Constraints to Water Transfers in Unadjudicated Basins: The Middle Rio Grande as a Case Study

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Abstract: Water reallocations are contentious under the best of circumstances. When a basin lacks a comprehensive adjudication of water rights, the levels of legal and economic complexity and controversy intensify. This paper evaluates the Middle Rio Grande, a region of New Mexico that would seem an ideal location for water markets as the need to reallocate water between existing uses is high. Due to the lack of an adjudication, and other complicating factors such as the Endangered Species Act, proposed transfers require a complex evaluation system created by the New Mexico Office of the State Engineer. Even with this evaluation system in place, many questions linger about the validity of transfers and their larger impacts.

Keywords: *reallocation, river adjudications, water transfers*

Water transfers are viewed as a voluntary mechanism through which water can be reallocated in semi-arid areas in the southwestern United States. Despite the disproportion of marginal benefits received by various uses in the Middle Rio Grande of New Mexico, transfers are not frequent occurrences. This paper evaluates the process by which transfers are evaluated, and explores the notion that lack of supply of tradable rights constricts water markets.

The Middle Rio Grande is a long, narrow, semi-arid region in New Mexico extending approximately 160 river miles from the outlet of Cochiti Dam in the north to Elephant Butte Reservoir in the south. By most accounts, water in the region is grossly over-allocated, meaning there are far more claims to water than actual water. The basin must deal with significant hydrologic variance; the standard deviation of the Rio Grande's annual flow is nearly half of the mean. Shortages are frequent, and fights between uses are common, even in years of relatively high supply.

In 2003, the Middle Rio Grande Water Assembly drafted a regional Water Plan (MRGWA 2003). The purpose of the plan was to evaluate water use and the water supply of the region. The plan also attempted to quantify the regional water deficit, meaning the amount of water consumed that is over the natural rate of recharge. The water plan

estimates the regional deficit at roughly 55,000 acre-feet annually.

The Middle Rio Grande is a fast-growing region, containing the booming cities of Albuquerque and Rio Rancho. Between 2000 and 2005, the population of Bernalillo County grew 8.6 percent, to 603,562 inhabitants (US Bureau of the Census 2007). This growth is leading to an increase in water demand adding strain to the region's water supply.

The presence of two endangered species has further complicated the water conundrum of the Middle Rio Grande. Therefore, the need to protect these species has created changes in the management of low stream flows. The Rio Grande Silvery Minnow (*Hybognathus amarus*), and the Southwestern Willow Flycatcher (*Empidonax traillii*) are both Federally protected species. These species have specific habitat requirements related to stream flows, and it is possible that transfers could be prevented, or at least delayed, because of species' needs. In *Rio Grande Silvery Minnow v. Keys* (2002), Judge Parker ordered a cessation of diversions from the Rio Grande until minimum stream flows were met at various locations in the Middle Rio Grande. A new Biological Opinion, along with new water operations are in place, but the possibility of water being reallocated from water users to endangered species still exists. At

Table 1. Value of selected crops for the Middle Rio Grande, NM (Niemi 1997).

Crop	Net earnings/ irrigated acre (\$)	Net earnings/ irrigated acre/ac-ft water consumed (\$)
Alfalfa	195	48.75
Pasture	-80	-20.00
Green Chile	385	96.25

this time, individual transfers are not evaluated for their impacts on these species. Larger transfers and the cumulative impacts of transfers are considered by various member entities in the Middle Rio Grande Endangered Species Act Collaborative Program – a Federally-funded multi-jurisdictional governmental organization dedicated to the protection of the species.

Albuquerque and its smaller neighbor Rio Rancho have investigated the use of large water projects, including trans-boundary water reallocations and ground water desalinization, as a mechanism to increase water supplies. Albuquerque has recently completed a surface water project that will allow it to withdraw non-native water from the Rio Grande, water that originates in the Colorado River Basin and is pumped into the basin via a tunnel system under the San Juan Mountains. When flows are adequate, the City can divert up to 94,000 acre-feet annually to meet a portion of its water demand. The city can consume 47,000 acre-feet, and the rest must be returned to the River system at the City's waste water treatment facility (U.S. Bureau of Reclamation 2004). Rio Rancho has explored the use of a deep saline aquifer approximately 2,500 feet below the surface (Clark 2009).

In the absence of additional large water projects, reallocation from existing uses may be necessary to meet the growing water demand. In the Middle Rio Grande, the net earnings per acre-foot of water consumed (Table 1) is significantly lower than a municipality's willingness to pay for that water (Niemi 1997). Empirical evidence in the Middle Rio Grande suggests that reallocation is problematic for myriad reasons, including the lack of information about what rights can be transferred, and resistance to transfers by other water right holders.

Importance of Better-Defined Water Rights

Often a transfer of water has unknown impacts on downstream users, or at least an impact that is difficult to quantify (Hennessy 2004, Matthews 2003, Dellapenna 2000, Gould 1988). According to Gould (1988), a water right should contain the following information:

- a diversionary amount,
- a consumptive amount,
- the point of diversion,
- the purpose of use,
- place of use, and
- the priority date of the right.

Also important, but often omitted from water rights are,

- the time of year during which water can be diverted from a water course, and
- the size and location where return flows re-enter the system.

A change in any of these attributes can negatively impact downstream users. In the Middle Rio Grande, few of these elements are defined – and none have been legally confirmed.

Matlock (2007) estimates less than one-quarter of New Mexico's water rights have been adjudicated. Many western states suffer a similar dilemma – several states, like New Mexico, have, deliberately or not, saved the most contentious river basin adjudications until the end. A full discussion of the utility of adjudications is beyond the scope of this article, but numerous articles have addressed this subject (Ottem 2006, Tarlock 2006). A lack of an adjudication may directly constrain water markets by limiting certainty about the product being purchased, and may increase transaction costs associated with a transfer if it is challenged by a third party. The Middle Rio Grande suffers from a “perfect storm” lacking adjudication of both pueblo and state water rights. What is known is the pueblo rights are senior to state rights, but the quantity of the senior rights is unclear.

The New Mexico Office of the State Engineer (NMOSE) publically states a desire to begin a water rights adjudication of state rights in the Middle Rio Grande, despite recognizing it will cost an estimated \$300 million and will take an

estimated 55 years (Matlock 2007). This raises the questions of “Should we even bother?”, and “what lies in store in the meantime?”

Even if a state adjudication were completed, this process would ignore the issue of quantifying the rights of the six Indian Pueblos in the Middle Rio Grande. An adjudication of a small river system in northern New Mexico was begun in 1966. Although litigation has occurred (*State of New Mexico v. Aamodt* 1976), and despite numerous claims of an imminent settlement, the adjudication has not reached completion. Because the basis of the Pueblo water right is unclear, it is possible only a small percentage of state water rights currently being used would receive water if the pueblos consumed their full allocation. This will not be clear until a settlement or an adjudication of Pueblo rights occurs.

In the context of water transfers and the development of effective water markets, clarifying the extent of water rights has the effect of clarifying what is being purchased. Market efficiency is predicated on, among other things, an assumption of perfect information about what is being purchased. In the Middle Rio Grande, the lack of an adjudication of water rights makes it unclear whether a water right is valid – yet alone likely to receive water in a year of hydrologic shortage.

Institutional Constraints

Several forms of institutional constraints are present in the Middle Rio Grande, further limiting water transfers. First is the Rio Grande Compact (1938) an interstate compact signed by Colorado, New Mexico, and Texas. Whether the Compact fully restricts transfers, or just poses an additional legal battle is unclear (Matthews and Pease 2006), and beyond the scope of this article. The other restriction is more local. Water rights held by the Middle Rio Grande Conservation District cannot be transferred outside the District. The district is narrow and many municipal and industrial uses in the Middle Rio Grande lie outside it. This transfer limitation precludes numerous leasing options.

The Water Transfer Approval Process in the Middle Rio Grande

The challenges in transferring water in an over-

appropriated and unadjudicated basin are high, and there is a continual concern that some of the rights transferred are no longer valid (Gould 1988). This issue is hardly unique to New Mexico. To protect senior water rights holders from this, the NMOSE has created an administrative system designed to deal with water rights transfers until an adjudication occurs.

The NMOSE had used an administration evaluation system for several years, but the New Mexico Legislature provided this power in statute, stating, “the adjudication process is slow, the need for water administration is urgent, compliance with interstate compacts is imperative and the state engineer has authority to administer water allocations in accordance with the water rights priorities recorded or declared or otherwise available to the state engineer” (NM Stat 72-2-9.1).

The State Legislature added, “The State Engineer may determine the elements of a water right for purposed of administration prior to the completion of an Adjudication and during the pendency of a water rights adjudication” (NM Stat 72-2-9.1). The NMOSE created a system called Active Water Resource Management to address water rights evaluations.

In the Middle Rio Grande, this process begins when a proponent files notice with the NMOSE of an intent to transfer (or lease) a water right. The state’s first step is an evaluation of whether a valid water right exists. This is done in two steps. First the right is evaluated to determine whether it existed before March 19th, 1907, the date the New Mexico Water Code was enacted. Water rights perfected before 1907, and only these rights, are considered freely-transferable (Matthews and Pease 2006). In the Middle Rio Grande, this is not as easily accomplished as one might think – this process is explained below. The 2nd portion of the investigation evaluates whether the right is still valid; this is accomplished by using surveys and aerial photographs to determine whether water has continually been applied to a beneficial use.

The determination of whether a pre-1907 water right exists begins by examining a series of maps that were created in 1917 as part of a Rio Grande Drainage Survey. Site-specific data from 1907 is sparse, so the 1917 maps are used as a proxy. If a parcel of land is indicated as having

Figure 1. Evaluation criteria for water right transfers in the Middle Rio Grande. (New Mexico Office of the State Engineer 2001).

been irrigated in 1917, then the Office of the State Engineer (OSE) recognizes a pre-1907 water right for that parcel. If a parcel of land is not indicated as having been irrigated on the 1917 survey, then the individual wishing to claim a valid water right must provide some other form of evidence that the parcel was irrigated during this time period. This is far from an exact science, and leaves the door open for creative arguments. For example, some have argued a parcel of land that was listed as “alkali soil not in production” is evidence of irrigation in previous years. Photographs or other surveys are viewed as acceptable forms of evidence of water use in lieu of inclusion on the 1917 maps. At one time, the NMOSE accepted signed affidavits

as a form of evidence; however, this is no longer considered adequate.

If a right is determined to have been perfected before 1907, then the process moves to its second stage, a determination of whether the right remains valid. Like step one, this second step is riddled with methodological gaps resulting from a lack of data, and is far from either accurate or precise.

In New Mexico a water right is considered forfeited if water is not applied to a beneficial use for four consecutive years. In addition the OSE must notify the right holder that they are at risk of losing their water right and give them a year to put the water to use (NM stat 72-5-28). The process to determine whether a right has been continually

applied to a beneficial use has several steps. After the 1917 survey, the next “data point” the state uses is a 1926-27 Appraisal Sheet. Next, the state determines that a water right is no longer valid if in any two consecutive aerial photographs (1935, 1947, 1955, and 1963) that are examined; the parcel of land is not being irrigated. This procedure is contentious because the aerial photographs do not show consecutive years. Figure 1 outlines the full procedure for evaluating the existence of a valid water right.

Consider an irrigator in the Middle Rio Grande that regularly applies their water to a beneficial use except for the years 1947 and 1955. This irrigator has not allowed a period of four or more years to elapse without having applied their water right to a beneficial use, so their right should remain valid. Because aerial photographs from 1947 and 1955 are used by the OSE to evaluate whether a right has remained active, this right would be declared invalid. There are grounds for an appeal of this decision if the protestant has evidence to the contrary. However, the cost of appealing this decision and the cost of producing evidence of continual use adds significant cost to the transfer process.

Another method a water right holder could use to appeal the NMOSE’s determination that their water right is no longer valid is the lack of notice provided by the NMOSE. NM stat 72-5-28 expressly states that in order for a right to be declared abandoned or forfeited, the NMOSE must provide notice to that right holder. Since the NMOSE did not do so, it is questionable whether it can declare the right extinguished. Several attorneys in the Middle Rio Grande have successfully used this argument to have their client’s right recognized.

Use Limits: The Good, the Bad, and the Ugly

If the right is determined to be valid, the state then utilizes a use limit to create a maximum transferable amount, based on the acres of irrigated land. In the Middle Rio Grande, the credit is 2.1 acre-feet per irrigated acre. In another attempt to increase conservation, the New Mexico legislature passed a law allowing the NMOSE to create region-specific consumptive amounts (New Mexico Register 19.25.13.21 2004). The purpose of this

is to allow the state to place volumetric ‘caps’ on water use on a per-region basis. The NMOSE is in the process of creating these limits for each basin.

Use limits are a controversial tool for water managers. While they can better clarify the volumetric extent of water rights in basins that have not been adjudicated, they are critiqued as a potentially unconstitutional taking (Cobridge 1995). Use limits are not a substitute for an adjudication because more is required in an adjudication than a calculation based on irrigated acreage. However, use limits may provide utility by creating an upper volumetric limit to water rights in unadjudicated basins (Corbridge 1995). This could streamline transfers by creating a maximum consumptive amount that can be transferred (Matthews 2003).

While contentious, without this formula the state would have to determine how much water has been historically used, a near impossible task when one considers the lack of data available about water use at the turn of the 20th Century. The use limit provides a way of streamlining at least one portion of the transfer evaluation process.

If use limits were not present, the state would need to make a determination of historical use based on a variety of factors including:

- Crop grown
- Soil characteristics
- Irrigation method
- Size of delivery ditch
- Evaporation rate of the region

Integrating the above variables into a right, based on the limited available historical data, would be difficult and would lead to at best an approximation of historical water use. In addition to lacking precision, this kind of determination adds cost and time to a transfer application – limiting the cost-effectiveness of transfers. More pointedly, does historical use matter when a modern determination by the state suggests that using modern irrigation techniques, the upper limit of what constitutes a consumptive beneficial use, is lower than this historical amount? The Doctrine of Prior Appropriation has always been based on using only as much water as needed to carry-out a beneficial use (Beck 1991, NM Stat 72-1-2). The Duty of water, the amount needed to carry-out that beneficial use, can change with time (MacDonnell 1999).

Clear as Rio Grande Sediment

To further complicate matters in the Middle Rio Grande, the legality of the NMOSE's use of administrative power under the authority of Active Water Resource Management has been questioned. In *Tri-state Generation and Transmission v. Antonio* (Tri-state) (2007), the NMOSE's power to make water rights determinations was challenged by a power utility on numerous grounds; the most notable was the use of hydrographic surveys for making water right determinations. First, the surveys are not reviewed by the court for their validity, second, these surveys usually only include rights on file with the NMOSE, which, like the 1917 survey, is not a comprehensive catalog of water rights. The third critique of using hydrographic surveys is their lack of a priority date (*Tri-state* 2007).

The issue can be distilled to whether the Office of the State Engineer, in enacting use limits, was engaging in defining property rights, and whether that constitutes an over-reach of powers. The State statute (NM Stat. 72-2-9 amended 2003) made clear the legislature's intent to allow the NMOSE to make determinations of the boundaries of water rights as long as it did not interfere with current or upcoming adjudications (*Tri-state* 2007). However, it was unclear whether the legislature had the authority to grant these powers to the NMOSE. Citing *Pueblo of Isleta v. Tondre* (1913), the Court stated, "Not only have courts considered it the judiciary's exclusive jurisdiction to determine priorities, the State Engineer has been specifically prohibited from undertaking that task" (*Tri-state* 2007).

In ruling for the petitioner, Judge Reynolds stated, "this Court must accept the Petitioner's view that the current authority of the State Engineer for priority administration is as set forth in Section 72-2-9, namely that he can administer priorities from court decrees and licenses issued by him, but that he cannot determine priorities from other sources" (*Tri-state* 2007). This brings into question whether the current laborious process can continue since most of the currently irrigated acres have not been recognized by a court decree, and irrigators have never had to receive a license to use their water.

This case did not directly impact the NMOSE

water rights evaluation process in the Middle Rio Grande, but it does open the door for appeals to any decision of the NMOSE on the grounds that the agency is engaging in rulemaking, an over-extension of its powers (Kerwin 2003). Specifically the Court found fault with the NMOSE's Administrable Water Rights procedure stating, "Taking the Middle Rio Grande as an example, many thousands of water users would be subject to "interim", i.e., indefinite, decisions by the State Engineer prioritizing their rights and cutting off water to those who do not have priority dates earlier than his flexible administration dates..." (*Tri-state* 2007).

Before use limits or other administrative processes can serve as a clarifying force in water rights administration, they must first clear this legal hurdle. The NMOSE is still promulgating new rules for administrative review. It is likely such use of administrative power will be challenged repeatedly in court, potentially creating a quagmire that undermines the utility of this process by adding financial and temporal transaction costs. The NMOSE's use of an administrative process will ultimately hinge on how well it can tip-toe around this constitutional issue until an adjudication or some other form of judicial decree of water rights occurs.

Conclusion

The lack of adjudicated water rights constrains markets by limiting certainty over what is being purchased and by adding complexity and expense to water transfers. In basins lacking adjudicated rights, a system must exist to evaluate each transfer to ensure the right being transferred is valid. The transfer review system in the Middle Rio Grande uses existing information to determine the validity of a right and a use limit to determine the volumetric extent of a right. This process is controversial and fraught with pitfalls, but in absence of a full adjudication, it is the only mechanism in place to allow transfers.

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