibiting water right sales, to which a party can turn if they wish to buy or sell rights. However, the escalation of prices for water rights in many basins, coupled with the increased difficulty of consummating actual changes in the place or purpose

of use of a right, raises the possibility that organized exchanges for bulk water might facilitate the movement of water among users and uses.

New Mexico briefly opened a window for such exchanges in the Lower Pecos a few years ago,⁵ despite strong opposition, as basically an insurance policy against the possibility that the water right purchase program there might not succeed in achieving compliance with the U.S. Supreme Court decree in *Texas v. New Mexico*⁶ and priorities would have to be administered. Whenever administration of priorities becomes a real possibility, the risk arises that high valued uses of water for municipal and industrial purposes could be trapped holding junior rights which could be curtailed. Although such users have been quite adept at securing sources for water, under an unexpected priority call much scrambling could still occur without any certainty in the short run that all needs will be met.

The Drought Emergency Water Bank in California was generally judged to be a successful short-term response to drought in 1991-2, but there is less assurance that it will be as successful today now that 1) much of the least valuable agricultural water has already been moved to municipal and industrial uses under long-term contracts and 2) agricultural irrigation practices have already become increasingly efficient, with less water available for short-term leases in the face of higher commodity prices.

Longer-term, recent research reveals that irrigators may be significantly more willing to sell bulk water than they are to sell their underlying water entitlements themselves.⁷ The latter activity is a one-time event, irreversible for practical purposes, and doesn't ensure the best price for the bulk water commodity being sold. Consequently, organized water exchanges may have utility on a longer-term basis as well as a short-term response to drought. Organized exchanges which could offer both spot and future contracts for bulk water present attractive instruments for improving the efficiency with which bulk water moves from one use to another.

The third section of this paper explores some of the obstacles to the creation of organized exchanges for bulk water, and the fourth section briefly reports on an initial effort in New Mexico to create such an exchange. The second section below begins, however, with an account of the emergence of informal water markets in

the Middle Rio Grande and Lower Pecos basins. This section emphasizes that the origin of basin water markets rests on the underlying hydrologic and legal conditions which give rise to the utility of markets.

Lower Pecos and Middle Rio Grande Water Rights Markets

Two of the earliest markets for water rights in New Mexico emerged in the Lower Pecos and Middle Rio Grande basins as the result of hydrological conditions and legal/administrative responses to them. In the Lower Pecos, declining water levels in the Roswell Artesian Basin led to the adjudication of water rights, metering of wells and the introduction of conservation measures including the permanent retirement of almost 7,000 acres of irrigated farmland with their appurtenant water rights through market purchases by the Pecos Valley Artesian Conservancy District between 1958 and 1985.⁸ This practice of achieving hydrologic balance through market purchases and retirement of water rights was most recently extended by the New Mexico Interstate Stream Commission to the entire Lower Pecos basin as part of the State's effort to comply with the U.S. Supreme Court decree in *Texas v. New Mexico*.

In the Middle Rio Grande, the combination of drought and the necessity of complying with the Rio Grande Compact led State Engineer Steve Reynolds to declare the Rio Grande ground water basin in 1956 and condition future expansion of ground water pumping by requiring offsets to the eventual effect of that pumping upon the flow of the river. A principal means for obtaining the required offsets became the purchase and retirement of existing rights, chiefly from irrigation. The resulting informal market for water rights has led to a historical pattern of increasing prices for pre-1907 rights, as reported in Table 1 and Figure 1.

The prices reported for the earliest years in Table 1 are either individual prices for particular transactions of which there were not many, or they are interpolations of prices from neighboring years when no direct price data was available. During the 1980s and early 1990s, the constant price of \$1,000 for the right to consume an acre-foot of water per annum reflects the standing offer by the City of Albuquerque which was the principal buyer during that period of time.

Table 1
Middle Rio Grande Water Right Prices
 (dollars per acre foot per annum of consumptive use)

Year	<i>Price (\$)</i>	Year	<i>Price (\$)</i>	Year	<i>Price (\$)</i>
1960	214	1976	786	1992	1000
1961	243	1977	802	1993	1000
1962	276	1978	818	1994	1000
1963	214	1979	833	1995	1617
1964	214	1980	889	1996	2233
1965	267	1981	945	1997	2720
1966	214	1982	1000	1998	2963
1967	214	1983	1000	1999	3689
1968	214	1984	1000	2000	4105
1969	250	1985	1000	2001	4141
1970	252	1986	1000	2002	4577
1971	254	1987	1000	2003	4793
1972	280	1988	1000	2004	5498
1973	500	1989	1000	2005	7815
1974	492	1990	1000	2006	10751
1975	532	1991	1000	2007	18071

Although transactions with prices both above and below \$1,000 occurred during that period, the standing price offered by the City was dominant. By 1995, however, competition for rights had grown to the point that the City could no longer maintain the set price. From that year on, the listed prices are averages of a sample (non-random) of transactions weighted by the size of the transaction. In both basins, as well as others, there have also been sales of bulk water, also known as leases of water rights. But, the focal point of market activity in most New Mexico basins has always been on the sale and change of use for the water rights themselves. The recent fifty year contract between the Jicarilla Apache Nation and the City of Santa Fe for 3,000 acre-feet per annum of San Juan-Chama Project water is a conspicuous exception to this pattern.⁹

The sharp increase in prices paid for Middle Rio Grande water rights since 2004 underscores the potential utility of an organized exchange for bulk water in this basin. There are a number of reasons for the increase, but two are especially pertinent here.¹⁰ First, the number of protests to transfers of water rights has increased and increased the difficulty of obtaining administrative approval for the transfer even though willing buyers and sellers have agreed upon the terms of the sale. Second, the quantity of rights offered for sale has not increased at the same rate as the price of rights. Both of these factors could potentially be alleviated by an organized exchange for bulk water.

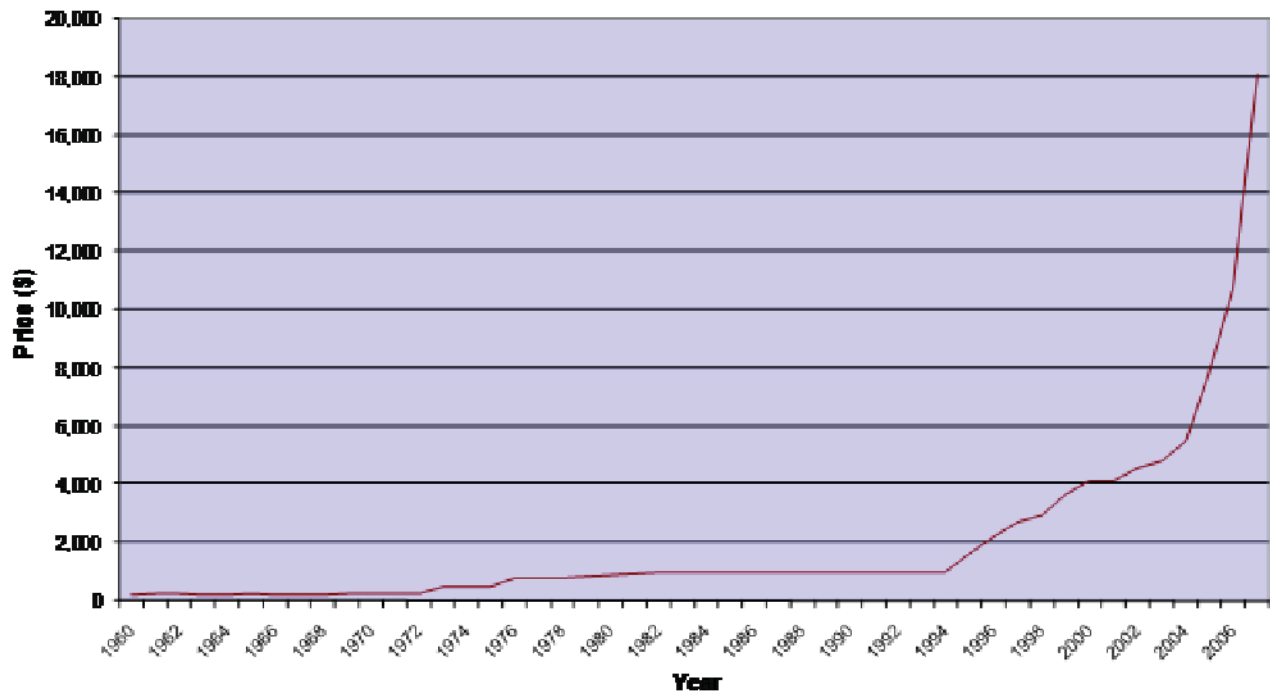


Figure 1. Middle Rio Grande Water Right Prices (dollars per acre foot of consumptive use per annum)

With regard to protests, the permanent change in location or use of a water right is likely to be much more strongly opposed than a single year shift in bulk water withdrawal and use. Moreover, practically speaking, the single year shift offers a learning opportunity for determining if the perceived adverse consequences of a permanent change in location or use of the right will, in fact, be realized. If so, then the necessary adjustments could be made to future sales of bulk water under the same right. With regard to supply, as reported above, current irrigators are more likely to sell bulk water, i.e., effectively leasing their water right, than to part irrevocably with their rights.

Obstacles to the Formation of Organized Exchanges for Bulk Water

Suppose for the moment that active, organized exchanges for bulk water existed through which willing buyers and sellers could readily purchase and sell contracts for the delivery of a fixed quantum of water at a fixed delivery point in a specified current or future year. Moreover, suppose that administratively the State Engineer were willing to recognize a large class of rights to water in a given basin as amenable to the acceptance of short-term leases of those rights under specified conditions without the necessity of further scrutiny by his office due to their short-term nature.¹¹

Then, potential buyers and sellers could make individual decisions about the current and future disposition of bulk water contracts traded on the exchange based upon prevailing market conditions. If for a given year an owner of water rights did not want to exercise the rights for their current purpose of use, the owner would have the option of selling a bulk water contract for that year at the prevailing market price under the administrative conditions specified by the State Engineer. Similarly, a municipality seeking assured access to water for some year or period of years could purchase contracts for the desired bulk water under known conditions while it developed or implemented a longer-term strategy for accommodating change.

At this juncture in the evolution of water markets in New Mexico such a hypothetical exchange obviously does not exist. Moreover, there are numerous obstacles to their formation hidden in the hypothetical suppositions just made. For purposes of discussion, however, many of the obstacles can be identified, and some possible remedies considered. To lend concreteness to the identification task, the Middle Rio Grande basin will be used as a potential locus for the exchange.

1. *Adjudication.* To begin with, there has been no adjudication of water rights in the Middle Rio Grande, which certainly is less than an ideal condition for the creation of a water exchange for bulk water contracts. However, it should be noted that

the basin has managed to reallocate water rights without adjudication, a much more formidable endeavor, for forty-five years or so before current protests have slowed the process. The administrative measures the State Engineer has adopted to allow reallocation to proceed have not been universally popular, but they have been conservative. And, to the extent that previous adjudications or settlements have been precursors to an eventual Middle Rio Grande adjudication, the de facto outcome of previous reallocation transactions approved by the State Engineer have been largely confirmed or expanded rather than reduced.

2. *Homogeneity of contracts.* Depending on what is counted, there may be somewhere between five and ten different types of water rights in the Middle Rio Grande including tribal rights, pre-1907 appropriative rights and San Juan-Chama Project rights. For a water exchange to work, bulk water contracts need to be completely homogeneous if possible and certainly have at most a few distinguishable forms. Otherwise, each transaction inevitably becomes an individually negotiated trade which negates much of the efficiency of the organized market. While rights themselves will likely remain disparate, contracts to deliver one acre-foot of water at a specific location at a specific time could be made much more homogeneous. The Jicarilla-Santa Fe contract specifies a delivery point and time, and bulk contracts for delivery of other water could be standardized as well.
3. *Priorities.* The priority of a given right under which a bulk water contract was sold would have to be made an explicit part of the contract, and buyers would assume the risk that drought or other conditions could prompt priority administration in the year of the contract. Contracts derived from the most senior rights would likely command premium values.
4. *Impairment.* Prevention of impairment requires the existence or construction of a hydrologic model of the pertinent basin that is officially and broadly recognized as the basis for whatever conditions the State Engineer imposes upon the changes in place or purposes of use of bulk water.
5. *Public welfare.* Maintenance and enhancement of the economy of a given basin is perforce conducive to the public welfare. In those basins for which there is a consensus or a preponderance of opinion that other values conflict with economic values,

the formation of organized water exchanges could be excluded.

6. *Conservation of water.* Accurate pricing of the scarcity value of water may be the most important factor ensuring adequate conservation of it. And, organized water exchanges offer efficient institutional mechanisms for establishing and publicizing accurate prices.
7. *Logistics of administration and accountability.* Establishment of a coordinated process for maintaining a smooth relationship between the organized water exchange and the administrative process of the State Engineer is essential to the success of the exchange. Ideally, the State Engineer would specify necessary conditions to which bulk water contracts must conform and then delegate responsibility for compliance with those conditions to the exchange itself. Of course, the exchange would be required to report all trades to the State Engineer and be accountable at all times. Such a delegation of responsibility was contemplated by the draft operating rules established previously for the Lower Pecos water banks.
8. *Enforcement.* Consistent with the above condition, the State Engineer retains ultimate enforcement authority for impairment, public welfare and conservation of water criteria. The exchange assumes legal enforcement responsibility for contracts traded under its supervision.
9. *Public opinion.* Water is often seen by public opinion as different from other natural resources which are traded as commodities in the normal course of business. Obviously, the consent of the public, explicit or implicitly granted, is necessary to the successful formation of organized water exchanges.
10. *Regulation.* As is usually the case with most commodity markets, sufficient public regulation is required to ensure against abuse of the market process.

Current Activity

As noted above, the State of California is re-establishing an emergency drought water bank which will be run by its Department of Water Resources. In New Mexico, researchers at the University of New Mexico¹² have obtained federal funding to research and potentially implement an organized water exchange in the Mimbres Basin. Organized exchanges may be the next evolutionary step in New Mexico water markets.

Endnotes

¹ <http://www.iid.com/Media/IID-and-SDCWA-Amended-Joint-Petition.pdf>

² Morris Israel and Jay R. Lund, "Recent California Water Transfers: Implications for Water Management," *Natural Resources Journal*, Vol. 35, pp. 1-32, Winter, 1995.

³ http://www.water.ca.gov/drought/docs/2009water_bank.pdf

⁴ http://www.ncwcd.org/hot_topic/rentalwater.asp

⁵ <http://www.ose.state.nm.us/doing-business/rules-n-regs/ISC-regs/wb-regs-mcf-12-12-2002.pdf>

⁶ 462 U.S. 554 (1983).

⁷ Ereny Hadjigeorgalis, "Managing Drought through Water Markets: Farmer Preferences in the Rio Grande Basin," *Journal of the American Water Resources Association*, Vol. 44, No. 3, pp-594-805, June, 2008.

⁸ Shomaker, J.W., "How we got here—a brief history of water development in the Pecos Basin," *Water Resources of the Lower Pecos Region, New Mexico*, New Mexico Bureau of Geology and Mineral Resources Decision-Makers Field Conference, 2003, pp. 61-64.

⁹ Water Supply Agreement between the City of Santa Fe and the Jicarilla Apache Nation, September 2, 2004.

¹⁰ For a fuller discussion of the reasons, see F. Lee Brown, "Market Prices as Measures of Scarcity in New Mexico and the West," *Beyond the Year of Water: Living within Our Water Limitations*, Water Resources Research Institute, New Mexico State University, November, 2007.

¹¹ The Office of the State Engineer had actually begun drafting regulations which would effectively allow such temporary changes in use in the Lower Pecos pursuant to the enactment of the water banking legislation in the Lower Pecos, but they were never promulgated.

¹² Professor David Brookshire, Department of Economics, University of New Mexico, is the principal investigator for this research project.